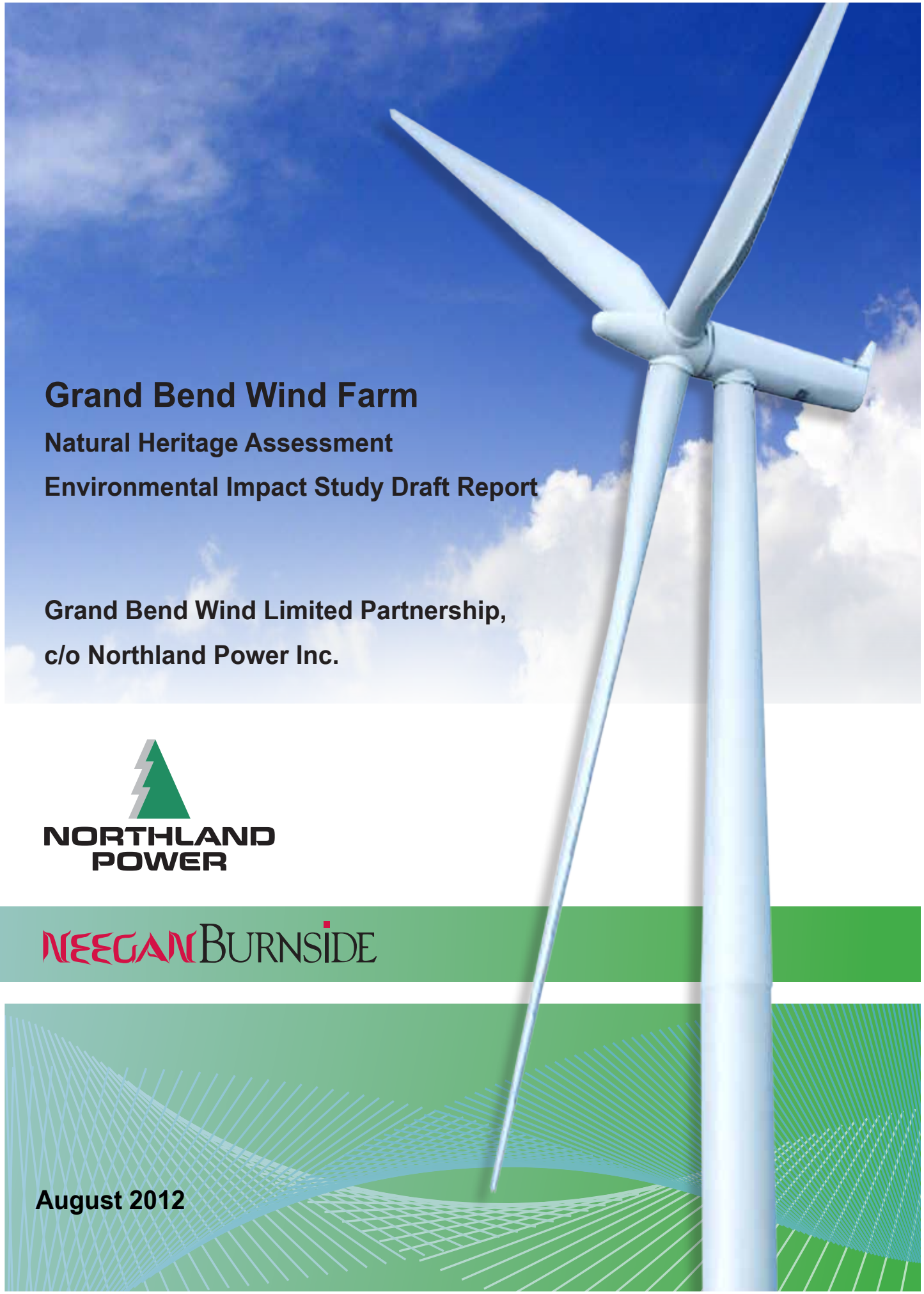

Grand Bend Wind Farm

Natural Heritage Assessment

Environmental Impact Study Draft Report

Grand Bend Wind Limited Partnership,

c/o Northland Power Inc.

NORTHLAND POWER

NEEGAN BURNSIDE

August 2012

Grand Bend Wind Farm
Natural Heritage Assessment
Environmental Impact Study Draft Report

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Prepared for:

Grand Bend Wind Limited Partnership

August 2012

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Record of Revisions

Revision	Date	Description
0	August 14, 2012	Initial Submission to the Ministry of Natural Resources (MNR), Municipalities and First Nations
0	August 27, 2012	Initial Draft Submission to Municipal and Aboriginal Communities as well as Selected Government Agencies

Executive Summary

The Grand Bend Wind Limited Partnership, c/o Northland Power Inc. ("Northland") is proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the Environmental Protection Act. The project is classified as a Class 4 Wind facility under the Regulation. The Grand Bend Wind Farm ("the Project") is located in Huron County, spanning the lower-tier municipalities of Bluewater and Huron South. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County.

The basic project components will include up to 48 turbines (Siemens SWT-2.3-113 direct drive wind turbine generators with a total name plate capacity of 100 MW), turbine access roads, a 36 kV electrical collection system, substation and a new transmission line within municipal road Right-Of-Ways ("ROWs") along Rodgerville Road, Line 17 and Road 183 with connection to the provincial power grid at the 230 kV transmission line south of the Seaforth Transformer Station. During construction temporary components will include access roads and work/storage areas at the turbine locations and transmission connections.

Under O.Reg. 359/09, a Natural Heritage Assessment ("NHA") is a required component of a REA Application for a Class 4 Wind Facility. The NHA is to be completed in four stages as follows:

- Stage 1: Records Review;
- Stage 2: Site Investigation;
- Stage 3: Evaluation of Significance; and,
- Stage 4: Environmental Impact Study.

This report presents the findings of the Stage 4, Environmental Impact Study ("EIS").

Based on the results of the Evaluation of Significance, the features listed in the table below are present within 120 m of the Project Location and meet the criteria for provincial significance or are being treated as significant:

Significant Features or Features Being Treated as Significant

Feature Type	# of Features	Feature Identifiers
Significant Features		
Valleyland	1	V-001
Provincially Significant	2	WE-027, WE-029 (Hay Swamp Complex)

Feature Type	# of Features	Feature Identifiers
Wetlands		
Significant Woodlands	32	W-004, W-012, W-013, W-014, W-020, W-021, W-023, W-026, W-029, W-030, W-031, W-034, W-036, W-037, W-039, W-041, W-042, W-053, W-067, W-079, W-081, W-086, W-088, W-093, W-094, W-099, W-102, W-104, W-118, W-123, W-127, W-128
Turtle Nesting Areas	1	TNA-002
Deer Yarding Areas	2	DYA-001 DYA-002
Amphibian Breeding Habitat (Woodland)	1	ABH-007
Wetlands Treated as Significant		
Wetlands Treated as Provincially Significant	22	WE-001, WE-002, WE-008, WE-010, WE-011, WE-012, WE-013, WE-014, WE-015, WE-016, WE-017, WE-020, WE-022, WE-026, WE-030, WE-031, WE-032, WE-033, WE-034, WE-035, WE-037, WE-038,
Wildlife Habitat Treated as Significant and Requiring Habitat Use Study Prior to Construction		
Bat Maternal Colonies	10	BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010
Turtle Wintering Areas	1	TWA-003
Habitat for Special Concern and Rare Species	13	SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013
Generalized Candidate Significant Wildlife Habitat		
Generalized Candidate Significant Wildlife Habitat	N/A	N/A

The EIS identifies all potential negative environmental effects on the significant natural heritage features as a result of the Project activities.

A number of criteria for each potential negative environmental effect were considered to understand the extent of the effect and to develop appropriate mitigation and monitoring strategies. Key considerations included:

- the magnitude of the effect both in intensity and spatial scale;
- the proximity of the effect in relation to the Project;
- the likelihood of occurrence and reoccurrence of the effect;
- the timing and duration of the effect;
- the permanence or irreversibility of the effect; and,
- the potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.

Mitigation measures were developed to address all potential impacts. Wherever possible, construction, operation and decommissioning scheduling and procedures were developed to avoid occurrence of a potential effect. In cases where avoidance was not possible, an appropriate mitigation strategy was developed to minimize the magnitude, likelihood, duration and permanence of the potential effect. Mitigation strategies were typically developed according to the following approach:

- design project siting to avoid occurrence of the effect;
- develop construction, operation and decommissioning scheduling and procedures to mitigate the effect; and,
- develop rehabilitation measures to restore affected features.

Performance objectives were then developed to provide a benchmark against which to evaluate the success of mitigation strategies. In general, performance objectives are to:

- minimize environmental effects during all phases of the project;
- reduce the environmental effects on natural habitats, flora, and fauna;
- avoid accidents and malfunctions;
- avoid levies or sanctions from the corresponding authorities for negligent environmental performance; and,
- comply with all environmental quality standards set by law.

Some mitigation strategies will require environmental monitoring to ensure proper implementation and confirmation that the effect is adequately mitigated. In some cases where the likelihood of a significant negative environmental effect is low, a monitoring approach has been proposed in lieu of a mitigation strategy. To prepare for an event where environmental monitoring may reveal a negative environmental effect, contingency measures have been developed to achieve the following:

- rehabilitate or correct a negative environmental effect;
- notify the applicable agencies if required; and,
- develop alternative mitigation strategies that could prevent the same negative environmental effect from occurring again.

With the mitigation, performance objectives, monitoring and contingency measures described in this report, it is anticipated that the project will not cause negative environmental effects. Should any unexpected effects occur, they will be identified through ongoing monitoring processes and actions will be undertaken to correct them. As such, the Grand Bend Wind Farm meets all provincial policies and regulations with respect to natural heritage.

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Tables

Appendices

Glossary of Terms

ABH	**Amphibian Breeding Habitat**
BMC	**Bat Maternal Colony**
CSWH	**Candidate Significant Wildlife Habitat**
DYA	**Deer Yarding Area**
EIS	**Environmental Impact Study**
ELC	**Ecological Land Classification**
EOS	**Evaluation of Significance**
GCSWH	**Generalized Candidate Significant Wildlife Habitat**
MNR	**Ministry of Natural Resources**
NHA	**Natural Heritage Assessment**
PSW	**Provincially Significant Wetland**
SCC	**Species of Conservation Concern**
SS	**Seeps and Springs**
SWH	**Significant Wildlife Habitat**
TNA	**Turtle Nesting Habitat**
TWA	**Turtle Wintering Area**

1.0 Introduction

The Grand Bend Wind Limited Partnership, c/o Northland Power Inc. ("Northland") is proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the Environmental Protection Act. The project is classified as a Class 4 Wind facility under the Regulation. The Grand Bend Wind Farm ("the Project") is located in Huron County, spanning the lower-tier municipalities of Bluewater and Huron South. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County. The project location and study area is provided in **Appendix A, Figure 1.**

The basic project components will include up to 48 turbines (Siemens SWT-2.3-113 direct drive wind turbine generators with a total name plate capacity of 100 MW), turbine access roads, a 36 kV electrical collection system, substation and a new transmission line within municipal road Right-Of-Ways ("ROWs") along Rodgerville Road, Line 17 and Road 183 with connection to the provincial power grid at the 230 kV transmission line south of the Seaforth Transformer Station. During construction temporary components will include access roads and work/storage areas at the turbine locations and transmission connections.

Under O.Reg. 359/09, a Natural Heritage Assessment ("NHA") is a required component of a REA Application for a Class 4 Wind Facility. The NHA is to be completed in four stages as follows:

- Stage 1: Records Review;
- Stage 2: Site Investigation;
- Stage 3: Evaluation of Significance; and,
- Stage 4: Environmental Impact Study.

This report presents the findings of the Stage 4, Environmental Impact Study ("EIS") and builds upon the previous Records Review, Site Investigation and Evaluation of Significance ("EOS"). Part V, Section 38 of the REA Regulation requires that an EIS conducted as part of REA be prepared in accordance with the procedures established by MNR. An EIS must assess the construction, installation, use, operation, changing and retiring of the renewable energy facility.

The purpose of the EIS is to:

- Identify and address any potential negative environmental effects that the project may cause to significant or provincially significant natural features, Provincial Parks and Conservation Reserves within 120 m of the Project Location.

Specifically, the EIS must identify:

- Potential negative effects resulting from the project;
- Mitigation measures to be used to minimize environmental effects;
- An Environmental Effects Monitoring Plan ("EEMP"), including:
  - Performance objectives;
  - Mitigation measures planned to achieve performance objectives;
  - Monitoring to ensure that mitigation strategies are meeting objectives; and,
  - Contingency plans should mitigation measures fail to meet objectives.
- Describe how the Construction Plan Report addresses any negative environmental effects.

Additional post-construction monitoring measures are provided in the Environmental Effects Monitoring Plan for Birds and Bats (Neegan Burnside, August 2012). Mitigation measures and the EEMP provided herein are consistent with information provided in the Construction Plan Report and Design and Operations Report.

1.1 Project Location

The proposed Project is located in Huron County, spanning the lower-tier municipalities of Bluewater and South Huron as well as a portion of Huron East and the municipality of West Perth in Perth County. The Project Study Area, shown in **Appendix A, Figure 1** is bounded by:

- The Bluewater Highway (Highway 21) to the west;
- Main Street East/Grand Bend Line to the south;
- Blackbush and Shipka Lines with a small section of the study area in the central section of the project extending to Bronson Line and to the east; and,
- Staffa Road to the north; and,
- Including two potential transmission line routes, as described below.

Two transmission line routing options were originally studied, a northern route and a southern route, as described in the Records Review Report (Neegan Burnside, June, 2012). The northern route was identified as having fewer natural heritage as well as social, aesthetic and technical constraints as was thus selected as the preferred route. This route runs from a transformer sub-station on Lot 14, Concession 13, former Hay Township, and follows Sararas/Rodgerville Road to Line 17 and Road 183, connecting to the existing 230 kV Hydro One transmission line just south of the Seaforth Transformer Station ("TS"). The southern route was discarded as an option and was not studied any further.

O.Reg. 359/09 defines the Project Location as:

> "*a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any air space in which a person in engaging in or proposes to engage in the project.*"

For the purposes of this Project, the Project Location includes the footprint of the facility components, plus any temporary work and storage locations. The boundary of the Project Location is used for defining setback and site investigation distances according to O.Reg. 359/09. The buildable area, which includes the footprint of the facility components, plus any temporary work and storage locations, will be staked on private lands. All construction and installation activities will be conducted within these designated areas; this includes construction vehicles and personnel. Similarly, all installation activities related to transmission lines within the municipal road allowance will be contained within the boundaries of the road allowance.

2.0 Findings of the Evaluation of Significance

Based on the results of the EOS, the features listed in **Table 2.1** and shown on **Figure 2** in **Appendix A** are present within 120 m of the Project Location and meet the criteria for provincial significance or are being treated as significant:

Table 2.1 Significant Features or Features Being Treated as Significant

Feature Type	# of Features	Feature Identifiers
Significant Features		
Valleyland	1	V-001
Provincially Significant Wetlands	2	WE-027, WE-029 (Hay Swamp Complex)
Significant Woodlands	32	W-004, W-012, W-013, W-014, W-020, W-021, W-023, W-026, W-029, W-030, W-031, W-034, W-036, W-037, W-039, W-041, W-042, W-053, W-067, W-079, W-081, W-086, W-088, W-093, W-094, W-099, W-102, W-104, W-118, W-123, W-127, W-128
Turtle Nesting Areas	1	TNA-002
Deer Yarding Areas	2	DYA-001 DYA-002
Amphibian Breeding Habitat (Woodland)	1	ABH-007
Wetlands Treated as Significant		
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Wildlife Habitat Treated as Significant and Requiring Habitat Use Study Prior to Construction		
Bat Maternal Colonies	10	BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010
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Generalized Candidate Significant Wildlife Habitat		
Generalized Candidate Significant Wildlife Habitat	N/A	N/A

3.0 Environmental Impact Study and EEMP Framework

3.1 Potential Negative Environmental Effects

The EIS identifies all potential negative environmental effects on the significant natural heritage features listed in **Table 2.1** as a result of the Project activities listed in **Table 4.1**.

A number of criteria for each potential negative environmental effect were considered to understand the extent of the effect and to develop appropriate mitigation and monitoring strategies. Key considerations included:

- the magnitude of the effect both in intensity and spatial scale;
- the proximity of the effect in relation to the Project;
- the likelihood of occurrence and reoccurrence of the effect;
- the timing and duration of the effect;
- the permanence or irreversibility of the effect; and,
- the potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.

3.2 Mitigation Strategies

The primary mitigation measure employed to reduce impacts to natural features and functions was avoidance. Micro-siting of Project components has been undertaken with consideration of potential impacts to natural features, wildlife and wildlife habitat. The Project is sited predominately within actively cultivated agricultural land with limited natural habitat removal required for the Project.

Wherever possible, construction, operation and decommissioning scheduling and procedures were developed to avoid occurrence of a potential effect. In cases where avoidance was not possible, an appropriate mitigation strategy was developed to minimize the magnitude, likelihood, duration and permanence of the potential effect. Mitigation strategies were typically developed according to the following approach:

- design project siting to avoid occurrence of the effect;
- develop construction, operation and decommissioning scheduling and procedures to mitigate the effect; and,
- develop rehabilitation measures to restore affected features.

Project siting measures were described in the EOS. This report focuses primarily on scheduling and other mitigation and rehabilitation measures. Mitigation will be enacted through a variety of mechanisms, including:

1. Contract Documents. Northland is committed to operating the Project in an environmentally responsible manner and in compliance with all applicable environmental laws, regulations, and guidelines. All of Northland's contractors and subcontractors will be accountable for actions that have an adverse effect on the environment. As such, any contract documents executed by Northland will incorporate appropriate provisions from the REA documents. Additionally, all contractors, subcontractors, and other associates of the Project will follow the guiding principles of the monitoring program. These organizations will also comply with all relevant municipal, provincial, and federal legislation.

2. Management Structures. Northland, the turbine manufacturer, the Balance of Plant Contractor and the Operation and Maintenance Contractor, will take steps to ensure that they have appropriately skilled personnel to carry out the environmental responsibilities as defined in this Report. All organizations associated with Project development activities will develop responsive reporting systems that clearly assign responsibility and accountability for development actions. As appropriate, Northland will review these reporting documents.

3. Change Management. During the implementation of the Project, change may be required to address unforeseen or unexpected conditions or situations. Northland Power, the turbine manufacturer, the Balance of Plant Contractor and the Operation and Maintenance Contractor will be responsible for ensuring environmental and safety issues are addressed. Northland Power will affect any significant changes to Project programs, procedures, and plans throughout the life of the Project.

4. Environmental Procedures. Northland, the turbine manufacturer, the Balance of Plant Contractor and the Operation and Maintenance Contractor will be responsible for implementing all approved environmental procedures during all phases of the Project. Individual personnel responsibilities will be assigned as necessary to support the full and effective implementation of the environmental procedures. Environmental procedures will address the following issues to prevent environmental contamination:
   - Spills and releases: to identify the specific procedures for the prevention, response, and notification of spills. In addition it should establish the general procedures for spill clean-up, personnel training, and material handling and storage to prevent spills;
   - Hazardous waste management: to outline the procedures for the proper identification of hazardous waste and its proper storage, handling, transport, and disposal. In addition, the procedures should outline specific requirements for personnel training, emergency response, product review and approval, and record keeping; and,

- Solid waste management: to establish alternative procedures for the management and disposal of used lubricants, used drums, and general office waste.

These procedures will ensure internal and external risks are fully evaluated and the information communicated to personnel in advance of any accident or malfunction.

5. Operation and Maintenance Training Program. As appropriate Northland and/or the Operation and Maintenance Contractor should develop an operations training program to ensure personnel receive appropriate training in relation to operation and maintenance programs, environmental procedures, and the emergency preparedness and response plan. With respect to the environment and natural heritage, training may cover the following issues:

- Environmental Protection, including:
  - Important/sensitive environmental features and areas;
  - Incidence reporting (spills, wildlife incidents); and,
  - Materials disposal.

- Facility Safety, including:
  - Accident reporting; and,
  - Chemical and hazardous materials handling.

- Emergency Preparedness, including:
  - Fire preparedness and response;
  - Natural disasters (i.e., extreme weather events); and,
  - Hazardous materials and spill response.

Training should begin as the initial staff complement is hired during the pre-operational mobilization period. There should also be on-going training for personnel as well as specific training sessions for new hires.

3.3 Performance Objectives

Performance objectives were developed to provide a benchmark against which to evaluate the success of mitigation strategies. In general, performance objectives are to:

- minimize environmental effects during all phases of the project;
- reduce the environmental effects on natural habitats, flora, and fauna;
- avoid accidents and malfunctions;
- avoid levies or sanctions from the corresponding authorities for negligent environmental performance; and,

- comply with all environmental quality standards set by law.

Performance objectives specific to natural heritage features and project activities are listed in Tables 5.2, 5.4, 5.6 and 5.10 of this report.

3.4 Environmental Monitoring and Contingency Plans

Some mitigation strategies will require environmental monitoring to ensure proper implementation and confirmation that the effect is adequately mitigated. In some cases where the likelihood of a significant negative environmental effect is low, a monitoring approach has been proposed in lieu of a mitigation strategy. To prepare for an event where environmental monitoring may reveal a negative environmental effect, contingency measures have been developed to achieve the following:

- rehabilitate or correct a negative environmental effect;
- notify the applicable agencies if required; and,
- develop alternative mitigation strategies that could prevent the same negative environmental effect from occurring again.

Reporting is an important component of the monitoring program. Specific internal audits (e.g., management team and/or process team), and external audits against the plans, safety and environmental procedures, and other policies and procedures are all part of establishing performance standards necessary to minimize risks on a continuing basis. As appropriate, a formal audit program for the Project with regard to environmental programs should be performed annually.

In certain instances (e.g., post-construction monitoring for birds and bats), annual monitoring reports are a condition of the Project approval and must be provided to agencies for review. Northland will be responsible for ensuring that all reporting requirements are met.

4.0 Description of Project Components and Activities

4.1 Construction

Construction activities for the Project generally involve:

- pre-construction works for investigation, design, and layout of Project components;
- site works to prepare the lands and facilitate access for construction;
- civil and mechanical works for the roads and turbines;
- electrical works for electricity generation and transmission; and,
- restoration works to reinstate temporary construction areas to predevelopment conditions.

Further details of these works are described in the Construction Plan Report, and are summarized in **Table 4.1** below.

4.2 Operation/Maintenance

Operations and maintenance activities for the Project generally involve:

- wind turbine operation and monitoring;
- transmission line maintenance;
- planned/scheduled maintenance of Project components;
- unscheduled maintenance of Project components;
- waste management;
- sewage management; and,
- water taking.

Further details of these works are described in the Design and Operations Report, and are summarized **in Table 4.1** below.

4.3 Decommissioning

Decommissioning activities for the Project generally involve:

- reinstating construction access roads to remove Project components;
- turbine disassembly and disposal;
- transmission line removal;
- removal and disposal of all other Project components; and,
- site restoration.

Further details of these works are described in the Decommissioning Plan Report, and are summarized in **Table 4.1** below.

4.4 Summary of Project Activities

Activities associated with project construction, operation, maintenance and decommissioning are summarized in **Table 4.1**.

Table 4.1 Summary of Construction, Operation/Maintenance and Decommissioning Activities

Phase	Activity	Description of Activity
Construction	Site Preparation	• Site survey including installing survey stakes for layout of Project components; • Geotechnical investigation including borehole and test pit sampling of subsurface soils; • Installation of Erosion and Sediment Control measures; • Installation of construction site safety measures; and, • Clearing and grubbing of lands required for construction.
	Tile Drain Modifications	• Installation of new headers and modifications to existing tile drains.
	Local Road Improvements	• Temporary culvert extensions at intersections; and, • Placement, grading, and compacting of additional aggregate at intersections.
	Access Roads	• Stripping and stockpiling of topsoil and subsoil separately; • Rough-grading; • Trench excavation and installation of 36 kV collector line and fiber optic cable; • Backfilling and compacting trench; • Installation of geotextile if required to reinforce subsoil; and, • Placing, fine-grading and compacting granular sub-base and base materials.
	Watercourse Crossings	• Culvert installations; • High-Pressure Directional Drilling; • Punch and Bore; and, • Overhead Line Construction.
	Turbine Assembly	• Stripping and stockpiling of topsoil and subsoil separately; • Foundation excavation; • Ground wiring, formwork, and rebar assembly; • Concrete pouring; • Tower erection; • Nacelle installation; and, • Rotor assembly and installation.
	36 kV Collection System	• For work within private land, refer to access road construction; and, • For work within public Right-of-Way, the 36 kV collector line will be installed underground in the gravel shoulder.
	230 kV Transmission	• Installation of utility poles; and, • Installation of 230 kV transmission line on utility poles.

Phase	Activity	Description of Activity
	Line	
	Communication Lines	• Installation of fiber optic communication lines in conjunction with 36 kV collection system and 230 kV transmission line.
	Transformer Sub-station and Switchyard	• Stripping and stockpiling of topsoil and subsoil separately; • Electrical connections and ground wiring; • Placement, fine-grading, and compacting of aggregate foundation; • Installation of electrical equipment; and, • Installation of safety features.
	Parts and Storage Building	• Stripping and stockpiling of topsoil and subsoil separately; • Placement, fine-grading, and compacting of aggregate building pad; • Construction of reinforced concrete foundation; • Erection of framing, siding, and roofing; and, • Construction of well and septic system.
	Site Restoration	• All private and public lands temporarily used for construction will be restored to pre-development conditions (restoration of local roads, vegetation, agricultural land, etc.).
Operation	Wind Turbine Operation	• Full-time monitoring of wind turbine operation based out of Parts and Storage building.
	Planned / Scheduled Maintenance	• Bi-annual inspections and maintenance of Project components, including transmission line.
	Unscheduled Maintenance	• Unscheduled maintenance of Project components.
	Waste Management	• Proper storage, transportation, application and disposal of oil and grease.
	Sewage Management	• Maintenance of Parts and Storage Building septic system.
	Water Taking	• Maintenance of Parts and Storage Building well and potential treatment and storage systems.
Decommissioning	Reinstatement of Construction Access Roads	• Widening of site entrances and access road turns to transport Project components off-site. Refer to Access Roads during the Construction phase for procedure.
	Turbine Disassembly	• Reverse engineering of turbines with use of a crane; and, • Transportation of turbine equipment off-site for re-use, salvage, or disposal.
	Removal of Electrical Equipment (i.e. Switchyard, Transformer Sub-station, Turbine step-up transformers)	• Electrical decommissioning / de-energizing; • Proper removal and disposal of oil from transformers; and, • Transportation of electrical equipment off-site for re-use, salvage, or disposal.
	Removal of Access Roads	• Removal of granular access roads off-site; • Replacement with topsoil as applicable.
	Removal of	• Breaking-up concrete turbine foundations to an appropriate

Phase	Activity	Description of Activity
	Foundations	depth, and disposal off-site.
	Removal of 36 kV Collection System	• Removal of underground cable and disposal off-site for re-use, salvage, or disposal; and, • Replacement of affected areas with topsoil as applicable.
	Removal of 230 kV Transmission Line	• Removal of transmission line and utility poles for re-use, salvage, or disposal off-site; and, • Re-vegetation as applicable.
	Site Restoration	• Removal and disposal of all waste from site; and, • Restoration of Project area to pre-development conditions (i.e. topsoil and vegetation replacement as applicable).

5.0 Identification of Potential Negative Environmental Effects and Mitigation Measures

This section of the EIS is organized according to the type of features present, including features identified as:

- Generalized Significant Wildlife Habitat;
- Significant Features;
- Wetlands treated as significant; and,
- Other features treated as significant and requiring a habitat use study to confirm significance.

For Generalized Significant Wildlife Habitat a number of standard construction mitigation measures are identified. These measures will also be applied to all other significant features; however, rather than reiterating them for each feature, reference is simply made back to Section 5.1. Mitigation for other types of features includes all standard measures as well as the additional measures described in each respective section.

For each type of feature, potential environmental effects, mitigation, performance objectives, monitoring and contingency measures are identified.

5.1 Generalized Significant Wildlife Habitat

The types of habitats identified as Generalized Significant Wildlife Habitat ("GCSWH") are present in **Table 5.1**. These types of habitats are identified as generalized because their location relative to various project components means that negative effects are predictable, short-term in duration and can be mitigated using standard construction mitigation. The location of these features is shown on **Figures 2a-h** in **Appendix A**.

Table 5.1 Generalized Significant Wildlife Habitat within 120 m of the Project Location

ID	Habitat Type
GCSWH-WSSA	Waterfowl Stopover and Staging Areas (Aquatic)
GCSWH-BMC	Bat Maternal Colonies
GCSWH-TWA	Turtle Wintering Areas
GCSWH-WNA	Waterfowl Nesting Areas
GCSWH-WRN	Woodland Raptor Nesting
GCSWH-TNA	Turtle Nesting Areas
GCSWH-ABH	Amphibian Breeding Habitat (Woodland)
GCSWH-WASBB	Woodland Area-sensitive Bird Breeding Habitat
GCSWH-SS	Seeps and Springs

Work within these features is limited to minor vegetation removal associated with the installation of utility poles and below ground collector and overhead transmission lines.

Other construction activities may occur adjacent to these features. Potential effects on these features include:

- accidental encroachment into features;
- mortality of wildlife inadvertently moving through construction zones;
- limited vegetation removal;
- introduction of invasive species into the environment;
- sediment and erosion impacts associated with:
  - open cuts/trenching for installation of the turbines, access roads, underground collector lines, parts storage building, transformer sub-station and utility poles;
  - directional drilling and/or punch and bore installation of select portions of the underground collector lines and transmission line;
- effects on seepage areas due to dewatering for construction of the turbine foundations;
- spills from equipment fueling or oiling/greasing of project components;
- impacts of noise on wildlife; and,
- dust effects.

General mitigation measures, performance objectives, monitoring and contingency plans are summarized in **Table 5.2**. A detailed description of each project activity is provided in **Table 4.1**.

Table 5.2 General Construction and Decommissioning Effects, Mitigation, Performance Objectives, Monitoring and Contingency Plans

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
Site Preparation	• Limited vegetation removal (D).	• No project components will be located directly within any natural significant features boundaries • Vegetated buffers will be left in place to the extent possible. • A Tree Preservation Plan will be developed during the detailed design phase in order to identify trees which may need to be removed or trimmed during construction of the transmission line. Trees requiring removal will be replaced at a ratio determined through the Tree Preservation Plan based on the age, size, species and health of the tree. The Tree Preservation Plan will also include recommendations for minor adjustments to utility pole locations in order to minimize tree loss to the extent possible. • Time vegetation removal to avoid periods of habitat use where possible especially during breeding bird season for migratory birds (May 1 – July 30) undertaking active nest surveys if clearing of vegetation must take place during breeding bird season. • Any cleared areas will be re-vegetated using a native seed mix where appropriate.	• Duration is expected to be moderate (10-15 years until replacement trees have matured); however magnitude, frequency and geographic scope are very limited. • No residual effect anticipated	• Minimal vegetation removal for installation of utility poles only.	• Undertake monthly site inspections during the Site Preparation stage to ensure that only specified trees are removed and that remaining trees are not damaged during construction activities. • If active nests are found in an area where vegetation must be cleared, construction activities will be suspended during breeding bird period. • Replacement trees will be monitored for one year to ensure at least 80% survival. Additional trees will be planted if survival rate is lower.
All Construction and Decommissioning Activities	• Accidental encroachment of equipment, stockpiles etc. into natural areas (I).	• All work zones should be delineated with silt fencing and be clearly marked to indicate that no work should occur outside the fenced area.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No disturbance to natural areas.	• An Environmental Inspector will perform regular inspection to ensure that mitigation is implemented.
All Construction and Decommissioning Activities	• Potential soil compaction (D).	• Heavy equipment and material stockpiles will be limited to fenced construction areas. • Temporary construction staging areas and construction roads which have been compacted will be rehabilitated upon completion of construction.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• Minimize soil compaction to the extent possible. • Rehabilitate any compacted soils within temporary construction areas.	• An Environmental Inspector will perform regular inspection to ensure that equipment and stockpiles do not extend beyond construction areas. • Northland and the contractor will work with participating landowners to ensure that soils in construction areas are rehabilitated to pre-construction conditions.
All Construction and Decommissioning Activities	• Mortality of wildlife inadvertently moving through construction zones (I).	• Silt fencing will be properly installed and maintained around work zones will also act to kept wildlife out of work areas. • Construction traffic will be restricted to day time hours. • Speed limit signage will be posted along	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No wildlife mortality.	• An environmental inspector will regularly monitor fenced areas to ensure that fencing is properly keyed/toed in to the ground to ensure that wildlife cannot gain access under fenced area. • If wildlife inadvertently moves into a construction area, the Environmental Inspector will move the

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
		construction travel routes to ensure that construction vehicles respect appropriate speeds.			species outside of the work area, if possible, using gloves and a bucket or plastic tub, as appropriate. • If any species at risk are encountered that are not identified on relevant permits, all work will cease within the immediate work area and the Ministry of Natural Resources will be contacted.
Installation and removal of 36kV collector lines, 230kV transmission line, communication lines	• Sediment and erosion impacts associated with open cuts/trenching and directional drilling/punch and bore activities (I).	• Implementation of the erosion and sediment control measures will conform to industry best management practices and recognized standard specifications such as Ontario Provincial Standards Specifications (OPSS). • Sediment and erosion control measures will be implemented prior to construction and maintained during the construction phase to prevent the escape of sediment from work zones: • All sediment and erosion control measures will be inspected prior to construction and maintained during the construction phase to prevent entry of sediment into natural features; • If the sediment and erosion control measures are not functioning properly, no further work will occur until the sediment and/or erosion problem is addresses; • All disturbed areas of the construction site will be stabilized immediately and re-vegetated as soon as conditions allow; and, • Sediment and erosion control measures will be left in place until all areas of the construction site have been stabilized. • Directional drilling will be undertaken in accordance with the Department of Fisheries and Oceans' Operational Statement. • Directional drilling and/or punch and bore operations will be designed with launching and receiving pits that will minimize tree loss and disturbance of natural vegetation wherever possible.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No erosion and sediment impacts on wildlife habitats.	• A plan for addressing impacts associated with "frac-out" during directional drilling will be prepared in accordance with the Operational Statement. • Erosion and sediment control measures will be regularly inspected to ensure they are functioning and are maintained as required. • If erosion and sediment control measures are not functioning properly, alternative measures will be implemented and prioritized above other construction activities.
Site Restoration	• Introduction of invasive species into natural areas (I).	• All disturbed areas of the construction site will be re-vegetated as soon as conditions allow. Where re-vegetation is required in the municipal road allowance, as a result of transmission line	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No introduction of invasive species.	• An Environmental Inspector will perform regular inspection to ensure that mitigation is implemented. • If extensive invasion of non-native species is identified as a result of the Project, contingency measures may include an applicable herbicide

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
		installation, standard roadside seed mixes, which do not contain invasive species, will be used.			application. An herbicide application plan will be developed as required.
Turbine assembly	• Effects on groundwater levels/seepage areas and wetlands due to dewatering for construction of turbine foundations (I).	• Any discharge from dewatering will be outlet to a vegetated area at least 30m from a habitat area utilizing a sediment filter bag.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No effect on groundwater levels.	• An Environmental Monitor should be on-site during any dewatering within 120m of natural features. The Monitor should ensure that the filter bag is working appropriately and ensure that no sediment is entering habitat areas. • In the event of sediment discharge, all operations should stop immediately until the problem can be resolved. • If significant changes in water levels/seepage areas are noted, operations should cease until water levels recover.
All Construction and Decommissioning Activities	• Spills from equipment fueling, oiling, greasing of project components (I).	• All materials and equipment used for the purpose of site preparation and project construction shall be operated and stored in a manner that prevents any deleterious substances (petroleum produces, silt, etc.) from entering natural features: • Any stockpiled materials will be stored and stabilized away from the feature; • Refueling and maintenance of construction equipment should occur a minimum of 30 m from a natural feature; and, • Hazardous material transportation and application will occur in designated areas according to operational procedures. Proper spill containment equipment will be used and maintained on site.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• Minimize potential for indirect effects from accidental spills.	• As appropriate, spills will be reported to the MOE Spills Action Centre.
All Construction and Decommissioning Activities	• Impacts of construction noise on wildlife (I).	• Environmental noise will be reduced through the standard operating practices. A traffic plan will be developed and implemented by the Construction Contractor. • Work within 120 m of Amphibian Breeding Habitats (GCSWH-ABH) will not occur after dusk during the breeding season (April, May and June). • Work within 120m of bird habitats (GCSWH-WRN, GCSWH-WASBB, GCSWH-WNA, GCSWH-WSSA) will not occur in the early morning hours (between dawn and 1.5 hours after dawn) during the breeding season (May 15-July 30).	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• Minimize effects of noise.	• The Environmental Inspector will ensure that all operational plans and construction timing associated with noise reduction are being followed.

Project Activity	Potential Effects (D=Direct) (I=Indirect)	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
All Construction and Decommissioning Activities	• Dust effects on wildlife habitat (I).	• As appropriate, dust from the work areas will be controlled through suppressants (e.g. water).	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• Minimize effects from dust on wildlife habitats.	• Dust emissions will be monitored daily during construction to ensure dust control watering frequency and rates are adequate.

5.2 Significant Features

Features within 120 m of the Project Location which have previously been identified as significant or were evaluated as significant during the EOS are summarized in **Table 5.3** and shown on **Figures 3a-h** in **Appendix A**.

Table 5.3 Significant Features

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
Valleyland	V-001:	• Limited wildlife movement corridor; and, • Surface water storage and conveyance.	• 3 m, (overhead transmission line).
Provincially Significant Wetland	WE-027:	• Flood attenuation; • Water quality improvement; groundwater recharge; and, • Deer yarding habitat (DYA-001).	• 6 m (underground collector line); and, • 14 m (overhead transmission line).
	WE-029:	• Flood attenuation; • Water quality improvement; groundwater recharge; and, • Deer yarding habitat (DYA-002).	• 26 m (overhead transmission line).
Significant Woodlands	W-004:	• Spring ephemerals abundant in FOD4-2 community; and, • No specific habitat features identified.	• 34 m (turbine); • 31 m (assembly site area boundary); • 31 m to 83 m (access road: construction only); and, • 31 m to 107 m (access road and underground collector line).
	W-012:	• Vernal pools; patches of Spicebush in shrub layer.	• 69 m (access road: construction only); and, • 96 m (access road).
	W-013:	• N/A	• 11 m (underground collector line); • 68 m (assembly site area boundary); • 73 m (turbine); and, • 70 m (access road: construction only).
	W-014:	• Spring ephemerals abundant; Shagbark Hickory abundant in some locations.	• 3 m to 94 m (underground collector line); • 37 m (turbine); • 35 m (assembly site area boundary); • 28 m (access road: construction only); and, • 89 m (access road).
	W-020:	• N/A	• 2 m to 117 m (access road:

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
			construction only); • 4 m (access road and underground collector line); • 20 m (underground collector line); • 113 m (turbine); and, • 112 m (assembly site area boundary).
	W-021:	• Vernal pools; Sugar Maple with Red Oak in canopy; north end more disturbed.	• 5 m (underground collector lines); • 2 m, to 90 m (access road: construction only); • 30 m to 42 m (assembly site area boundary); • 39 m to 58 m (turbine); • 60 m to 87 m (access road and underground collector line).
	W-023:	• CUP3 approximately 50 years old; vernal pools present in the FOM6-1 and SWD2-2 communities; dead ash present in canopy.	• 2 m (access road and underground collector line); • 36 m to 87 m (access road: construction only); • 2 m to 116 m (underground collector line); • 38 m to 117 m (assembly site area boundary); • 39 m to 119 m (turbine); and, • 95 m (access road and underground collector line).
	W-026:	• Vernal pools present in the FOD5-8 community; spring ephemerals abundant in some locations.	• 2 m (access road and underground collector line); • 2 m to 49 m (access road: construction only); • 2 m to 116 m (underground collector line); • 39 m to 63 m (assembly site area boundary); • 40 m to 86 m (turbine); and, • 96 m (access road and underground collector line).
	W-029:	• Vernal pools present in the SWD2-2 community.	• 2 m (underground collector line); • 47 m (access road and underground collector line); • 33 m to68 m (access road: construction only); • 43 m to 95 m (assembly site area boundary); and, • 61m to 95 m (turbine).
	W-030:	• N/A	• 20 m (underground collector line).
	W-031:	• N/A	• 7 m (underground collector line).

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
	W-034:	• N/A	• 2 m (underground collector line).
	W-036:	• Vernal pools.	• 8 m to 117 m (access road and underground collector line); • 2 m to 80 m (access road: construction only); • 24 m to 48 m (assembly site area boundary); • 34 m to 71 m (turbine).
	W-037:	• Seepages noted; occasional Balsam Fir; spring ephemerals abundant in some locations.	• 2 m to 67 m (underground collector line); • 5 m to 107 m (access road: construction only); • 21 m to 98 m (turbine); • 20 m to106 m (assembly site area boundary); and, • 78 m to 114 m (access road and underground collector line).
	W-039:	• Green Ash forest with some White Elm and Trembling Aspen; Green Ash Swamp with Trembling Aspen; European Buckthorn in understory.	• 2 m to 51 m (overhead transmission line).
	W-041:	• Vernal pools.	• 32 m (assembly site area boundary); • 46 m to 60 m (turbine); • 43 m (access road: construction only); and, • 43m to 116 m (access road and underground utility line).
	W-042:	• Garlic Mustard (invasive species) present in some locations in FOD4-2 community.	• 2 m (underground collector line); • 7 m to 78 m, (access road and underground collector line); • 2 m to 95 m (access road: construction only); • 67 m to 119 m (turbine); and, • 66 m to 116 m (assembly site area boundary).
	W-053:	• N/A	• 2 m to 52 m (access road and underground collector line); and, • 2 m (access road: construction only).
	W-067:	• N/A	• 92 m (turbine); and, • 92 (assembly site area boundary).
	W-079:	• Spring ephemerals present; vernal pooling.	• 14 m to68 m (overhead transmission line).
	W-081:	• N/A	• 18 m to 118 m (overhead

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
			transmission line).
	W-086:	• N/A	• 3 m to 34 m (overhead transmission line).
	W-088:	• Mature forest dominated by Sugar Maple and White Ash.	• 6 m (underground collector line); • 6 m to 35 m (overhead transmission line).
	W-093:	• N/A	• 120 m (overhead transmission line).
	W-094:	• N/A	• 26 m (overhead transmission line).
	W-099:	• N/A	• 28 m to 60 m (overhead transmission line).
	W-102:	• Patches of mature deciduous forest dominated by Sugar Maple, White Elm and White Ash; lowland portions dominated by Green Ash Swamp; portions of coniferous plantation.	• 2 m to 101 m (overhead transmission line).
	W-104:	• N/A	• 19 m to 46 m (overhead transmission line).
	W-118:	• Mature Sugar Maple and American Beech forest with some White Ash.	• 5 m (overhead transmission line).
	W-123:	• White Ash dominated with some Sugar Maple; mid-aged.	• 18 m (overhead transmission line).
	W-127:	• N/A	• 92 m (overhead transmission line).
	W-128:	• Willow swamp; White Ash and Sugar Maple forest.	• 20 m (overhead transmission line).
Turtle Nesting Areas	TNA-002:	• Snapping turtle nest and egg shells present.	• 7 m to 20 m (underground collector lines); • 2 m (access road and underground utility line).
Deer Yarding Areas	DYA-001:	• Stratum II Deer Yard.	• 6 m (underground collector lines); • 29 m to 55 m (overhead transmission lines).
	DYA-002:	• Stratum II Deer Yard.	• 26 m (overhead transmission lines).
Amphibian Breeding Habitat (Woodland)	ABH-007:	• Open water and marsh area supporting concentrations of spring peeper and green frog.	• 20 m to 116 m (assembly site area boundary); • 35 m to 89 m (turbine); • 32 m to 98 m (access road: construction only); • 91 m (underground collector line); and,

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
			• 92 m to 103 m (access road and underground collector line).

No portions of the project, or activities associated with it, will be located within any of these features. Some activities will occur adjacent to these features, including:

- construction of access roads, transformer sub-station, parts and storage building;
- installation of overhead and below ground collector lines, transmission lines and communication lines;
- construction of turbines;
- operation of the wind facility; and,
- decommissioning of the facility.

As such, there is potential for these features to be affected during construction, operation and decommissioning phases of the project.

All of the general construction mitigation described in **Table 5.2** will apply to activities occurring in and around these features. In addition to general mitigation, several specific measures, performance objectives, monitoring and contingency plans have been identified for these features above and beyond those previously described. These additional measures are summarized in **Table 5.4**.

Table 5.4 Summary of Potential Negative Effects and Proposed Mitigation Measures for Significant Features

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/ duration)	Performance Objective	Monitoring Plan and Contingency Measures
CONSTRUCTION AND DECOMMISSIONING						
All Significant Features Significant Valleylands V-001 Significant Wetlands WE-027, WE-029 Significant Woodlands W-004, W-012, W-013, W-014, W-020, W-021, W-023, W-026, W-029, W-030, W-031, W-034, W-036, W-037, W-039, W-041, W-042, W-053, W-067, W-079, W-081, W-086, W-088, W-093, W-094, W-099, W-102, W-104, W-118, W-123, W-127, W-128 Turtle Nesting Areas TNA-003 Deer Yarding Areas DYA-001 DYA-002 Amphibian Breeding Habitat ABH-007	• All Construction and Decommissioning Activities	• General construction and decommissioning effects. • Refer to effects listed under Generalized Significant Wildlife Habitat.	• Refer to mitigation listed under Generalized Significant Wildlife Habitat.	• Refer to Residual Effects listed under Generalized Significant Wildlife Habitat.	• Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.	• Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.
Significant Valleylands V-001	Installation and removal of 230kV transmission line and communication lines	• Slope failure, erosion or slumping during work in and around slope areas (I). • The effects identified above could have an effect on the health (water quality) of the watercourse within the valley as well as on the health of the forested areas within the valley.	• The detailed design and construction plan for this area will include a geotechnical assessment that will outline specific mitigation for work on sloped areas. • A permit from the Ausable Bayfield Conservation Authority will be required for work in this area. All conditions of the permit will be met.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No slope failure, erosion or slumping. • No decrease in health, functionality and stability of the valleyland.	• Erosion and slope stability measures will be regularly inspected to ensure they are functioning and are maintained as required.
Significant Woodlands W-04, W-020, W-21, W-23, W-026, W-29, W-30, W-31, W-34, W-036, W-37, W-	• Construction and removal of access roads adjacent to the following woodlands:	• Inadvertent loss of, or disturbance to, vegetation along the edge of woodlands during construction of adjacent access roads and below ground collector lines (I).	• Access road and collector lines will be no closer than the dripline of each woodland edge. • Below ground collector lines will be	• Limited duration, frequency, geographic extent. • No residual effect	• No disturbance to woodlots.	• Silt fencing and tree hoarding will be installed along the dripline and monitored by an

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/ duration)	Performance Objective	Monitoring Plan and Contingency Measures
042, W-053,	• W-053 (access road to T-16); • W-042 (access road to T-18); • W-036 (access road to T-25 and T-28); • W-026 (access road to T-31); and, • W-020 (access road to T-40). • Installation of 36kV collector lines adjacent to the following woodlands: • W-04 and W-037 (collector line along Sararas Road); • W-029, W-030, W-034, W-031 (collector line along Shipka Road); • W-023 and W-026 along Schadeview Road; • W-020 along Turnbull's Road; and, • W-021 along the field edge between T-37 and T-39.	• The effects identified above could have minor effect on the size of woodlands and their function in providing edge habitat for a variety of species including Red-headed woodpecker (Special Concern species).	located within the gravel road shoulder and will not extend into wooded areas. • Additional, taller tree protection fencing (tree hoarding) should be installed in these areas to protect tree limbs from equipment in adjacent areas. • Any tree roots which extend into the construction area should be cut and re-packed into soil to avoid desiccation. • Vegetation along the woodland edges should be surveyed for rare species by biologist prior to removal (see mitigation for Species of Conservation Concern).	anticipated.		Environmental Inspector.
Significant Wetlands WE-027, WE-029	• Installation and removal of 230kV transmission line and communication lines	• Inadvertent loss of, or disturbance to, vegetation within the wetlands (I). • Movement of exposed sediment into the wetlands (I). • The effects identified above could have minor effect on the size of wetlands and on the function of the wetland as surface water storage.	• Two options for mitigation may be used: • The transmission line may be located on the opposite side of the road from these wetlands. In this case, mitigation will include: • Clearly demarcating wetlands and ensuring the equipment and material stockpiles do not encroach into the wetland in the opposite ROW. • The transmission line may be directionally drilled below ground under the wetlands. In this case, mitigation measures will include: • Entrance and exit pits will be at least 30m from the edge of the wetland; and, • Sediment and erosion controls will be used around the entrance and exit pits.	• May be residual effect associated with frac-out during directional drilling. • Likelihood is low, limited duration, frequency and geographic extent.	• No vegetation loss or disturbance associated with sediment and erosion on Provincially Significant Wetlands.	• An Environmental Inspector will regularly monitor operations to ensure that activities do not encroach into wetland areas. • If directional drilling is used, an Environmental Inspector will be on-site during drilling activities. • A plan to address potential frac-out will be developed and activated by the Environmental Inspector if required.

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/ duration)	Performance Objective	Monitoring Plan and Contingency Measures
Significant Turtle Nesting and Amphibian Breeding Habitat ABH-007 TNA-002	All Construction and Decommissioning Activities	• Accidental mortality due to wildlife moving through the construction zone (I). • The effect identified above may affect individual animals but unlikely to affect population health or resiliency. No effect on habitat functionality.	• During construction wildlife fencing (sediment fencing) will be installed around all work areas within 120m of these habitats prior to any earth movement, stockpiling or other activities on the site. Fencing must be keyed in correctly and monitored for proper installation and maintenance by the Environmental Inspector.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No accidental mortality. • No reduced amphibian breeding due to noise impacts.	• The Environmental Inspector should be on-site for daily inspections of wildlife fencing for signs of turtles accessing the construction zone. This should occur in the work zone associated with T-40, its access road and all associated components during the period between March and October when turtles are active. • If any turtles are found within the work zone, the Environmental Inspector should relocate them to the nearest habitat area outside of the work zone. When relocating snapping turtles, care should be taken to avoid injury by wearing gloves and placing turtles into a bucket or large plastic tub for relocation. • Sediment/wildlife fencing within 120m of Amphibian Breeding Habitat (ABH-007) should also be inspected by the Environmental Inspector at least once a week during the breeding season.
Amphibian Breeding Habitat ABH-007	Construction of turbines T-21, T-22, T-23, T-24 and T-25, their access roads and all associated components	• Inhibition of amphibian breeding patterns and reproductive success due to disruptions of breeding calling patterns from turbine noise (I). • The effect identified above could affect the size and diversity of the amphibian population in this pond.	• Construction of turbines T-21, T-22, T-23, T-24 and T-25, their access roads and all associated components should not occur after dusk during the breeding season (April, May and June).	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No significant decrease in amphibian populations.	• Contractor and Environmental Inspector to monitor work schedules to ensure that no work occurs within the restricted timing window.
OPERATION						
Significant Woodlands W-39, W-79, W-81, W-86, W-88, W-93, W-94, W-99,	Operation of the 230kV overhead transmission line	• Fires or electrical outages from transmission line arcing to nearby trees and vegetation (I). • The effect identified above could affect the	• The transmission line will be maintained to comply with the tree and vegetation clearance requirements of the North American	• Likelihood of effect very limited and only expected to occur as an accidental	• No fires or power outages as a result of tree or vegetation arcing with	• If a transmission line fire or power outage occurs, the operations and maintenance staff will implement the Emergency

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/ duration)	Performance Objective	Monitoring Plan and Contingency Measures
W-102, W-123, W-128		size, health and ecological diversity of woodlands.	Electricity Reliability Corporation (NERC).	occurrence. • No residual effects anticipated.	transmission line.	Response Plan.
Amphibian Breeding Habitat ABH-007	Wind Turbine Operation	• Inhibition of amphibian breeding patterns and reproductive success due to disruptions of breeding calling patterns from turbine noise (I). • The effect identified above could affect the size and diversity of the amphibian population in this pond.	• Strategy to site turbines outside of habitat.	• Duration of the effect could be experienced throughout entire operating period of the turbines. • Effect most significant during spring breeding season. • Potential for residual effects exists.	• Minimize impacts to amphibian breeding. Baseline amphibian calling index to be maintained at 3 for both spring peeper and green frog.	• Conduct an Amphibian Monitoring Program for two years following construction of the wind farm. Amphibian surveys to be undertaken in accordance with Marsh Monitoring Program Manual (Bird Studies Canada, 1994). Surveys will be conducted between one-half hour after sunset and midnight during each of the following three periods: • April 15-30; • May 15-30; and, • June 15-30. • Contingency measures may include additional monitoring to determine cause of decline, possible turbine shut-down or blade feathering during breeding season. • Additional two years of monitoring if significant effects are observed.

Affected Environmental Feature(s)	**Project Activity**	**Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.**	**Mitigation Strategy**	**Residual Effect (magnitude/frequency/ duration)**	**Performance Objective**	**Monitoring Plan and Contingency Measures**
All Significant Features Significant Valleylands V-001 Significant Wetlands WE-027, WE-029 Significant Woodlands W-004, W-012, W-013, W-014, W-020, W-021, W-023, W-026, W-029, W-030, W-031, W-034, W-036, W-037, W-039, W-041, W-042, W-053, W-067, W-079, W-081, W-086, W-088, W-093, W-094, W-099, W-102, W-104, W-118, W-123, W-127, W-128 Turtle Nesting Areas TNA-003 Deer Yarding Areas DYA-001 DYA-002 Amphibian Breeding Habitat ABH-007	Planned and Unplanned Maintenance	• Maintenance activities may have impacts associated with spills and the accidental release of hazardous materials. • General effects such as those described under listed under Generalized Significant Wildlife Habitat may occur if earth movement is required. • Refer to effects listed under Generalized Significant Wildlife Habitat. • Maintenance activities are not anticipated to affect size, diversity, heath, connectivity or function of natural features.	• Procedures will be in place for the handling of hazardous materials, disposal of waste and management of dust and noise. • Any maintenance requiring earth movement will use the same mitigation measures described under Generalized Significant Wildlife Habitat.	• Refer to Residual Effects listed under Generalized Significant Wildlife Habitat. • No residual effect anticipated.	• Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.	• Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.

5.3 Wetlands Treated As Significant

Twenty-two wetlands within 120 m of the Project Location were treated as significant and assessed through the characteristics and ecological functions assessment, as listed in **Table 5.5** and shown on **Figures 4a-h** in **Appendix A**.

Table 5.5 Wetlands Treated As Significant

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
Wetlands Treated as Significant	WE-001:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 69 m (access road: construction only); and, • 96 m (access road). • 97 m to 108 m (assembly site area boundary).
	WE-002:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 2 m (underground collector line); • 39 m to 74 m (access road: construction only); • 47 m to 65 m (turbine); • 103 m (access road and underground collector line); and, • 44 m to 65 m (assembly site area boundary).
	WE-008:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and, • Moderate erosion control on shore of open water area.	• 38 m (underground collector line); • 67 m (assembly site area boundary); • 86 m (turbine); and, • 83 m to 95 m (access road: construction only).
	WE-010:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and, • Moderate erosion control on shore of open water area.	• 20 m to 116 m (assembly site area boundary); • 35 m to 89 m (turbine); • 32 m to 98 m (access road: construction only); • 91 m (underground collector line); and, • 92 m (access road and underground collector line).
	WE-011:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 33 m to 75 m (assembly site area boundary); • 47 m to 76 m (turbines); • 44 m (access road: construction only); • 102 m (access road); and, • 103 m (access road and underground collector line).
	WE-012:	• Flood attenuation; • Water quality improvement; and,	• 10 m to 67 m (underground collector line); and, • 71 m (access road: construction only).

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
		• Groundwater recharge.	
	WE-013:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 9 m to 43 m (overhead transmission line).
	WE-014:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 15 m to 119 m (overhead transmission line).
	WE-015:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and, • Moderate erosion control on shore of open water area.	• 2 m (overhead transmission line).
	WE-016:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and, • Moderate erosion control on shore of open water area.	• 62 m (overhead transmission line).
	WE-017:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 12 m to 51 m (overhead transmission line).
	WE-020:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 14 m to 68 m (overhead transmission line).
	WE-022:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 18 m to 118 m (overhead transmission line).
	WE-026:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 3 m to 34 m (overhead transmission line).
	WE-030:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 19 m to 55 m (overhead transmission line).
	WE-031:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 2 m to 101 m (overhead transmission line).
	WE-032:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and,	• 19 m (overhead transmission line).

Feature	Feature ID	Feature Attributes and Functions	Distance between Feature and all project components within 120 m
		• Low erosion control function due to lack of surrounding vegetation.	
	WE-033:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 19 m to 72 m (overhead transmission line).
	WE-034:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and, • Moderate erosion control on shore of open water area.	• 41 m to 107 m (overhead transmission line).
	WE-035:	• Flood attenuation; • Water quality improvement; • Groundwater recharge; and, • Low erosion control due to nature of slopes.	• 23 m to 103 m (overhead transmission line).
	WE-037:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 18 m (underground collector line); and, • 31 m (overhead transmission line).
	WE-038:	• Flood attenuation; • Water quality improvement; and, • Groundwater recharge.	• 20 m (underground collector line or overhead on alternate side of road).

No portions of the project, or activities associated with it, will be located within any of these features. Some activities will occur adjacent to these features, including:

- construction of access roads;
- installation of overhead and below ground collector lines, transmission lines and communication lines;
- construction of turbines;
- operation of the wind facility; and,
- decommissioning of the facility.

As such, there is potential for these features to be affected during construction, operation and decommissioning phases of the project.

All of the general construction mitigation described in **Table 5.2** will apply to activities occurring in and around these features. In addition to general mitigation, several specific measures, performance objectives, monitoring and contingency plans have been identified for these wetlands above and beyond those previously described. These additional measures are summarized in **Table 5.6**.

Table 5.6 Summary of Potential Negative Effects and Proposed Mitigation Measures for Wetlands Treated As Significant

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
CONSTRUCTION AND DECOMMISSIONING						
Wetlands Treated as Significant WE-001, WE-002, WE-008, WE-010, WE-011, WE-012, WE-013, WE-014, WE-015, WE-016, WE-017, WE-020, WE-022, WE-026, WE-030, WE-031, WE-032, WE-033, WE-034, WE-035, WE-037, WE-038,	All Construction and Decommissioning Activities	• General construction and decommissioning effects. • Refer to effects listed under Generalized Significant Wildlife Habitat.	• Refer to mitigation listed under Generalized Significant Wildlife Habitat.	• Refer to Residual Effects listed under Generalized Significant Wildlife Habitat. • No residual effect anticipated.	• Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.	• Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.
Wetlands Treated as Significant WE-013, WE-014, WE-015, WE-017, WE-020, WE-022, WE-026, WE-031, WE-038	Installation of 230kV transmission line and communication lines	• Minor loss of vegetation within the wetlands (D). • Movement of exposed sediment into the wetlands (I). • The effects identified above could have minor effect on the size of wetlands and on the function of the wetland as surface water storage and flood control.	• Two options for mitigation may be used: • The transmission line may be located on the opposite side of the road from these wetlands. In this case, mitigation will include: • Clearly demarcating wetlands and ensuring the equipment and material stockpiles do not encroach into the wetland in the opposite ROW. • The transmission line may be directionally drilled below ground under the wetlands. In this case, mitigation measures will include: • Entrance and exit pits will be at least 30m from the edge of the wetland; and, • Sediment and erosion controls will be used around the entrance and exit pits.	• May be residual effect associated with frac-out during directional drilling. Likelihood is low, limited duration, frequency and geographic extent. • No residual effect anticipated.	• No vegetation loss or disturbance associated with sediment and erosion on Provincially Significant Wetlands.	• An Environmental Inspector will regularly monitor operations to ensure that activities do not encroach into wetland areas. • If directional drilling is used, an Environmental Inspector will be on-site during drilling activities. • A plan to address potential frac-out will be developed and activated by the Environmental Inspector if required.

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
Wetlands Treated as Significant WE-001, WE-002, WE-008, WE-010, WE-011,	Turbine Assembly	• Localized effects on wetland water levels due to dewatering for construction of turbine foundations (I). • Water from the dewatering process could be outlet into a wetland causing scour within the wetland and deposition of sediment from the pumped water (I). • The effects identified above could affect habitat for aquatic species if standing water is drawn down. • Sedimentation could affect wetland functions associated with surface water storage and flood control.	• Dewatering will be minimized to the extent possible. • Any discharge from dewatering will be outlet to a vegetated area at least 30 m from a wetland utilizing a sediment filter bag.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• No effect on wetland water levels. • No sediment discharge into wetlands.	• An Environmental Monitor should be on-site during any dewatering within 120m of wetlands. The Monitor should ensure that the filter bag is working appropriately and ensure that no sediment is entering wetland areas. • In the event of sediment discharge, all operations should stop immediately until the problem can be resolved. • Although no effects on water levels is anticipated, the Environmental Monitor should also monitor water levels in the vicinity of dewatering activities during the dewatering process. If significant changes in water levels are noted, operations should cease until water levels recover.
OPERATION						
Wetlands Treated as Significant WE-001, WE-002, WE-008, WE-010, WE-011, WE-012, WE-013, WE-014, WE-015, WE-016, WE-017, WE-020, WE-022, WE-026, WE-030, WE-031, WE-032, WE-033, WE-034, WE-035, WE-037, WE-038,	Planned and Unplanned Maintenance	• Maintenance activities may have impacts associated with spills and the accidental release of hazardous materials. • General effects such as those described under listed under Generalized Significant Wildlife Habitat may occur if earth movement is required. • Refer to effects listed under Generalized Significant Wildlife Habitat. • Maintenance activities are not anticipated to affect size, diversity, heath, connectivity or function of wetlands.	• Procedures will be in place for the handling of hazardous materials, disposal of waste and management of dust and noise. • Any maintenance requiring earth movement will use the same mitigation measures described under Generalized Significant Wildlife Habitat.	• Refer to Residual Effects listed under Generalized Significant Wildlife Habitat. • No residual effect anticipated.	• Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.	• Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.

5.4 Wildlife Habitat Treated As Significant

Wildlife habitat which has been treated as significant is present in **Table 5.7** and shown on **Figures 4a-h** in **Appendix A**. These are features which may be significant and which are being treated as such until habitat use study can confirm the relative use of each habitat. If it is found that wildlife are not using the habitat in significant numbers, then the mitigation identified below will not be required.

Table 5.7 Wildlife Habitat Treated as Significant

Feature	Feature ID	Distance between Feature and all project components within 120 m
Bat Maternal Colonies	BMC-001:	• 3 m, 94 m (underground collector line); • 37 m (turbine); • 35 m (assembly site area boundary); • 28 m (access road: construction only); and, • 89 m (access road).
	BMC-002:	• 5 m (underground collector lines); • 2 m to 50 m (access road: construction only); • 30 m to 42 m (assembly site area boundary); • 39 m to 58 m (turbine); and, • 60 m to 87 m (access road and underground collector line).
	BMC-003:	• 2 m to 95 m (underground collector lines); • 39 m to119 m (turbine); • 36 m to 74 m (access road: construction only); • 38 m to 117m (assembly site area boundary); and, • 95 m to120 m (access road and underground collector line).
	BMC-004:	• 2 m (underground collector line); • 47 m (access road and underground collector line); • 33 m to 68 m (access road: construction only); • 43 m to95 m (assembly site area boundary); and, • 61 m to 95 m (turbine).
	BMC-005:	• 8 m to 117 m (access road and underground collector line); • 2 m to 80 m (access road: construction only); • 24 m to 49 m (assembly site area boundary); and, • 34 m to 71 m (turbine).
	BMC-006:	• 2 m to 67 (underground collector line); • 5 m to 107 m (access road: construction only); • 21 m to98 m (turbine); • 20 m to 106 m (assembly site area boundary); and, • 78 m to 97 m (access road and underground collector line).
	BMC-007:	• 92 m (turbine); and, • 92 (assembly site area boundary);
	BMC-008:	• 11 m (underground collector line); • 68 m (assembly site area boundary); • 73 m (turbine); and, • 70 m to 82 m (access road: construction only).
	BMC-009:	• 7 m to 96 m (access road and underground collector line);

Feature	Feature ID	Distance between Feature and all project components within 120 m
		• 2 m to 49 m (access road: construction only); • 20 m to 25 m (underground collector line); • 32 m to 63 m (assembly site area boundary); • 40 m to 86 m (turbine); and, • 7 m to 96 m (access road and underground collector line).
	BMC-010:	• 2 m (underground collector line); • 7 m to 78 m, (access road and underground collector line); • 2 m to 85 m (access road: construction only); • 67 m to 119 m (turbine); and, • 66 m to 116 m (assembly site area boundary).
Turtle Wintering Area	TWA-003	• 2m (underground collector line).
Habitat for Special Concern and Rare Species	SCC-001:	• 34 m (turbine); • 30 m (assembly site area boundary); • 31 m to 83 m (access road: construction only); and, • 71 m to 107 m (access road and underground collector line).
	SCC-002:	• 3 m to 94 m (underground collector line); • 37 m (turbine); • 35 m (assembly site area boundary); • 28 m to 89 m (access road: construction only); and, • 89 m (access road).
	SCC-003:	• 69 m (access road: construction only); and, • 96 m (access road).
	SCC-004:	• 2 m to 117 m (access road: construction only); • 7 m (access road and underground collector line); • 20 m (underground collector line); • 113 m (turbine); and, • 112 m (assembly site area boundary).
	SCC-005:	• 5 m (underground collector lines); • 2 m to50 m (access road: construction only); • 30 m to 42 m (assembly site area boundary); • 39 m to 58 m (turbine); and, • 60 m to 87 m (access road and underground collector line).
	SCC-006:	• 2 m to 58 m (underground collector line); • 39 m to 74 m (access road: construction only); • 47 m to 65 m (turbine); • 103 m (access road and underground collector line); and, • 44 m to 65 m (assembly site area boundary).
	SCC-007:	• 7 m to 96 m (access road and underground collector line); • 2 m to 49 m (access road: construction only); • 20 m to 25 m (underground collector line); • 32 m to 63 m (assembly site area boundary); • 40 m to 86 m (turbine); and, • 7 m to 96 m (access road and underground collector line).
	SCC-008:	• 2 m (underground collector line);

Feature	Feature ID	Distance between Feature and all project components within 120 m
		• 47 m (access road and underground collector line); • 33 m to 68 m (access road: construction only); • 43 m to 95 m (assembly site area boundary); and, • 61 m to 95 m (turbine).
	SCC-009:	• 8 m to 117 m (access road and underground collector line); • 2 m to 80 m (access road: construction only); • 24 m to 49 m (assembly site area boundary); and, • 34 m to 71 m (turbine).
	SCC-010:	• 2 m to 91 m (underground collector line); • 18 m to 107 m (access road: construction only); • 21 m to 98 m (turbine); • 20 m to116 m (assembly site area boundary); and, • 78 m to 114 m (access road and underground collector line).
	SCC-011:	• 27 m to 78 m (access road and underground collector line); • 17 m to 85 m (access road: construction only); • 101 m to119 m (turbine); and, • 89 m to 116 m (assembly site area boundary).
	SCC-012:	• 32 m (assembly site area boundary); • 46 m (turbine); • 43 m to 55 m (access road: construction only); and, • 46 (access road and underground collector line).
	SCC-013:	• 2 m to 52 m (access road and underground collector line); and, • 2 m (access road: construction only).

5.4.1 Habitat Use Studies

Habitat use studies will be completed prior to construction in Bat Maternal Colony, Turtle Wintering and Species of Conservation Concern habitats. Methodologies for habitat use studies are as follows:

Bat Maternal Colonies

Habitat use studies will be undertaken in BCM-001 through BMC-007 habitats, according to the procedures listed in **Table 5.8**.

BMC-008 through BMC-010 will not be surveyed as these habitats are inaccessible on properties.

Table 5.8 Methodology for Bat Maternal Colony Habitat Use Study

Feature ID	Habitat Use Study Criteria and Procedures
BMC-001	Surveys in each habitat area will be carried out in accordance with the procedures for Evaluating the Significance of Maternity Colony Roosts (MNR, 2011). Surveys will involve monitoring of candidate roost trees for evidence of maternal colonies through exit surveys. Exit surveys will be conducted in the month of June and will require a qualified observer to watch for bats exiting
BMC-002	
BMC-003	
BMC-004	
BMC-005	
BMC-006	

Feature ID	Habitat Use Study Criteria and Procedures
BMC-007	roosting sites from a viewing station during a period from 30 minutes before dusk until 60 minutes after dusk. Each candidate roost will be monitored once.
BMC-008	No survey possible due to site access restrictions. Habitat to continue to be treated as significant and mitigation described in Section 4.4.2 to be employed.
BMC-009	
BMC-010	

Turtle Wintering Areas

The Turtle Wintering Area will be searched twice for congregations of turtles basking on warm, sunny days during the fall (September or October) or spring (March to May).Weather conditions should be sunny and warm with temperatures about 20^{o}C.

One hour (60 minutes or more) will be spent at the site on each visit using binoculars to determine species observed. The habitat will be observed for signs of turtles emerging from, or preparing for, hibernation and basking on surrounding logs and rocks. Particular attention will be paid to any observations of Snapping Turtle, *Chelydra serpentina.* Turtles that are observed, if any, will be photographed and the location recorded with a GPS unit.

Habitat for Special Concern and Rare Species

Habitats for Special Concern and Rare Species will be surveyed by a qualified biologist prior to construction. Surveys will occur within the applicable bloom times noted in **Table 5.9**. No parts of the project are proposed within any of these habitats; however, work will occur adjacent to them. Surveys will be focused on portions of the habitat immediately adjacent to project components, particularly the areas where access roads and collector lines will be installed immediately adjacent to woodlands as noted in **Table 5.4**.

Table 5.9 Methodology for Species of Conservation Concern Habitat Use Study

CSWH ID	ELC Unit	ELC Community Name	Species Which May be Present	Bloom Time	Habitat Use Survey or Alternative Investigation? (i.e. Edge survey vs. full access)
SCC-001	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• May and June • July and August for Hairy Wood Mint.	Alternative Investigation.
	FOD5-8	Dry – Fresh Sugar Maple – White Ash Deciduous Forest Type			
SCC-002	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• May and June • July and August for Hairy Wood Mint.	Habitat Use Survey.
SCC-003	SWD2-2	Green Ash Mineral Deciduous Swamp Type	• Green Dragon • Scarlet Beebalm.	• May and June • June – August for Scarlett Beebalm.	Limited Access. Combination of alternative investigation and habitat use survey may be required.
SCC-004	FOD5-8	Dry – Fresh Sugar Maple – White Ash Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• May and June • July and August for Hairy Wood Mint.	Habitat Use Survey.
SCC-005	FOD5-1	Dry – Fresh Sugar Maple Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• May and June • July and August for Hairy Wood Mint.	Habitat Use Survey.
SCC-006	SWD2-2	Green Ash Mineral Deciduous Swamp Type	• Green Dragon • Scarlet Beebalm.	• May and June • June – August for Scarlett Beebalm..	Limited Access. Combination of alternative investigation and habitat use survey may be required.

CSWH ID	ELC Unit	ELC Community Name	Species Which May be Present	Bloom Time	Habitat Use Survey or Alternative Investigation? (i.e. Edge survey vs. full access)
SCC-007	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• May and June • July and August for Hairy Wood Mint.	Limited Access. Combination of alternative investigation and habitat use survey may be required.
	FOD5-8	Dry – Fresh Sugar Maple – White Ash Deciduous Forest Type			
SCC-008	SWD2-2	Green Ash Mineral Deciduous Swamp Type	• Green Dragon • Scarlet Beebalm.	• May and June • June – August for Scarlett Beebalm	Habitat Use Survey.
SCC-009	FOD3-2	Dry – Fresh White Birch Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• May and June • July and August for Hairy Wood Mint.	Limited Access. Combination of alternative investigation and habitat use survey may be required.
	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type			
SCC-010	MAM2-2	Reed-canary Grass Graminoid Mineral Meadow Marsh Type	• Burning Bush • Hairy Wood Mint • Chinese Hemlock Parsley • Crowned Beggar-ticks • Slim-flowered Muhly	• Colour most prevalent in the spring • July and August • August and	Limited Access. Combination of alternative investigation and habitat use survey may be required.
	SWT2-5	Red-osier Dogwood Mineral Deciduous Thicket Swamp Type			

CSWH ID	ELC Unit	ELC Community Name	Species Which May be Present	Bloom Time	Habitat Use Survey or Alternative Investigation? (i.e. Edge survey vs. full access)
	FOD5-8	Dry – Fresh Sugar Maple – White Ash Deciduous Forest Type	• American Gromwell • Hairy Bedstraw • Scarlet Beeblam.	September • August, September, October • May, June • May – August • June – August.	
	FOD5-8	Dry – Fresh Sugar Maple – White Ash Deciduous Forest Type			
SCC-011	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• Colour most prevalent in the spring • July and August • May, June • May – August.	Alternative Investigation.
	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type			
SCC-012	FOD4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• Colour most prevalent in the spring • July and August • May, June • May – August.	Alternative Investigation.
SCC-013	FOD3-1	Dry – Fresh Poplar Deciduous Forest Type	• Burning Bush • Hairy Wood Mint • Slim-flowered Muhly • American Gromwell • Hairy Bedstraw.	• Colour most prevalent in the spring • July and August • May, June • May – August.	Alternative Investigation.

5.4.2 Impacts and Mitigation for Wildlife Habitats Treated as Significant

No portions of the project, or activities associated with it, will be located within any of these features. Some activities will occur adjacent to these features, including:

- construction of access roads;
- installation of overhead and below ground collector lines, transmission lines and communication lines;
- construction of turbines;
- operation of the wind facility; and,
- decommissioning of the facility.

As such, there is potential for these features to be affected during construction, operation and decommissioning phases of the project.

All of the general construction mitigation described in **Table 5.2** will apply to activities occurring in and around these features. In addition to general mitigation, several specific measures, performance objectives, monitoring and contingency plans have been identified for these wetlands above and beyond those previously described. These additional measures are summarized in **Table 5.10**. If habitats are found to be non-significant, these measures outlined herein will not be required.

Table 5.10 Summary of Potential Negative Effects and Proposed Mitigation Measures for Features Treated As Significant

Affected Environmental Feature(s)	Project Activity	Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.	Mitigation Strategy	Residual Effect (magnitude/frequency/duration)	Performance Objective	Monitoring Plan and Contingency Measures
CONSTRUCTION AND DECOMMISSIONING						
Wildlife Habitat Treated as Significant Bat Maternal Colonies BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010 Turtle Wintering Area TWA-003 Habitat of Species of Conservation Concern SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013	All Construction and Decommissioning Activities	• General construction and decommissioning effects. • Refer to effects listed under Generalized Significant Wildlife Habitat.	• Undertake Habitat Use Study prior to construction to confirm significance. • Apply mitigation measures listed under Generalized Candidate Significant Wildlife Habitat in the case that habitats are significant.	• Limited duration, frequency, geographic extent. • No residual effect anticipated.	• Minimize impacts.	• In the case that habitats are significant, refer to monitoring and contingency measures listed under Generalized Candidate Significant Wildlife Habitat.
Species of Conservation Concern SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013	Site Preparation All Decommissioning Activities	• No SCC anticipated within work zones; however, small number of unanticipated individuals may be present outside of identified habitat areas and may require removal (I). • The effect identified above may affect individuals but no effect anticipated at the population scale.	• If a species is identified within a work zone during Habitat Use Studies, the qualified biologist undertaking surveys, in conjunction with the Environmental Inspector, will determine whether the species can be protected in situ or whether it can be re-located/transplanted to an alternative location away from construction activities.	• Likelihood of encountering individuals is minimal. • Magnitude of effect on population size and health is minimal. • Limited frequency. • No residual effect anticipated.	• No net loss of species of conservation concern.	• If a species cannot be successfully transplanted (e.g. a mature tree), replacement trees will be planted of the same species at a 2:1 ratio. • Transplants and replacement trees will be monitored for one year to ensure 80% survival rate. To the extent that this 80% survival rate isn't met additional specimens will be replanted.
OPERATION						
Bat Maternal Colonies BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010	Turbine Operation	• Impacts due to collisions with turbine blades during operation (D). • The effect identified above has the potential to affect the population size and health if collisions occur during maternal roosting periods and if mortality exceeds 10 bats/turbine/year.	• Refer to mitigation provided in the EEMP for birds and bats.	• Refer to the EEMP for birds and bats.	• Refer to the EEMP for birds and bats.	• Refer to the EEMP for birds and bats.

Affected Environmental Feature(s)	**Project Activity**	**Potential Effects (D=Direct) (I=Indirect) Potential effect on the size, diversity, health, connectivity, functionality and resilience of the natural feature.**	**Mitigation Strategy**	**Residual Effect (magnitude/frequency/duration)**	**Performance Objective**	**Monitoring Plan and Contingency Measures**
Wildlife Habitat Treated as Significant Bat Maternal Colonies BMC-001, BMC-002, BMC-003, BMC-004, BMC-005, BMC-006, BMC-007, BMC-008, BMC-009, BMC-010 Turtle Wintering Area TWA-003 Habitat of Species of Conservation Concern SCC-001, SCC-002, SCC-003, SCC-004, SCC-005, SCC-006, SCC-007, SCC-008, SCC-009, SCC-010, SCC-011, SCC-012, SCC-013	Planned and Unplanned Maintenance	• Maintenance activities may have impacts associated with spills and the accidental release of hazardous materials. • General effects such as those described under listed under Generalized Significant Wildlife Habitat may occur if earth movement is required. • Refer to effects listed under Generalized Significant Wildlife Habitat. • Maintenance activities are not anticipated to affect size, diversity, heath, connectivity or function of wildlife habitats.	• Procedures will be in place for the handling of hazardous materials, disposal of waste and management of dust and noise. • Any maintenance requiring earth movement will use the same mitigation measures described under Generalized Significant Wildlife Habitat.	• Refer to Residual Effects listed under Generalized Significant Wildlife Habitat. • No residual effect anticipated.	• Refer to Performance Objectives listed under Generalized Significant Wildlife Habitat.	• Refer to monitoring and contingency measures listed under Generalized Significant Wildlife Habitat.

6.0 Environmental Effects Monitoring Plan

Performance objectives, management and contingency plans have been identified in Tables 5.2, 5.4, 5.6 and 5.10 of this report. A separate EEMP for birds and bats has also been prepared (Neegan Burnside, August 2012). Information from both reports has been brought forward into the Design and Operations Report (Neegan Burnside, August, 2012) which provides and inclusive and comprehensive EEMP for all aspects of the project.

7.0 Construction Plan Report

Under O.Reg. 359/09, a Construction Plan Report must be prepared as part of the Renewable Energy Approval application package. Activities related to the construction of the Project as well as associated potential negative environmental effects are described within the Construction Plan Report. All impacts and mitigation related to natural heritage features described in this report have also been carried forward to the Construction Plan Report (Neegan Burnside, August 2011). This EIS and the Construction Plan Report thus address natural heritage features in a consistent manner.

8.0 Confirmation from Ministry of Natural Resources

Under Section 28 of O.Reg. 359/09, the Ministry of Natural Resources ("MNR") must review the EIS and confirm that it was completed in accordance with criteria and procedures accepted by that Ministry. This EIS is currently under review and is awaiting confirmation. A copy of the MNR confirmation will be provided in **Appendix B** upon receipt.

9.0 Conclusions

The Grand Bend Wind Farm is located within the vicinity of several natural heritage features, including features which are significant, which are treated as significant and which may be significant subject to a habitat use study prior to construction.

The project layout was designed to avoid impacts to these features as much as possible. Performance objectives have been set with the goal of avoiding impacts to all significant natural features. With the mitigation, monitoring and contingency measures described in this report, it is anticipated that performance objectives can be met.

Written by:

Signature _____ Date August 2012
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Northland Power Inc.

10.0 References

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Ministry of Natural Resources. 2011b. Natural Heritage Assessment Guide for Renewable Energy Projects. First Edition. Queen's Printer for Ontario.

NEEGAN BURNSIDE

Appendix A
Figures

Path: \\192.168.7.3\gis\Project\P Jobs\P1 Jobs\PIA019991\Map\Carto\Env Impact Study\019991_EIS_Fig1.mxd

81°0'0"W

43°30'0"N

Lake Huron

Goderich

Ashfield-Colborne-Wawanosh

North Huron

Morris-Turnberry

Howick

Minto

Wellington North

County of Dufferin

Caledon

R.M. of Peel

Centre Wellington

Erin

Brampton

Mapleton

North Perth

County of Wellington

Central Huron

Huron East

County of Huron

Guelph/Eramosa

Halton Hills

Milton

Woolwich

Wellesley

Guelph

R.M. of Halton

Bluewater

West Perth

County of Perth

Perth East

R.M. of Waterloo

Puslinch

Oakville

Cambridge

Wilmot

Kitchener

Burlington

Stratford

North Dumfries

Perth South

St. Marys

Zorra-Tavistock East

County of Brant

Hamilton

Blandford-Blenheim

Lucan Biddulph

Lambton Shores

North Middlesex

Middlesex Centre

Thames Centre

Zorra

County of Oxford

Brantford

West Lincoln

County of Lambton

County of Middlesex

Ingersoll

South-West Oxford

Norwich

Plympton-Wyoming

Adelaide-Metcalfe

Warwick

London

Haldimand County

Strathroy-Caradoc

Norfolk County

81°0'0"W

0 10 20 30

Kilometers

N

Wind Turbine Location

Project Area

NEEGAN BURNSIDE

Date: 15 August 2012

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Project Area

Prepared	Checked	Map Number
P. Stubbert	T. Radburn	1
Scale	Project	
1:150,000	PIA019991	

Path: \\192.168.7.3\gis\Project\P Jobs\PIA019991\Map\Cartol\Env Impact Study\019991_EIS_Fig2.mxd

81°50'0"W 81°45'0"W 81°40'0"W 81°35'0"W 81°30'0"W 81°25'0"W 81°20'0"W 81°15'0"W 81°10'0"W

43°30'0"N 43°25'0"N 43°20'0"N

Lake Huron

Figure 2a
Figure 2b
Figure 2c
Figure 2d
Figure 2e
Figure 2f
Figure 2g
Figure 2h

Zurich
Bluewater
Grand Bend
South Huron
Hensall
Huron East
Exeter
West Perth
Mitchell
South Huron
Perth South

21 4 8 84 83 83 23 81

500kv 115kv 230kv 115kv 115kv 115kv 115kv 230kv 115kv

0 1 2 3 4 5 6 7 8
Kilometers

N

Wind Turbine Location

120m From Project Location

Note: All infrastructure shown on the map represents proposed locations

NEEGAN BURNSIDE

Date: 16 August 2012

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2 - Key Map
Scale	Project	
1:150,000	PIA019991	

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Date: 16 August 2012

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
- Transformer Sub-Station; Switching Yard
- Access Road & Underground Collector Line
- Access Road
- Access Road: For Construction (Temporary)
- Assembly Site Area Boundary
- Ecoregion 6E - 7E Division

ELC Classes

- Agriculture
- Forest
- Open Water
- Cultural
- Wetland: Marsh
- Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2a
Scale	Project	
1:25,000	PIA019991	

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0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Date: 16 August 2012

- Wind Turbine Location
- Transformer Sub-Station; Switching Yard
- Ecoregion 6E - 7E Division
- 120m From Project Location
- Access Road & Underground Collector Line
- Study Area
- Access Road
- Transmission Line: Overhead
- Access Road: For Construction (Temporary)
- Collector Line; Transmission Line: Underground
- Assembly Site Area Boundary

ELC Classes

- Agriculture
- Forest
- Open Water
- Cultural
- Wetland: Marsh
- Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2b
Scale	Project	
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441000m.E 42 43 44 45 46 47 48 449000m.E

4803000m.N 02 01 4800 4799000m.N

T-26 T-27 T-28 T-29 T-30 T-31 T-32 T-33 T-34 T-35 T-36 T-37 T-38 T-39 T-40

GCSWH-WNA
GCSWH-BMC

GCSWH-WNA
GCSWH-BMC

GCSWH-WRN
GCSWH-WASBB
GCSWH-BMC

GCSWH-WRN
GCSWH-WASBB
GCSWH-BMC

GCSWH-WASBB

Hendrick Road

Schadeview Road

Dashwood Road

Blackbush Line

Bronson Line

Pepper Road

MacDonald Road

21

Mun. of Bluewater

Mun. of South Huron

Dashwood

0 500 1,000 1,500
Meters

N

NEEGAN BURNSIDE

Date: 16 August 2012

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
Assembly Site Area Boundary
Ecoregion 6E - 7E Division

ELC Classes
Agriculture
Forest
Open Water
Cultural
Wetland: Marsh
Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations.

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2c
Scale	Project	
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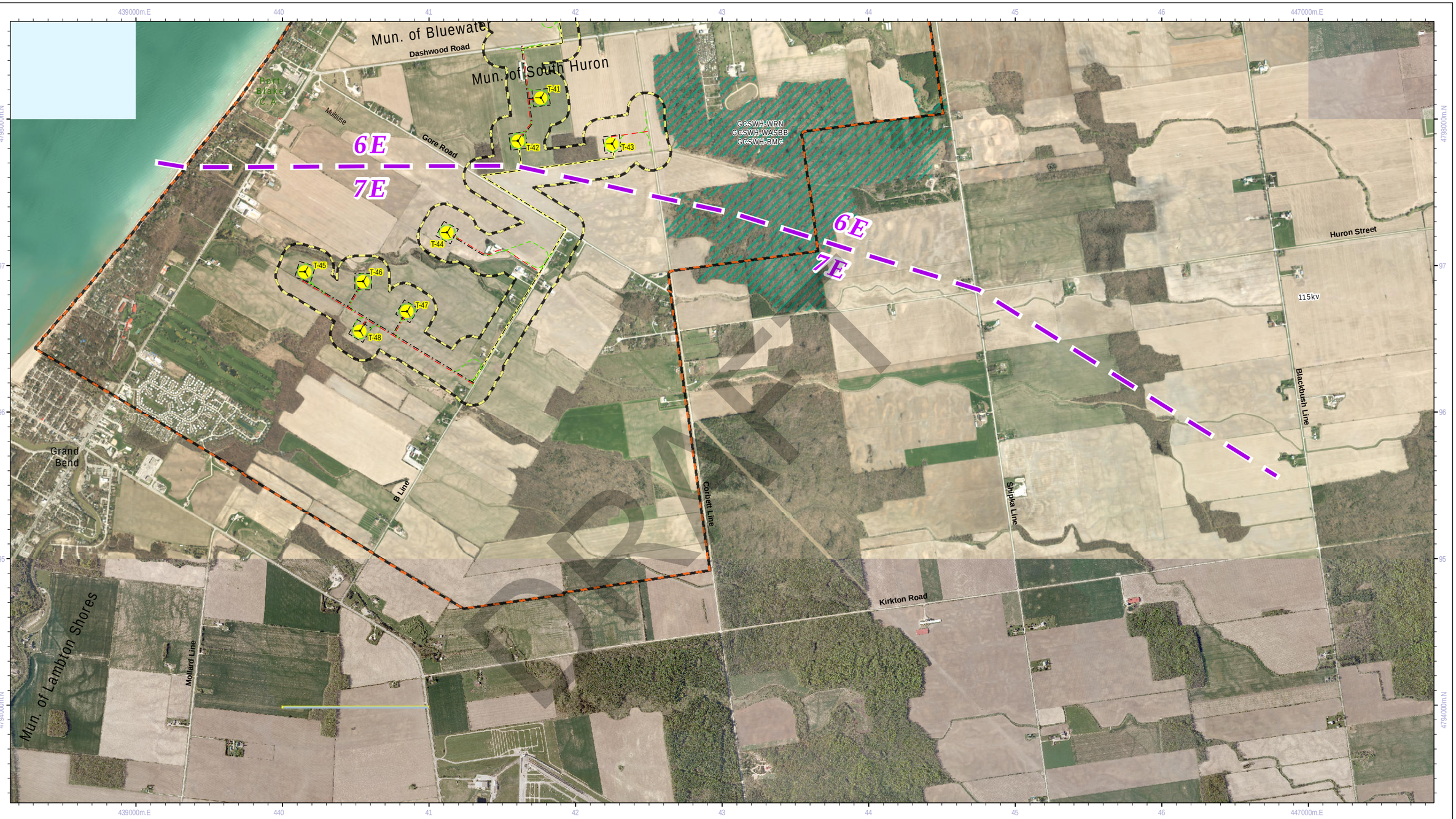

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Wind Turbine Location

120m From Project Location

Study Area

Transmission Line: Overhead

Collector Line; Transmission Line: Underground

Transformer Sub-Station; Switching Yard

Access Road & Underground Collector Line

Access Road

Access Road: For Construction (Temporary)

Assembly Site Area Boundary

Ecoregion 6E - 7E Division

ELC Classes

Agriculture

Forest

Open Water

Cultural

Wetland: Marsh

Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2d
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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Date: 16 August 2012

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
- Transformer Sub-Station; Switching Yard
- Access Road & Underground Collector Line
- Access Road
- Access Road: For Construction (Temporary)
- Assembly Site Area Boundary
- Ecoregion 6E - 7E Division

ELC Classes

- Agriculture
- Forest
- Open Water
- Cultural
- Wetland: Marsh
- Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2e
Scale	Project	
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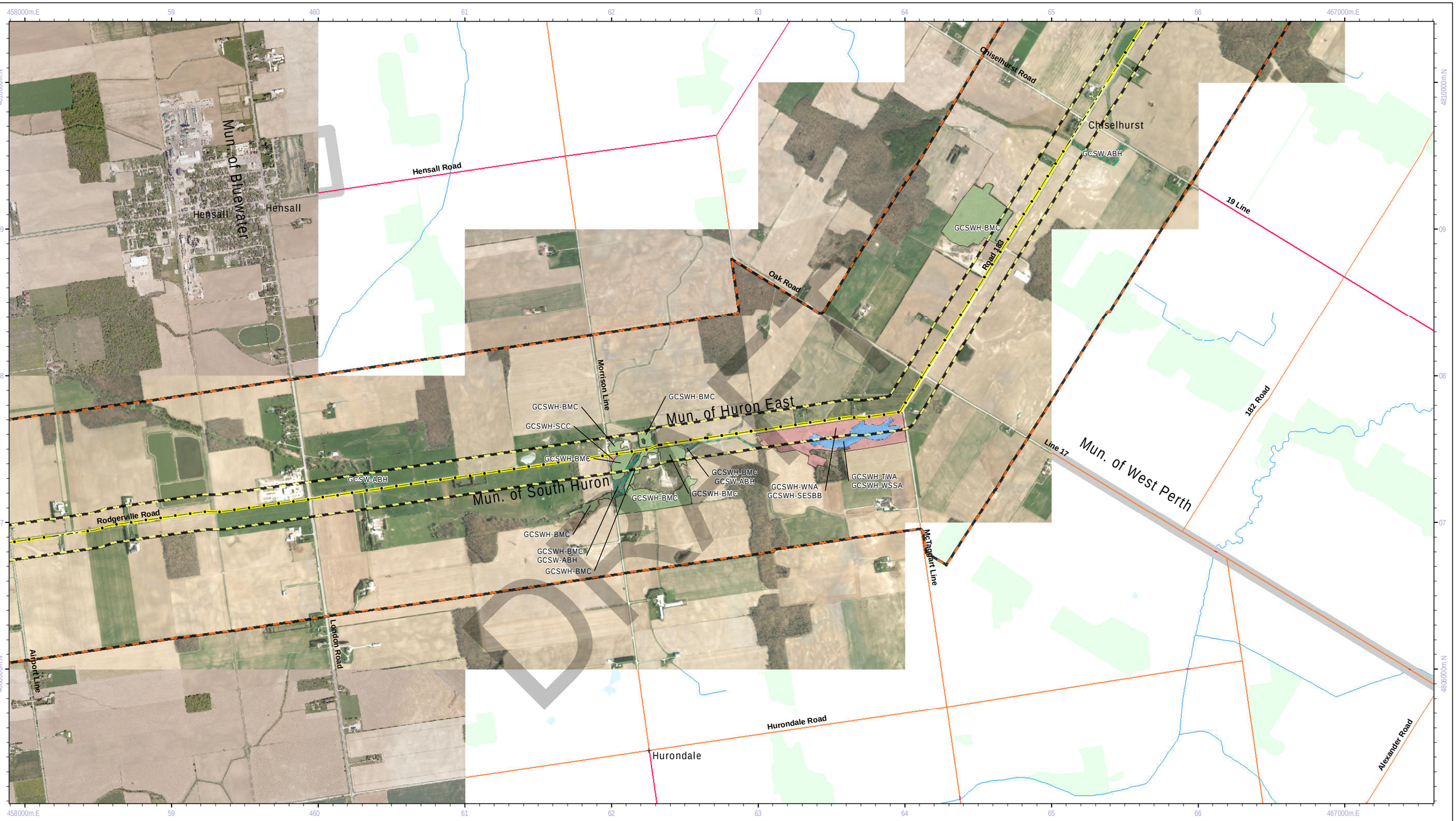

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Date: 16 August 2012

Wind Turbine Location

120m From Project Location

Study Area

Transmission Line: Overhead

Collector Line; Transmission Line: Underground

Transformer Sub-Station; Switching Yard

Access Road & Underground Collector Line

Access Road

Access Road: For Construction (Temporary)

Assembly Site Area Boundary

Ecoregion
6E - 7E Division

ELC Classes

Agriculture

Forest

Open Water

Cultural

Wetland: Marsh

Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2f
Scale	Project	
1:25,000	PIA019991	

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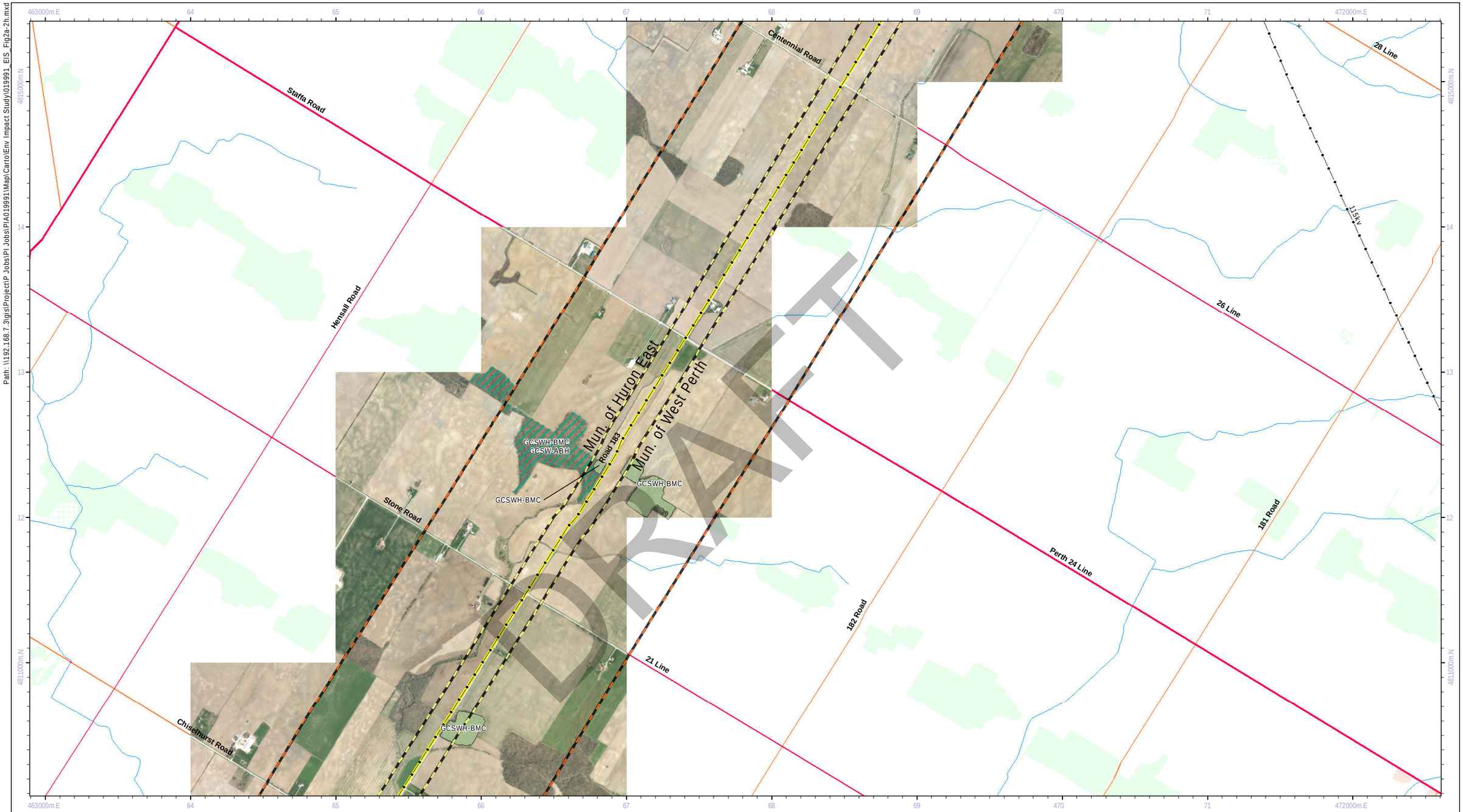

0 500 1,000 1,500
Meters

N

NEEGAN BURNSIDE

- Wind Turbine Location
- Transformer Sub-Station; Switching Yard
- Ecoregion 6E - 7E Division
- 120m From Project Location
- Access Road & Underground Collector Line
- Study Area
- Access Road
- Transmission Line: Overhead
- Access Road: For Construction (Temporary)
- Collector Line; Transmission Line: Underground
- Assembly Site Area Boundary

ELC Classes

- Agriculture
- Forest
- Open Water
- Cultural
- Wetland: Marsh
- Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2g
Scale	Project	
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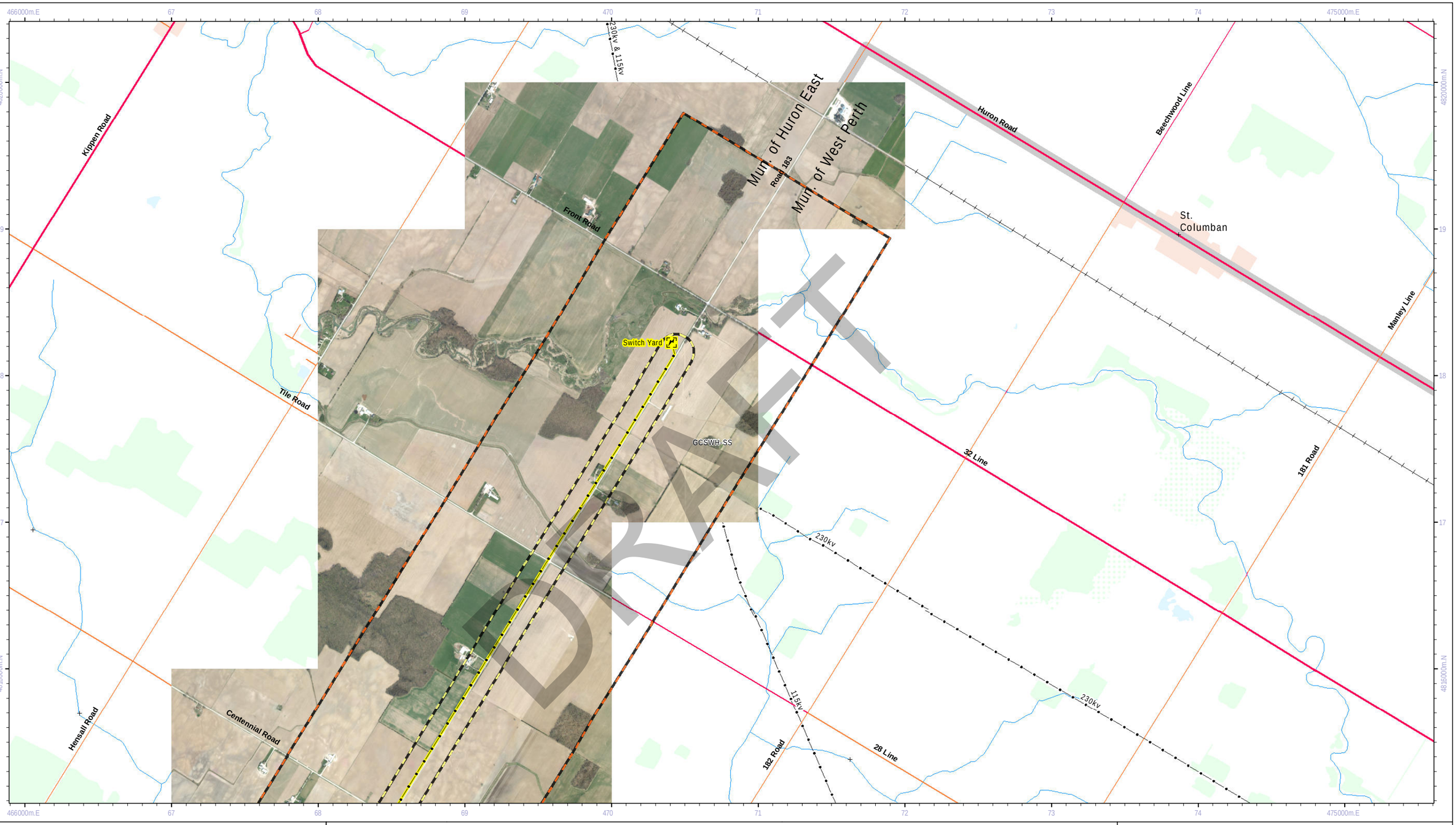

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Wind Turbine Location

120m From Project Location

Study Area

Transmission Line: Overhead

Collector Line; Transmission Line: Underground

Transformer Sub-Station; Switching Yard

Access Road & Underground Collector Line

Access Road

Access Road: For Construction (Temporary)

Assembly Site Area Boundary

Ecoregion
6E - 7E Division

ELC Classes

Agriculture

Forest

Open Water

Cultural

Wetland: Marsh

Wetland: Swamp

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Generalized Candidate SWH

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	2h
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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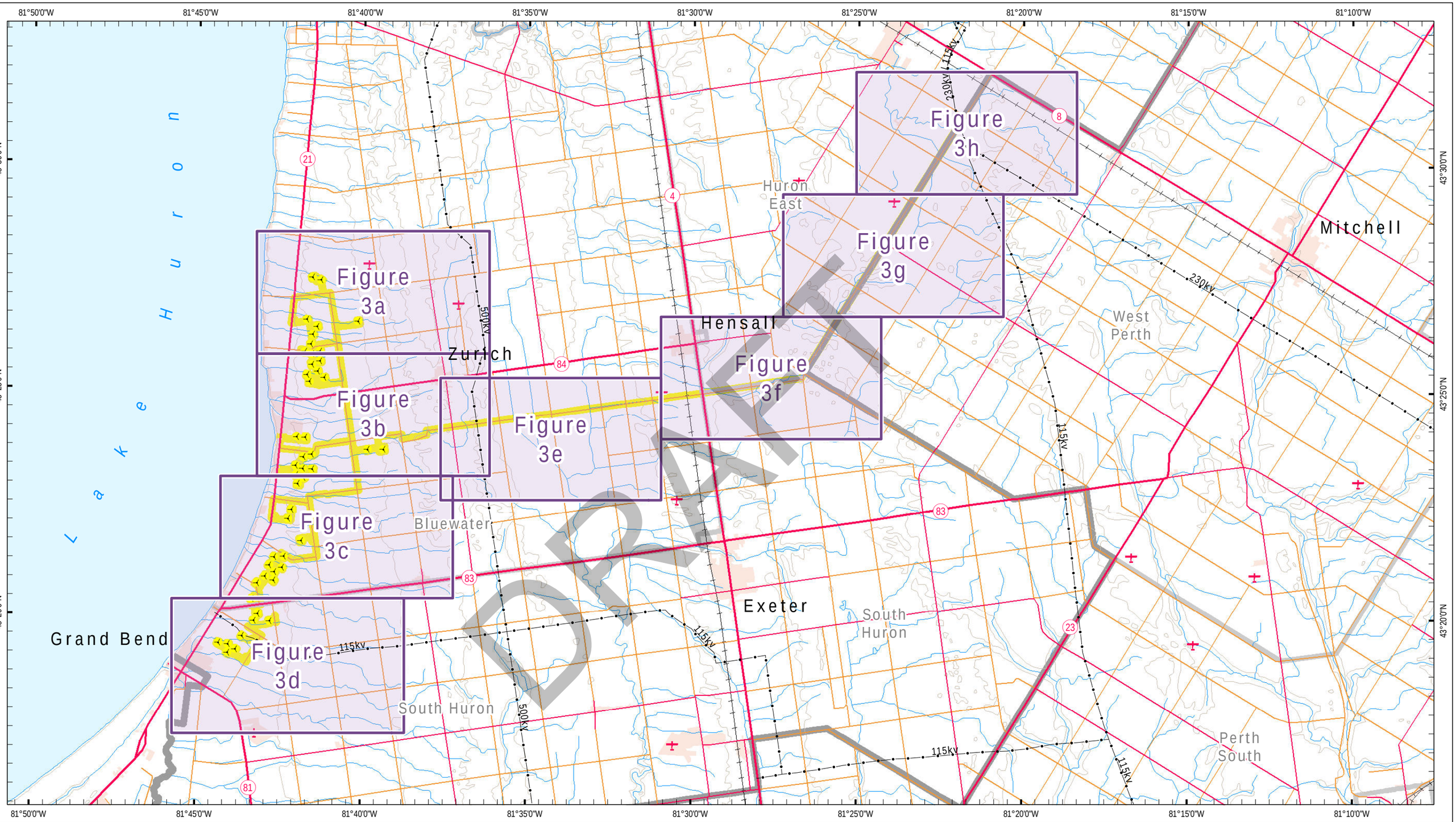

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Date: 16 August 2012

NEEGAN BURNSIDE

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3 - Key Map
Scale: 1:150,000	Project: PIA019991	

0 500 1,000 1,500
Meters

N

NEEGAN BURNSIDE

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
Assembly Site Area Boundary
Ecoregion 6E - 7E Division
Deer Yarding Area
Provincially Significant Wetland
Significant Woodland
Amphibian Breeding Habitat
Turtle Nesting Area
Valleyland

Note: All infrastructure shown on the map represents proposed locations.

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3a
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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0 500 1,000 1,500 Meters

N

NEEGAN BURNSIDE

Date: 16 August 2012

- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
- Transformer Sub-Station; Switching Yard
- Access Road & Underground Collector Line
- Access Road
- Access Road: For Construction (Temporary)
- Assembly Site Area Boundary
- Ecoregion 6E - 7E Division
- Deer Yarding Area
- Provincially Significant Wetland
- Significant Woodland
- Amphibian Breeding Habitat
- Turtle Nesting Area
- Valleyland

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3b
Scale	Project	
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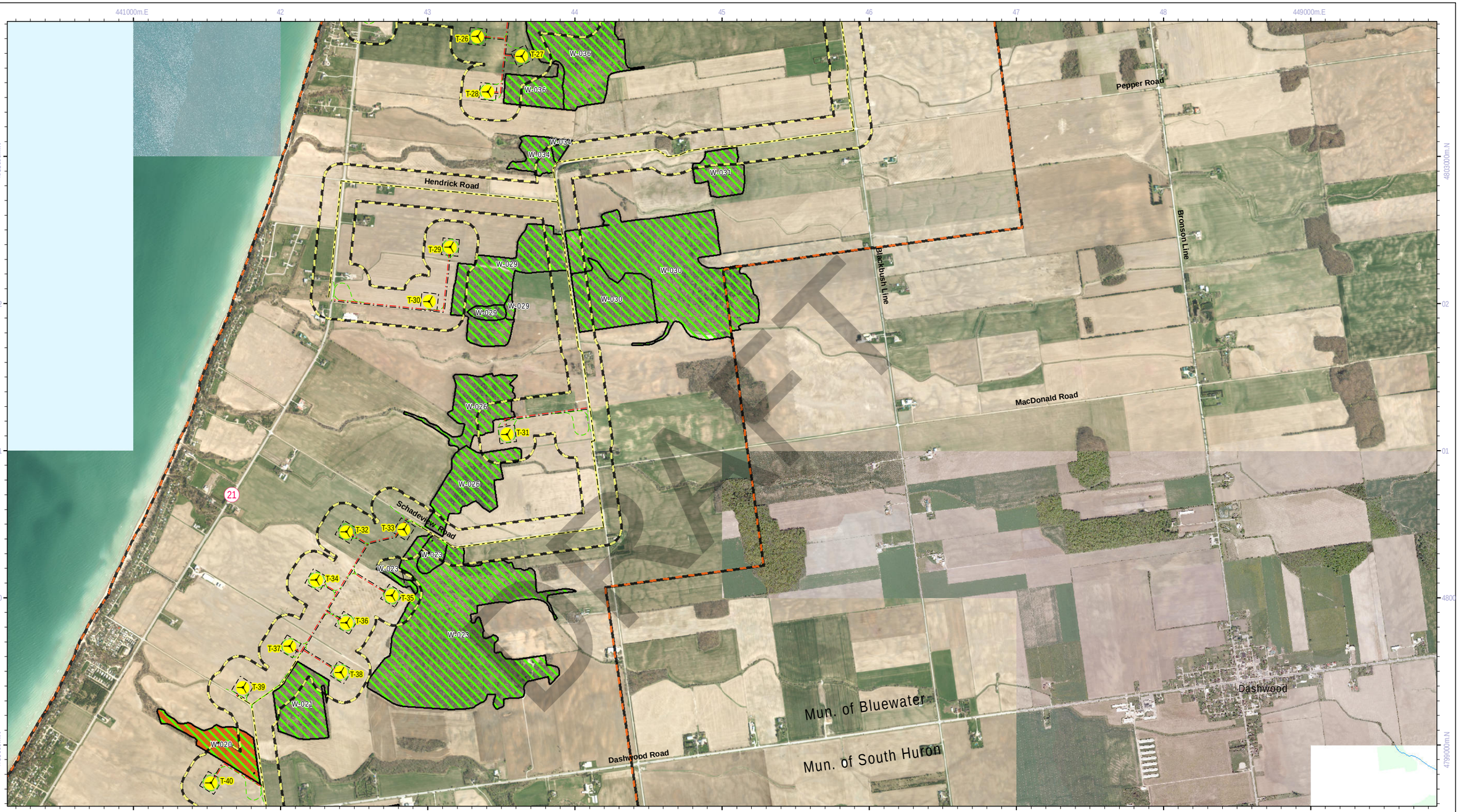

0 500 1,000 1,500
Meters

N

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
Assembly Site Area Boundary
Ecoregion 6E - 7E Division
Deer Yarding Area
Provincially Significant Wetland
Significant Woodland
Amphibian Breeding Habitat
Turtle Nesting Area
Valleyland

Note: All infrastructure shown on the map represents proposed locations.

NEEGAN BURNSIDE

Date: 16 August 2012

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3c
Scale	Project	
1:25,000	PIA019991	

0 500 1,000 1,500
Meters

N

NEEGAN BURNSIDE

- Wind Turbine Location
- Transformer Sub-Station; Switching Yard
- Ecoregion 6E - 7E Division
- 120m From Project Location
- Access Road & Underground Collector Line
- Study Area
- Access Road
- Transmission Line: Overhead
- Access Road: For Construction (Temporary)
- Collector Line; Transmission Line: Underground
- Assembly Site Area Boundary
- Deer Yarding Area
- Valleyland
- Provincially Significant Wetland
- Significant Woodland
- Amphibian Breeding Habitat
- Turtle Nesting Area

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3d
Scale	Project	
1:25,000	PIA019991	

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Date: 16 August 2012

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

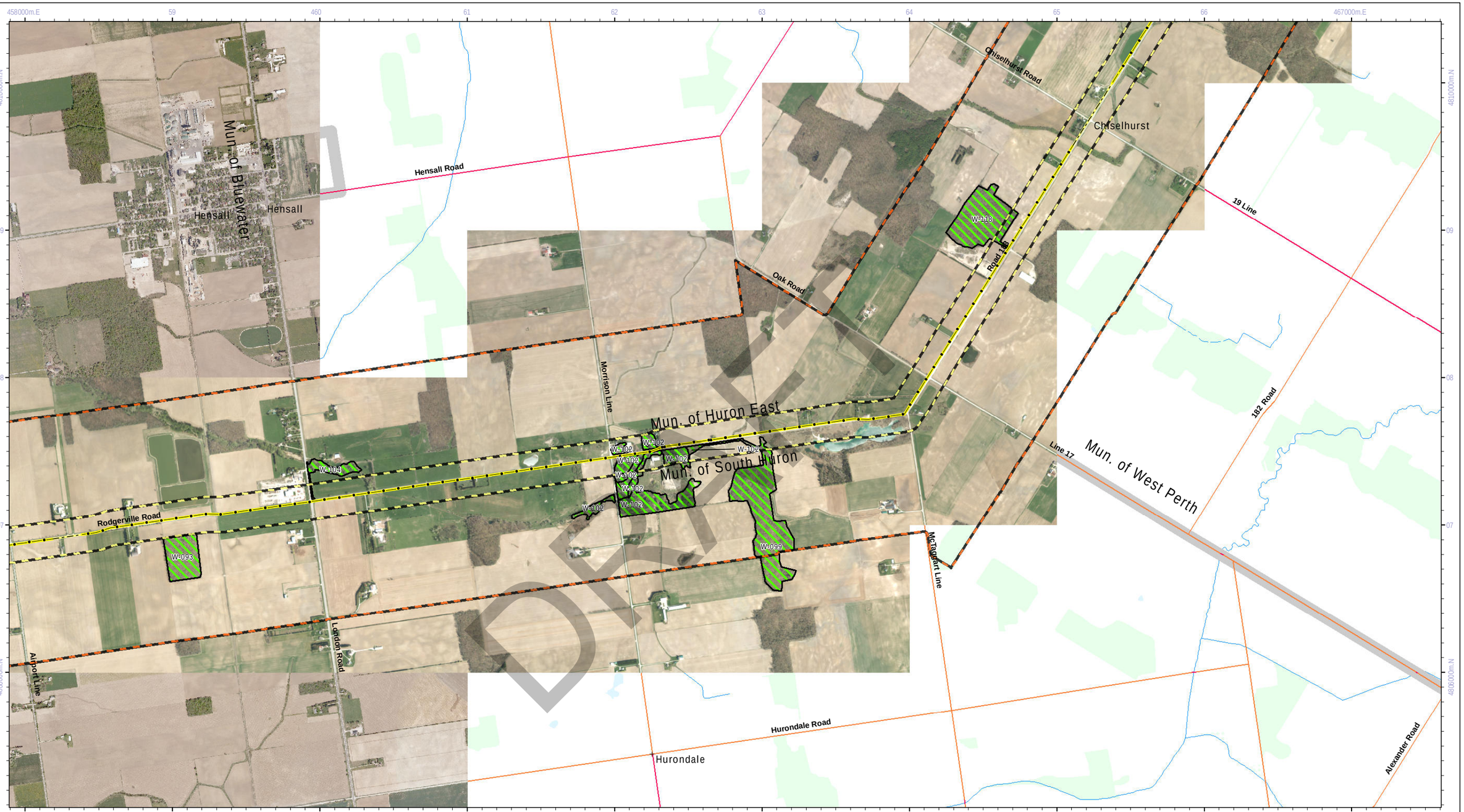
- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
- Transformer Sub-Station; Switching Yard
- Access Road & Underground Collector Line
- Access Road
- Access Road: For Construction (Temporary)
- Assembly Site Area Boundary
- Ecoregion 6E - 7E Division
- Deer Yarding Area
- Provincially Significant Wetland
- Significant Woodland
- Amphibian Breeding Habitat
- Turtle Nesting Area
- Valleyland

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3e
Scale	Project	
1:25,000	PIA019991	



0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
Assembly Site Area Boundary
Ecoregion 6E - 7E Division
Deer Yarding Area
Provincially Significant Wetland
Significant Woodland
Amphibian Breeding Habitat
Turtle Nesting Area
Valleyland

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3f
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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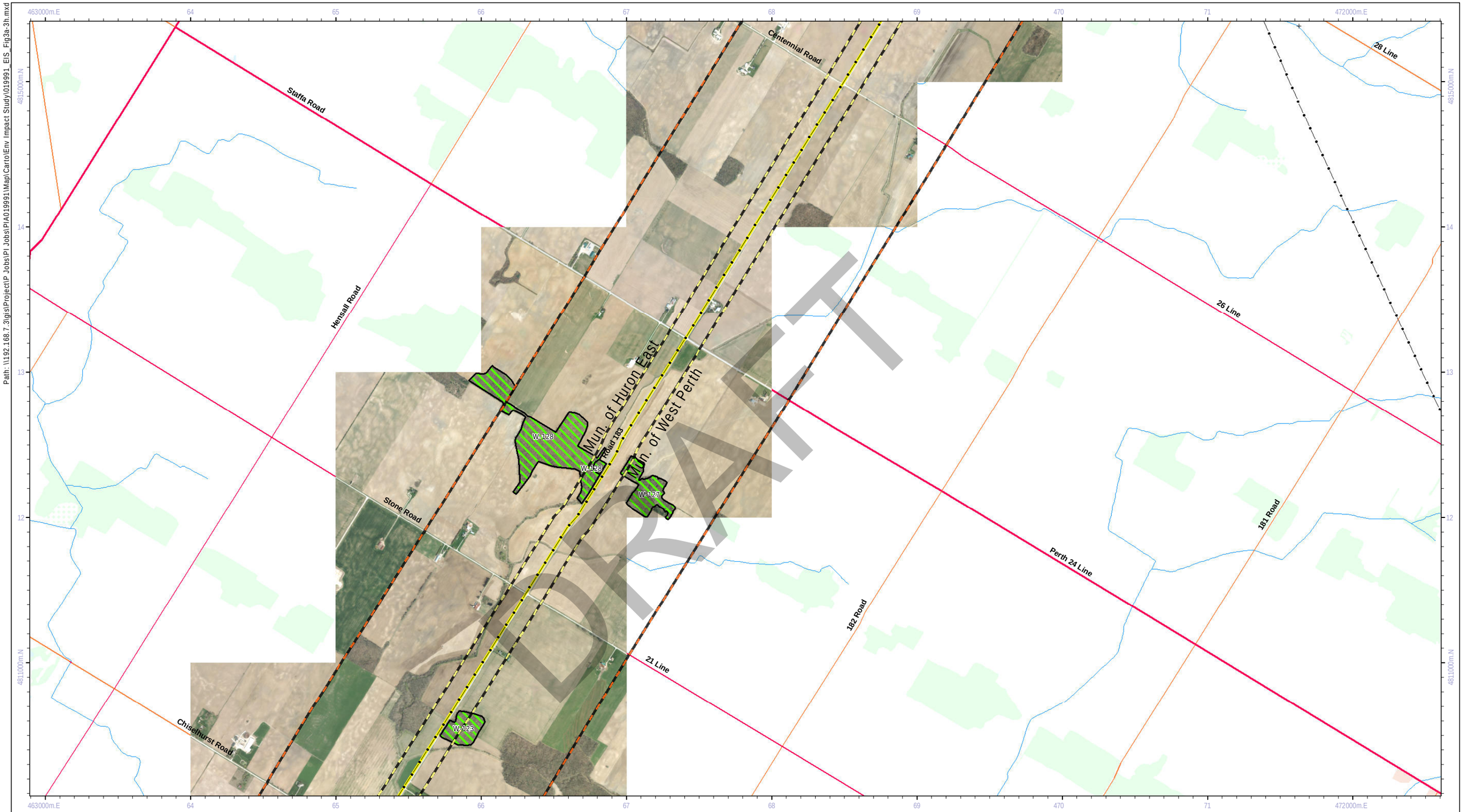

0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Wind Turbine Location

120m From Project Location

Study Area

Transmission Line: Overhead

Collector Line; Transmission Line: Underground

Transformer Sub-Station; Switching Yard

Access Road & Underground Collector Line

Access Road

Access Road: For Construction (Temporary)

Assembly Site Area Boundary

Ecoregion 6E - 7E Division

Deer Yarding Area

Valleyland

Provincially Significant Wetland

Significant Woodland

Amphibian Breeding Habitat

Turtle Nesting Area

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3g
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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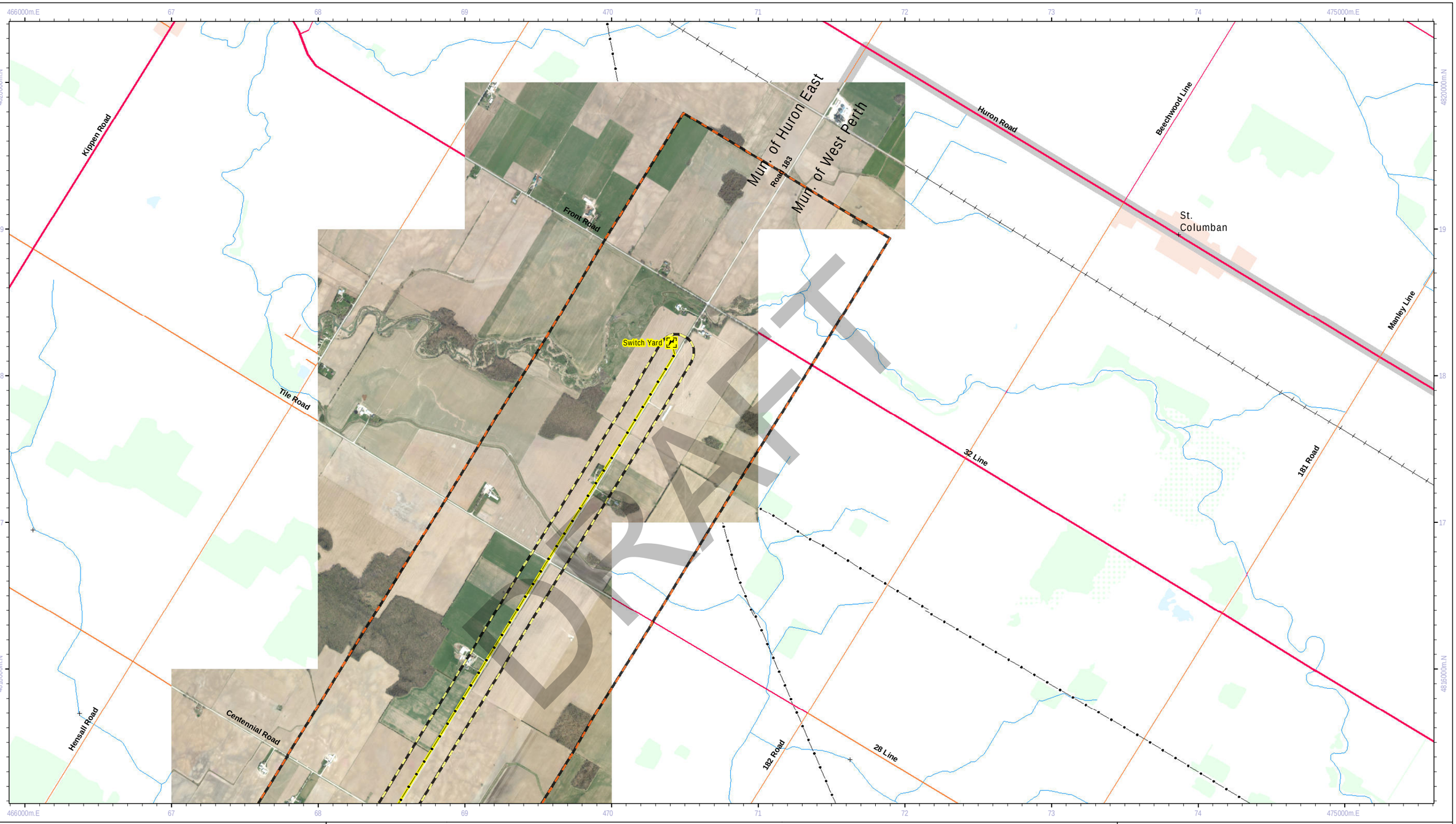

0 500 1,000 1,500

Meters

N

- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
- Transformer Sub-Station; Switching Yard
- Access Road & Underground Collector Line
- Access Road
- Access Road: For Construction (Temporary)
- Assembly Site Area Boundary
- Ecoregion 6E - 7E Division
- Deer Yarding Area
- Provincially Significant Wetland
- Significant Woodland
- Amphibian Breeding Habitat
- Turtle Nesting Area
- Valleyland

Note: All infrastructure shown on the map represents proposed locations.

NEEGAN BURNSIDE

Date: 16 August 2012

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Significant Features

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	3h
Scale	Project	
1:25,000	PIA019991	

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81°50'0"W 81°45'0"W 81°40'0"W 81°35'0"W 81°30'0"W 81°25'0"W 81°20'0"W 81°15'0"W 81°10'0"W

43°30'0"N 43°25'0"N 43°20'0"N

Lake Huron

Figure 4a
Figure 4b
Figure 4c
Figure 4d
Figure 4e
Figure 4f
Figure 4g
Figure 4h

Zurich
Bluewater
Grand Bend
Hensall
Huron East
Mitchell
West Perth
Exeter
South Huron
South Huron
Perth South

21 4 84 8 83 83 23 81

500kv 115kv 230kv 115kv 115kv 115kv 115kv 115kv 230kv

0 1 2 3 4 5 6 7 8
Kilometers

N

Wind Turbine Location

120m From Project Location

NEEGAN BURNSIDE

Date: 16 August 2012

Note: All infrastructure shown on the map represents proposed locations

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4 - Key Map
Scale: 1:150,000	Project: PIA019991	

0 500 1,000 1,500
Meters

N

NEEGAN BURNSIDE

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
Assembly Site Area Boundary
Ecoregion 6E - 7E Division
Habitat for Special Concern and Rare Species
Treated As Provincially Significant Wetland
Turtle Wintering Area
Bat Maternal Colony

Note: All infrastructure shown on the map represents proposed locations.

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4a
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Date: 16 August 2012

- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
- Transformer Sub-Station; Switching Yard
- Access Road & Underground Collector Line
- Access Road
- Access Road: For Construction (Temporary)
- Assembly Site Area Boundary
- Ecoregion 6E - 7E Division
- Habitat for Special Concern and Rare Species
- Treated As Provincially Significant Wetland
- Turtle Wintering Area
- Bat Maternal Colony

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4b
Scale	Project	
1:25,000	PIA019991	

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441000m.E 42 43 44 45 46 47 48 449000m.E

4803000m.N 02 01 4800 4797000m.N

T-26 T-27 T-28 W-036 W-036 Hendrick Road T-29 T-30 WE-003 W-029 W-026 T-31 W-026 21 Schadeview Road T-32 T-33 W-023 W-023 T-34 T-35 T-36 WE-002 T-37 T-38 T-39 W-021 W-020 TWA-003 T-40 Dashwood Road Blackbush Line Pepper Road Bronson Line MacDonald Road Mun. of Bluewater Mun. of South Huron Dashwood

0 500 1,000 1,500 Meters

N

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
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Treated As Provincially Significant Wetland
Turtle Wintering Area
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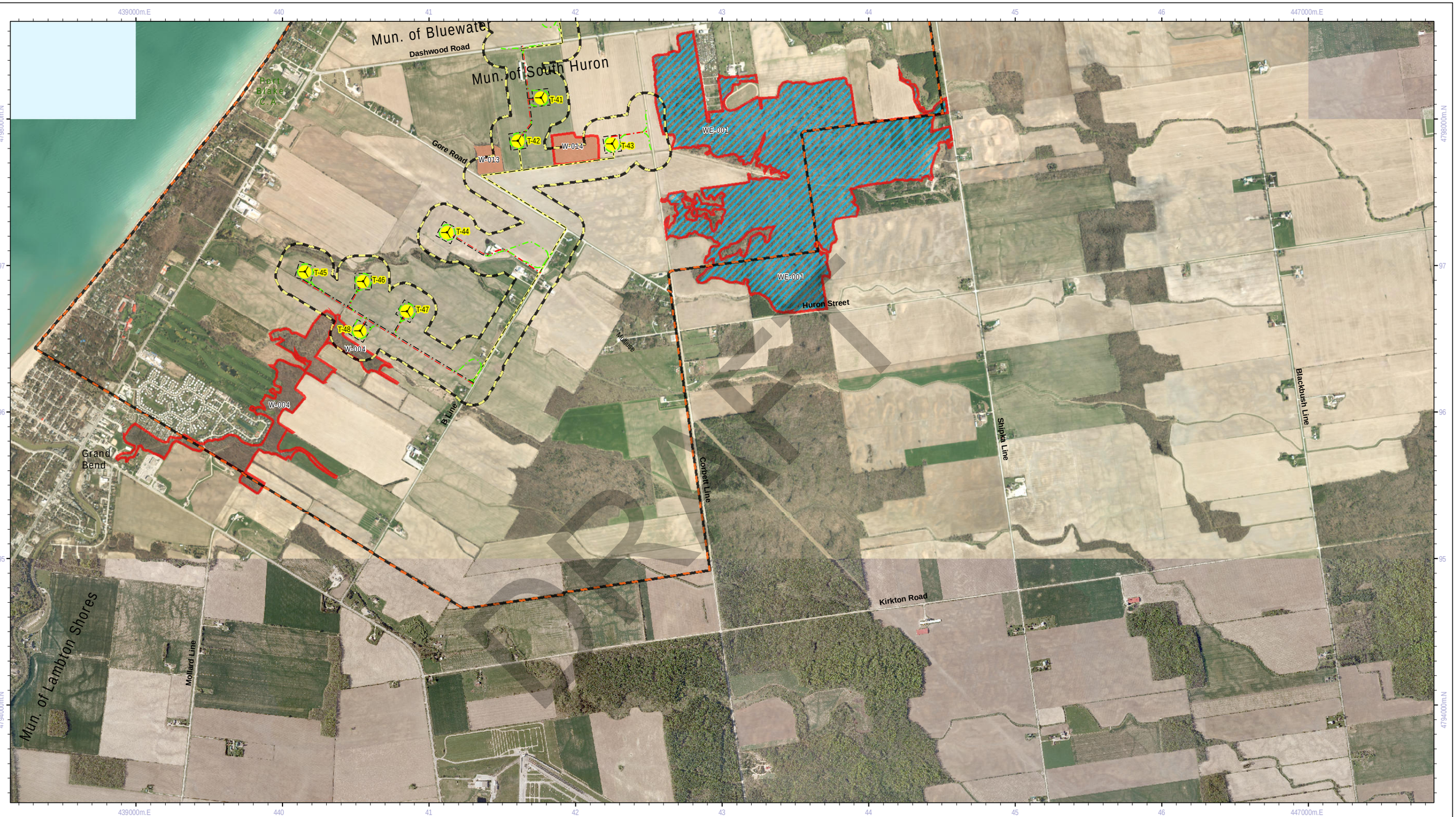
Note: All infrastructure shown on the map represents proposed locations

NEEGAN BURNSIDE

Date: 16 August 2012

Title
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4c
Scale	Project	
1:25,000	PIA019991	



0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Wind Turbine Location

120m From Project Location

Study Area

Transmission Line: Overhead

Collector Line; Transmission Line: Underground

Transformer Sub-Station; Switching Yard

Access Road & Underground Collector Line

Access Road

Access Road: For Construction (Temporary)

Assembly Site Area Boundary

Ecoregion 6E - 7E Division

Habitat for Special Concern and Rare Species

Treated As Provincially Significant Wetland

Turtle Wintering Area

Bat Maternal Colony

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4d
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Date: 16 August 2012

- Wind Turbine Location
- 120m From Project Location
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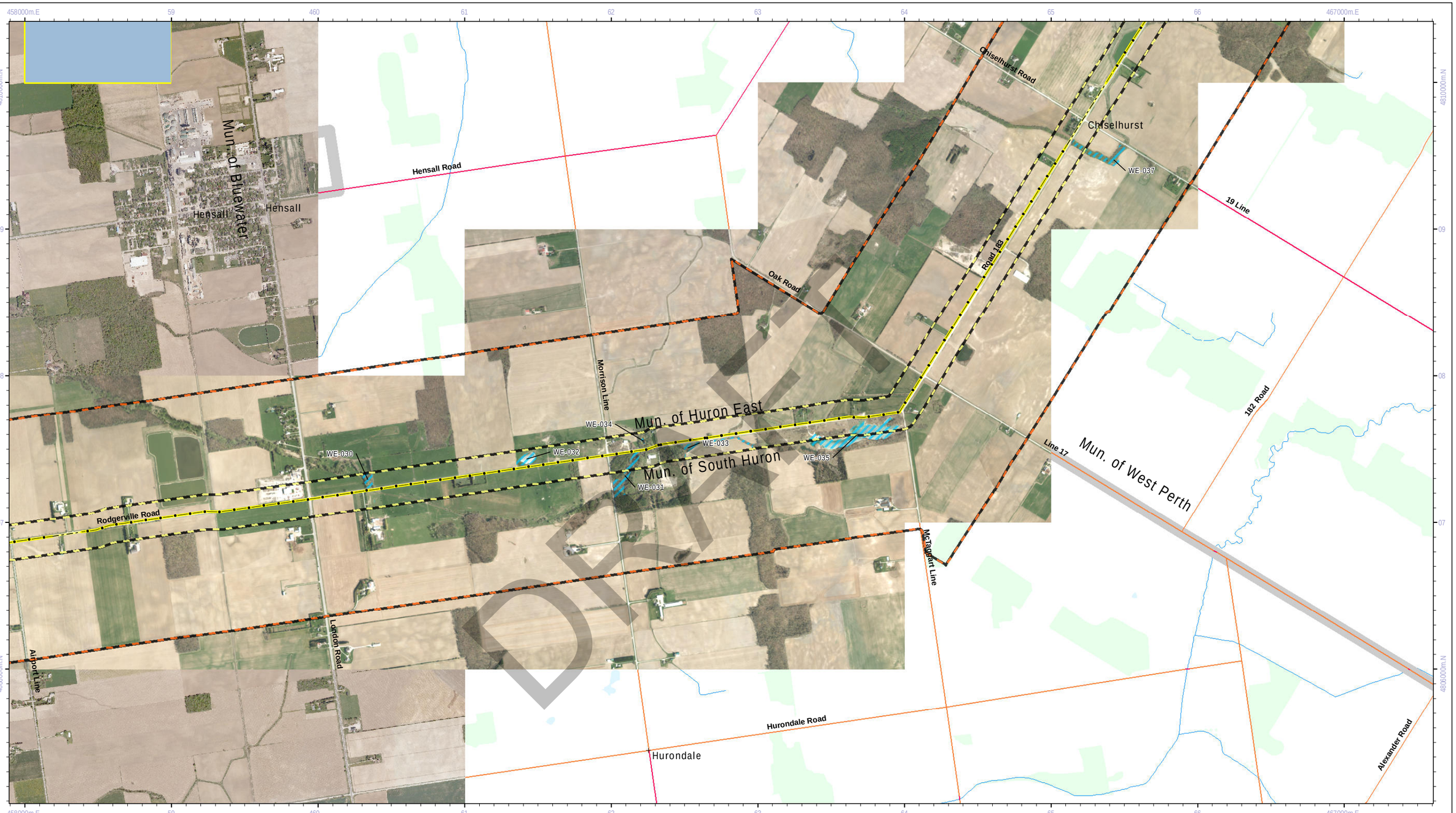
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4e
Scale	Project	
1:25,000	PIA019991	



0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

Wind Turbine Location
120m From Project Location
Study Area
Transmission Line: Overhead
Collector Line; Transmission Line: Underground
Transformer Sub-Station; Switching Yard
Access Road & Underground Collector Line
Access Road
Access Road: For Construction (Temporary)
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Treated As Provincially Significant Wetland
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Bat Maternal Colony

Note: All infrastructure shown on the map represents proposed locations.

Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4f
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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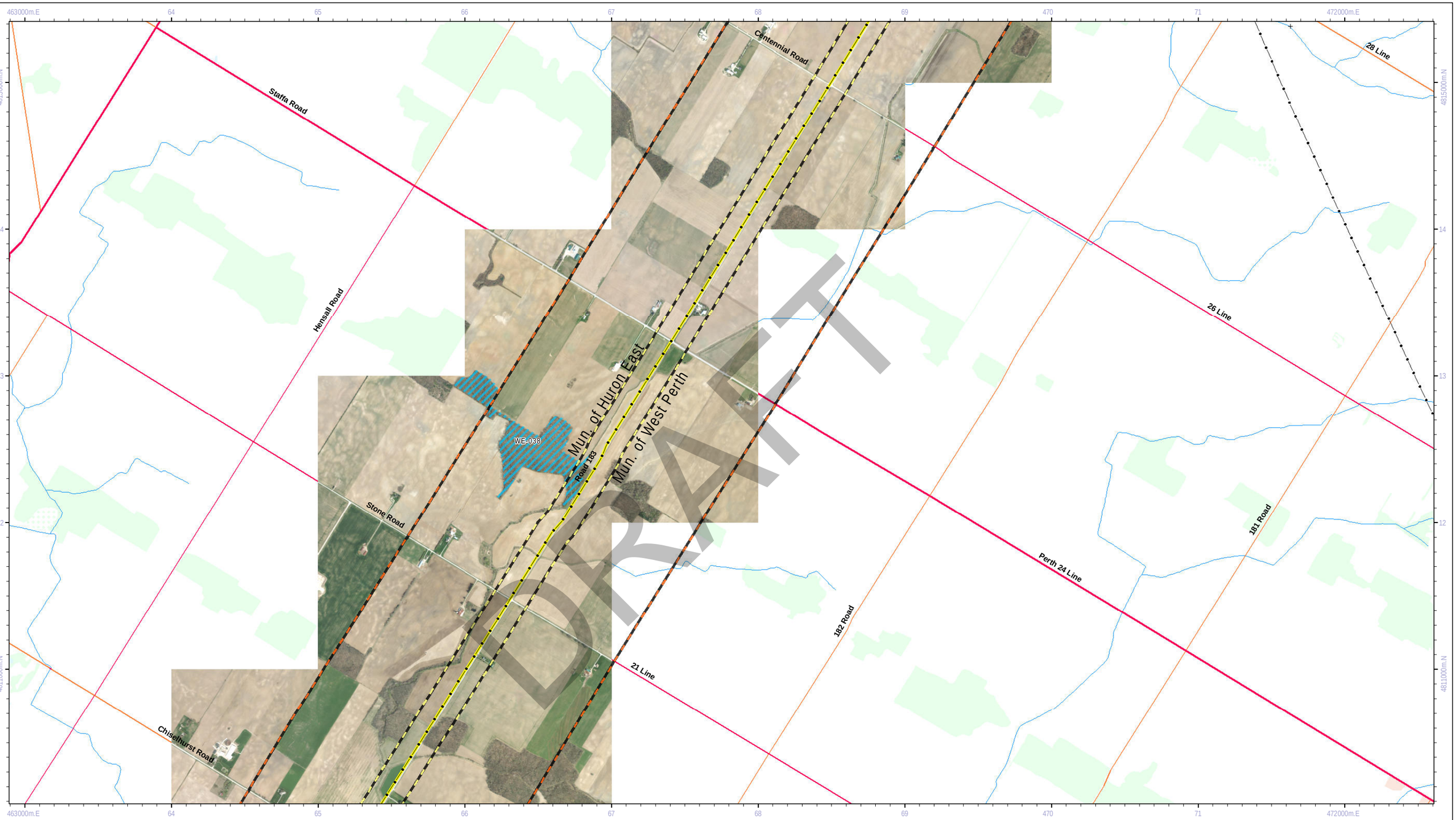
Date: 16 August 2012



0 500 1,000 1,500

Meters

N

NEEGAN BURNSIDE

- Wind Turbine Location
- 120m From Project Location
- Study Area
- Transmission Line: Overhead
- Collector Line; Transmission Line: Underground
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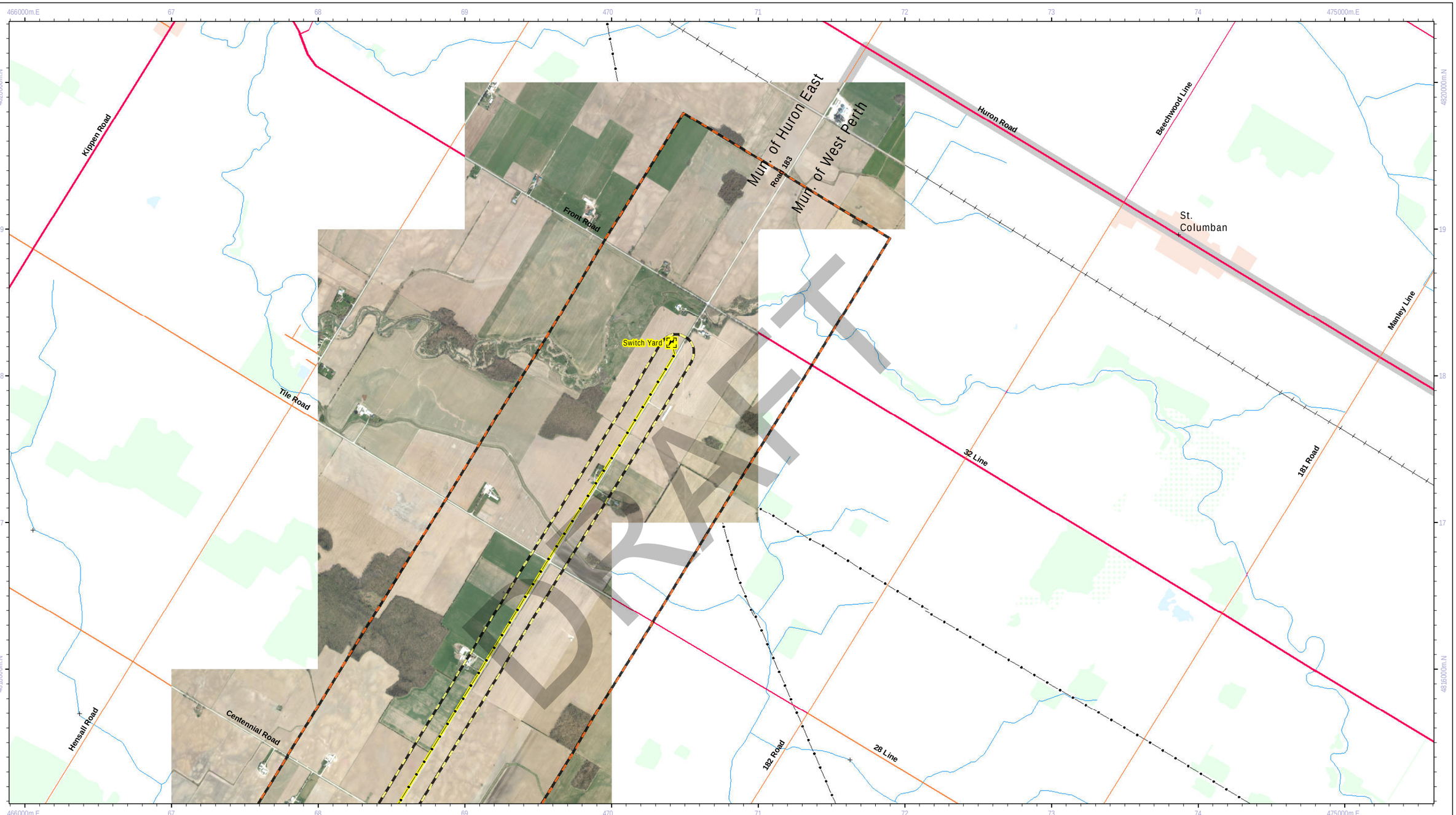
Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4g
Scale: 1:25,000	Project: PIA019991	



0 500 1,000 1,500

Meters

N

Wind Turbine Location

120m From Project Location

Study Area

Transmission Line: Overhead

Collector Line; Transmission Line: Underground

Transformer Sub-Station; Switching Yard

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Title

Grand Bend Wind Farm
Grand Bend Wind Limited Partnership
Environmental Impact Study
Features Treated as Significant

Prepared	Checked	Figure Number
P. Stubbert	T. Radburn	4h
Scale	Project	
1:25,000	PIA019991	

Date: 16 August 2012

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NEEGAN BURNSIDE

Appendix B
MNR Confirmation