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NEXTERA ENERGY CANADA, ULC SUMMERHAVEN WIND ENERGY CENTRE APPLICATION FOR A RENEWABLE ENERGY APPROVAL

Design and Operations Report

Submitted to:
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Toronto, Ontario
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REPORT



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Summerhaven Wind Energy Centre - Parcel Boundary Setback Reduction Analysis



1.0 INTRODUCTION

This Design and Operations Report (the Report) has been prepared to provide information to the public, Aboriginal communities, municipalities and local authorities regarding the proposed Summerhaven Wind Energy Centre (the Project). The Report is a required component of an Application for a Renewable Energy Approval (REA Application) under Ontario Regulation (O. Reg.) 359/09¹ made under the *Environmental Protection Act (EPA)*.

This Report has been prepared in accordance with O. Reg. 359/09 and Technical Bulletin Two: Guidance for preparing the Design and Operations Report (MOE, 2010). Table 1 summarizes information to be included in the Report based on Table 1 of O. Reg. 359/09 and directs readers to the associated section(s) of this document.

Table 1: Design and Operations Report requirements under O. Reg. 359/09

Requirement as per O. Reg. 359/09	Report section where information can be found
The proposed Site Plan, including alternatives being investigated	Section 2 and Site Plan Report
The design of the facility and the components to be used	Section 3
How the project will be operated	Section 4
How environmental effects during operations will be monitored and mitigated	Section 5
How emergencies and communications will be managed	Section 6

Additional information about the Project can currently be found in the Construction Plan Report (Golder, 2011a), Decommissioning Plan Report (Golder, 2011b), and Project Description Report (Golder, 2011c). A description of the Site Plan design is provided in the Design and Operations Report. As it is broadly applicable to all of the REA Reports, and to avoid redundancy, the Site Plan diagram has been provided as a stand-alone document (the Site Plan Report).

Technical studies associated with the REA Application requirements were initiated in 2007 and extended into 2010. Additional information about the Project and results of technical studies and assessments of negative environmental effects are available in the following reports:

- Wind Turbine Specifications Report (Golder, 2011d);
- Natural Heritage Assessment Report (Golder, 2011e);
- Stage 1 Archaeological Assessment Report (Golder, 2010a);
- Heritage Assessment Report (Golder, 2011j);
- Noise Study Report (Golder, 2011f);
- Water Assessment Report (Golder, 2011g);

¹ As amended by O. Reg. 521/10 which came into force on January 1, 2011.



- Site Plan Report (Golder, 2011h); and
- Consultation Report (Golder, 2011i).

Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports are not required as part of the REA Application for this Project (Ministry of Energy and Infrastructure, 2010) and are typically not publically available documents due to the confidential nature of the content. Stage 2, Stage 3 and Stage 4 Archaeological Assessment Reports will however be made available to the Ministry of Tourism and Culture (MTC) for review and their issuance of a Comment Letter in advance of construction and hard copies of this information will be provided to Aboriginal communities with an interest in the Project, as identified by the Director, and as agreed to by individual Aboriginal communities.

The quantities and description of general operations described in this Report are based on estimated means and methods consistent with current practice. As such, the quantities and general operations are subject to change upon hiring the construction contractor and circumstances encountered at the time of receiving the REA.

1.1 Project Summary

The Project consists of the site preparation, construction, operation, and decommissioning of 59 wind turbine generators with a total installed nameplate capacity of 131.04 MW. The Project will be owned and operated by NextEra Energy Canada, ULC (NextEra Energy Canada) and will be located in the vicinity of Nanticoke, Haldimand County, Ontario (Figure 1, end of Report). The Project lifespan from obtaining the REA Approval to the end of Decommissioning is estimated to be 27 years. A summary of the Project vital statistic is presented in Table 2.

Turbine towers will be constructed on a concrete foundation. Underground and overhead cables will interconnect individual turbines and eventually connect to the substation (see Site Plan Report). The operation of the wind turbines will be monitored remotely from a Project operations building located near the substation. Once tested and commissioned, the turbines will require scheduled visits for maintenance during the Operations Phase. Maintenance will include complete inspection of the turbine's components and the tower, functionality testing, replacement of worn parts, bolt tightening and lubrication of moving parts. Routine preventative maintenance activities will be completed as per manufacturer requirements.

The Project Area (Figure 1) encompasses approximately 22,583 ha of privately owned land parcels. Land use is predominantly cash-crop agriculture (i.e., farming for corn, soybeans, wheat), although some areas are pasture (predominantly for cattle) and several wooded areas are present. Selkirk Provincial Park and Haldimand Conservation Area are located along the shore of Lake Erie south of the Project Area. The Grand River runs northeast of the Project Area and an Imperial Oil refinery is directly southwest.

The location of the Project was predicated by interest expressed by local landowners. Haldimand County is also attractive for wind development due to its proximity to Lake Erie, which results in favourable wind conditions for wind power production.



Table 2: Summary of Project Vital Statistics

General	
Project Name	Summerhaven Wind Energy Centre
Project Ownership and Operation	NextEra Energy Canada, ULC
Project Lifespan (approval to decommissioning)	27 years
Project Nameplate Capacity	131.04 MW

Project Area (as shown in Figure 1)		
Location of Project	Privately-owned land near Nanticoke, Ontario	
Total Project Area	22,583 ha	
Total Land Area Used by Project Components	298 ha	
Turbines	Siemens 101	Siemens 93
Total Number	58	1
Rating	2.221 MW	2.221 MW
Number of Blades	3	3
Blade Length	49 m	45 m
Hub Height	80 m	80 m
Rotor Diameter	101 m	93m
Cut-in Wind Speed	4 m/s	4 m/s
Cut-out Wind Speed	25 m/s	25 m/s
Rated Wind Speed	12 – 13 m/s	12 – 13 m/s
Swept Area	8,000 m ²	6,800 m ²
Foundation Dimensions	Approximately 17 m × 17 m × 3 m	Approximately 17 m × 17 m × 3 m

Access Roads	
Length of 7.3 m-Wide Roads	11 km
Length of 11 m-Wide Roads	36.9 km

Electrical Transformers and Cables	
34.5 kV Collector System Cables	132 km (60 km overhead, 54 km underground trenched, 3 km underground directional drilled)
230 kV Transmission Cables	7.7 km (overhead)

Other Project Structures and Facilities	
Transforming Substation Size	2 ha
Switchyard Area	2 ha
Operations Building Size	465 m ² , adjacent 200 m ² parking area



2.0 SITE PLAN

NextEra Energy Canada considered a variety of factors when siting wind turbines and other Project infrastructure and examined potential constraints to development as part of the pre-planning stage for the Project. Additional constraints mapping was conducted by Golder and was used to aid in revising the layout of Project components relative to the natural features and the setbacks identified, reducing where possible the need for further studies and mitigating effects on the natural environment. The Golder constraints analysis, which considered several turbine location scenarios, included natural environment (terrestrial and aquatic), geological, archaeological, socio-economic, and land use-related considerations and served to assist in identifying the least constraining design options on land parcels with existing landowner agreements. A combination of the output of all constraints analysis exercises was used by NextEra Energy Canada to site turbines and other Project infrastructure. As the Project layout evolved through several iterations, the environmental, social and regulatory considerations of utmost concern included:

- Comments and opinions obtained through the public, Municipal and Aboriginal consultation process;
- Municipal and provincial government setbacks to significant natural heritage features and other infrastructure (e.g., wetlands, roads, parcel boundaries, structures, etc.);
- Lands under option to NextEra Energy Canada available to place infrastructure contained in the Project Area;
- Landowner preferences and minimizing changes to existing land use and function;
- Site access;
- Minimizing the lengths of cable lines and access roads;
- Determining a suitable transmission line corridor to Haldimand Hydro and point of interconnection (POI) with the 230 kV Hydro One transmission line;
- Available results from archaeological, built heritage and noise assessments;
- Proximity and predicted effects to known or assessed significant natural heritage features;
- Minimize watercourse crossings by access roads and underground cables;
- Meteorological conditions and wind resources; and
- Potential electricity production of individual turbines within the Project.

For purposes of the Project design, specific setback distances were considered and applied where possible. The sources of these setbacks are shown in Table 3, with specific setback distances discussed as appropriate in Section 5. A number of regulatory setbacks were based on municipal and provincial requirements, while others were applied by NextEra Energy Canada based on corporate or industry standards, environmental best practices and operational risk assessment. In some cases there is more than one possible setback type and distance that may apply to a single feature (e.g., pipelines).

As discussed in the Natural Heritage Assessment Report and Water Assessment Report, if it was not possible to comply with setback distances from significant natural features or water bodies then an Environmental Impact



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Study (EIS), as outlined in O. Reg. 359/09, was conducted to assess the potential negative environmental effects and details of a monitoring plan will be in the respective report.

Table 3: Sources of Setback or Consultation Distances from Project Components

Feature	Source
Cultural/Natural Features and Water Bodies	
Archaeological and Heritage Sites	Ontario Ministry of Tourism and Culture
Significant Wildlife Habitat and Valleylands	O. Reg. 359/09
Significant Woodlands	O. Reg. 359/09; Haldimand County Official Plan
Provincial Parks, Conservation Reserves, Provincially Significant Areas of Natural and Scientific Interest (life science)	O. Reg. 359/09
Provincially Significant Areas of Natural and Scientific Interest (earth science)	O. Reg. 359/09
Environmentally Significant Areas	Haldimand County Official Plan Environmental Constraint Areas Map (Schedule E)
Waterbodies	O. Reg. 359/09
Provincially Significant Wetlands	O. Reg. 359/09; Ontario Ministry of Natural Resources; Haldimand County Official Plan Environmental Constraint Map
Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation Limit (LPRCA)	O. Reg. 178/06 for Long Point Region Conservation Authority
Noise Receptors	
Non-participating	O. Reg. 359/09
Participating	Noise Impact Assessment following O. Reg. 359/09
Infrastructure and Municipal Planning	
Aggregate resources and petroleum wells	O. Reg. 359/09
Regional Airport	Haldimand County Official Plan Guidance/Zoning
Transmission Lines	Hydro One Inc.; Haldimand Hydro
MTO Highway	Ontario Ministry of Transportation
County Road	Haldimand County Official Plan Guidance/Zoning
Municipal Road	Haldimand County Official Plan Guidance/Zoning
Lot Line	O. Reg. 359/09
Electromagnetic Interference	
Wireless Broadband Link	RABC/CanWEA EMI Guidelines (RABC/CanWEA, 2007) and advice from independent Telecom impact consultants
Wireless EMI Link	RABC/CanWEA EMI Guidelines and advice from independent Telecom impact consultants
Civilian Air Traffic Control Radar	RABC/CanWEA EMI Guidelines
Seismological Monitoring Equipment	RABC/CanWEA EMI Guidelines
Weather Radar	RABC/CanWEA EMI Guidelines



Through an iterative process that considered setback requirements, environmental and social constraints and input acquired through the consultation process, a proposed Site Plan was determined. The Site Plan Report depicts the Project Location. A summary of changes in the Project Location relative to the draft REA reports which were available for consultation purposes in October and December 2010 are provided in the Site Plan Report.

The Site Plan Report shows the location of Project components, adjacent buildings, roads and noise receptors. Additionally, setbacks from protected properties, archaeological and heritage resources, natural features and water bodies in accordance with O. Reg. 359/09, are demonstrated in the Site Plan Report. An EIS for each known or assessed significant natural feature shown in the Site Plan Report, which is within the O. Reg. 359/09 setback distance from the Project Location, is provided in the Natural Heritage Assessment Report.

Noise receptors and the closest proposed noise source (turbine or substation) are documented in Table 4, as required in Technical Bulletin Two: Guidance for preparing the Design and Operations Report (MOE, 2010). Any receptors documented in Table 4 that are less than 550 m from wind turbines or the substation are associated with existing participating points of reception or participating vacant lots only. A table of the distances between noise receptors and the nearest sound source, either a turbine or the substation, is provided in the Noise Study Report. It is noted that the closest sound source does not necessarily generate the highest sound power level and readers are therefore referred to the Noise Study Report to identify the level at an individual receptor location.



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Table 4: Straight Line Distances to Nearest Noise Receptor from Turbines and Substation

Turbine or Substation ID¹	Distance to Noise Receptor from Turbine or Substation² (m)
1	486
2	Removed from design
3	506
4	518
5	479
6	570
7	538
8	559
9	452
10	531
11	394
12	641
13	610
14	478
15	588
16	776
17	406
18	541
19	441
20	529
21	779
22	454
23	492
24	638



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Turbine or Substation ID¹	Distance to Noise Receptor from Turbine or Substation² (m)
25	485
26	391
27	584
28	449
29	Removed from design
30	499
31	530
32	475
33	523
34	706
35	486
36	788
37	600
38	616
39	754
40	704
41	747
42	465
43	790
44	617
45	557
46	598
47	482
48	723
49	695



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Turbine or Substation ID¹	Distance to Noise Receptor from Turbine or Substation² (m)
50	615
51	578
52	803
53	684
54	556
55	725
56	656
57	609
58	616
59	542
60	Removed from design
61	581
62	485
Substation	110

¹ Turbine numbers 2, 29 and 60 do not exist in the REA submission design. To avoid confusion, turbine numbers have not been renumbered relative to the October 2010 draft REA documents posted for public comment.

² Any receptors that are less the 550 m from wind turbines or the substation are participating.



3.0 FACILITY DESIGN PLAN

The Project components were selected to optimize the power output while minimizing negative environmental effects and potential residual effects. The Site Plan is shown in the Site Plan Report. The Project will consist of the major components summarized in Table 5.

Table 5: Facility Design Plan Project Components

Access Roads	
Length of 7.3 m-Wide Roads ¹	11 km
Length of 11 m-Wide Roads	36.9 km
Electrical Transformers and Cables	
34.5 kV Collector System Cables	132 km (60 km overhead, 54 km underground trenched, 3 km underground directional drilled)
230 kV Transmission Cables	7.7 km (overhead)
Other Project Structures and Facilities	
Transforming Substation Size	2 ha
Switchyard Area	2 ha
Operations Building Size	465 m ² , adjacent 200 m ² parking area
Turbine Foundation Dimensions	Approximately 17 m × 17 m × 3 m

¹ Length of 7.3m-Wide Roads includes emergency access as requested by Haldimand County. Road width subject to Haldimand County approval to allow for emergency vehicle access and egress only.

Modern commercial-scale wind turbines consist of four large main components: a foundation, tower, nacelle (turbine housing), and a 3-bladed rotor (see example in Plate 1). Subject to final geotechnical surveys, turbine foundations are expected to be of a spread foundation design and will be constructed of concrete, steel formwork and rebar. Each turbine will be equipped with a step-up transformer inside the tower which will raise the voltage from 690 V to 34.5 kV. Due to the large size of the turbine steel tower, it will be delivered to the Project site in three sections (see Construction Plan Report for further details).

As seen in Plate 2, most of the components used to convert wind energy into electricity are contained in the nacelle of the turbine, which is also sound insulated to reduce noise emissions. In order to maximize production of electricity, modern wind turbines are designed to automatically rotate (yaw) into the wind at all times. Turbines are also able to change the pitch of their blades to capture as much kinetic energy from the wind as possible, or pitch out of the wind when wind speeds are above operational design criteria.

Aviation hazards related to the Project are addressed through Transport Canada and NAV CANADA (Land Use Clearance) approval processes. The lighting plan will be designed to ensure there is a balance between aviation safety and minimization of environmental/socio-economic effects, and reflects the most appropriate layout as per the Transport Canada guideline CAR 621.19.



Consultations between NextEra Energy Canada and NAV CANADA are on-going. Upon initial contact, NAV CANADA expressed concern that the proposed turbines would interfere with Air Traffic Control (ATC) operations at the Hamilton airport. NextEra Energy Canada, along with two wind developers in the area, engaged with NAV CANADA and other aviation stakeholders to perform an Operational Safety Risk Assessment, to determining the risk that may occur due to the wind turbines in the area. As a result of this assessment, held over two and a half days in Ottawa, the parties agreed that there was no significant safety risk posed by the turbines, but that they had the potential to impact operations at the ATC facility. Because the report contains some sensitive information about NAV CANADA's operations, it has not been included here. A copy can be made available upon request. NextEra Energy Canada is still in discussions with NAV CANADA to discuss how to mitigate these operational impacts.

A range of obstruction lighting scenarios can be used to comply with the local aviation regulations. The following standard integrated aviation light options are available:

- Low intensity. Red 10 – 200 cd/m²;
- Medium intensity. Red/white/dual 200 – 2,000 cd/m²; and
- Medium intensity. Red/white/dual 2,000 – 20,000 cd/m².

The recommended lighting option available for the Project has not yet been finalized and Transport Canada ultimately approves which turbines will be lit. Typically, Transport Canada does not require all turbines to have lighting and visual impacts are reduced by synchronizing the lights to flash simultaneously.

Fifty-eight 2.221 MW Siemens 101 Low Noise and one 2.221 MW Siemens 93 Low Noise wind turbine generators will be constructed. Selected wind turbine specifications for both turbine types are presented in Table 6. More detailed wind turbine specifications, including a discussion of the potential variance in specified parameters, are provided in the Wind Turbine Specifications Report.

Table 6: Siemens Turbine Specifications

Component	Siemens 101 Low Noise	Siemens 93 Low Noise
Rated capacity	2.221 MW	2.221 MW
Number of blades	3-bladed, horizontal axis	3-bladed, horizontal axis
Blade length	49 m	45 m
Hub height	80 m	80 m
Cut-in wind speed	4 m/s	4 m/s
Cut-out wind speed	25 m/s	25 m/s
Rated wind speed	12 – 13 m/s	12 – 13 m/s
Rotor diameter	101 m	93 m
Swept area	8,000 m ²	6,800 m ²

From the base of each turbine, power is transferred through 34.5 kV underground cables to either an adjacent wind turbine (wired in series) or to a junction box connected to several other turbines in the same circuit. From the junction box the power is carried either directly to the Project transforming substation or to a 34.5 kV



overhead cable before connecting to the substation. After power is “stepped up” to 230 kV at the substation, power will be fed into the existing 230 kV Hydro One transmission line located at the switchyard area (see Site Plan Report) via an overhead transmission line.

The transforming substation will include an isolation switch, circuit breaker, step-up power transformer, transmission switch gear, instrument transformers, reactive power compensation, and grounding and metering equipment. The switchyard area will contain a Project switching station and a Hydro One Networks Inc. (HONI) switching station. The HONI switching station will include three separate buildings and will connect to the main N1M circuit via two 230 kV tap egresses. Substation and Project-owned switchyard area components will be supplied by General Electric (GE).

The operations building will contain offices, a washroom, conference room, break room, control room, workshop and indoor parts storage. The operations building will be situated adjacent to the transforming station. A parking lot and parking spaces, sized to meet County Official Plan and Zoning By-Law requirements will be provided. A Building Permit to construct the operations building, parking and connect to local services will be required from the County.

Permanent meteorological towers are required to assess prevailing wind conditions during Operations and will be erected on-site for monitoring climatic conditions throughout the lifetime of the Project. Four new 60 m-high towers will be constructed as identified on the Site Plan, and will consist of a tube-type tower structure with a poured concrete foundation, and support wires which extend outward from the tower structure at specified height intervals. There will be two Field Permanent Meteorological Towers (FPMTs) and two SCADA Meteorological Towers (SMTs). SMT2 and SMT4 (see Site Plan Report) will be connected to the SCADA system which connects the individual turbines, substation, and meteorological towers to the Operations Building and allow for remote operation of the Project.

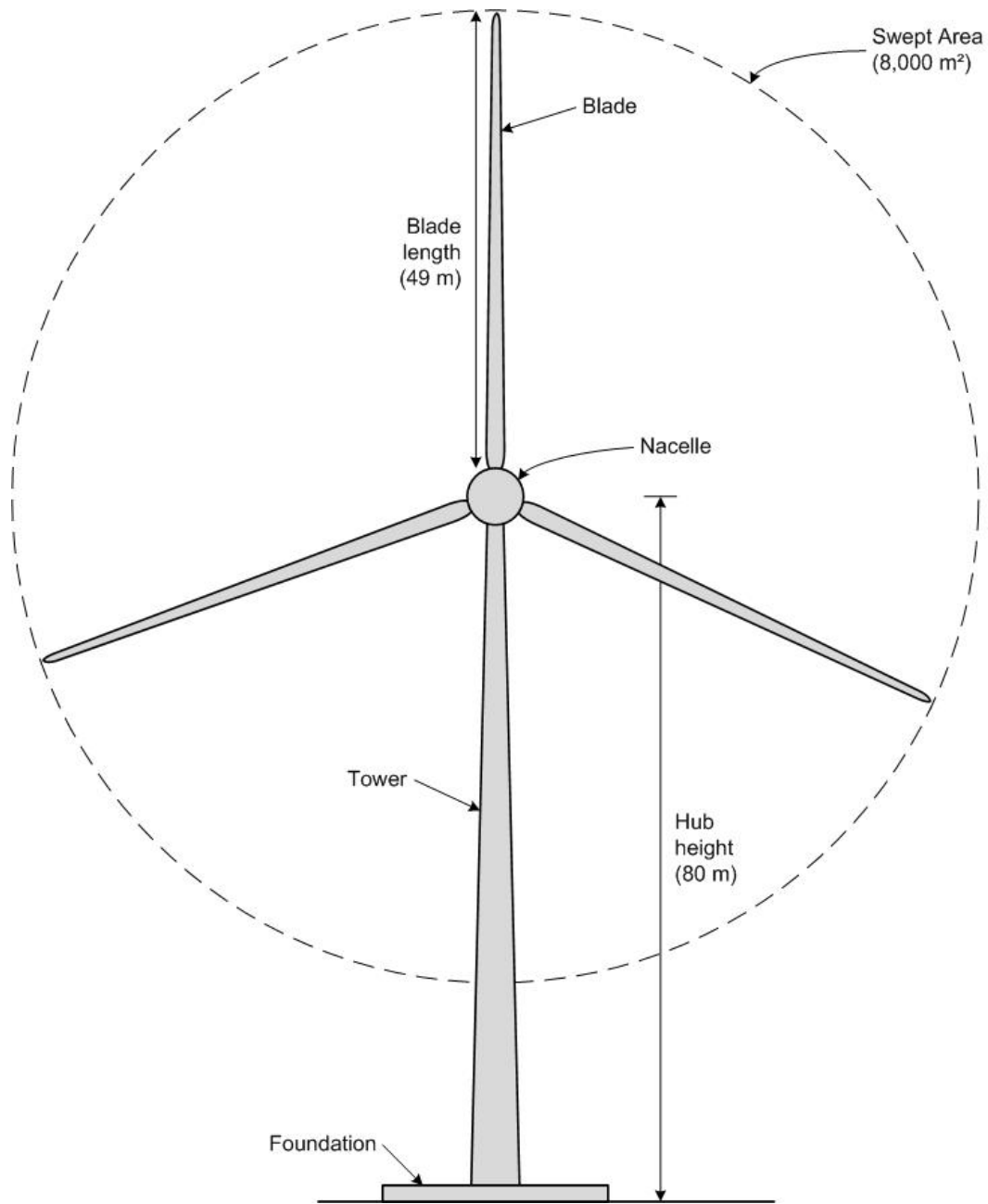
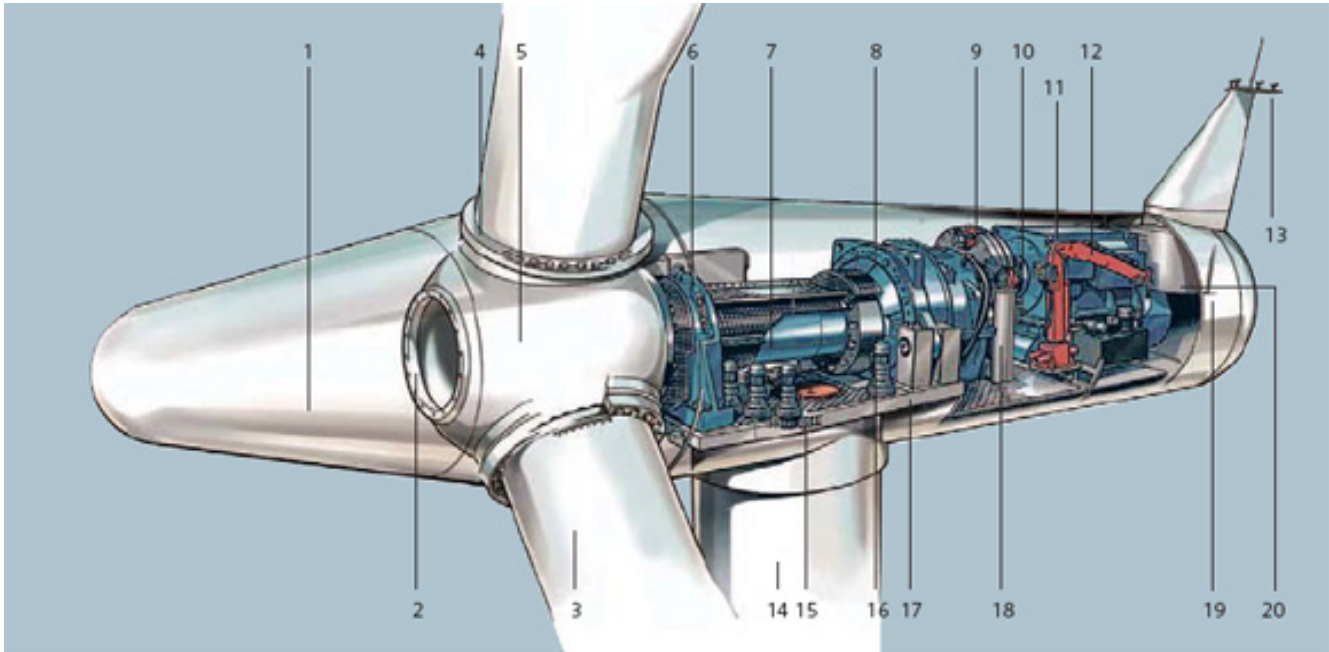


Plate 1: Basic Wind Turbine Specifications



- | | | | |
|-------------------|----------------|---------------------------|---------------------|
| 1 Spinner | 6 Main bearing | 11 Generator | 16 Yaw gear |
| 2 Spinner bracket | 7 Main shaft | 12 Service crane | 17 Nacelle bedplate |
| 3 Blade | 8 Gearbox | 13 Meteorological sensors | 18 Oil filter |
| 4 Pitch bearing | 9 Brake disc | 14 Tower | 19 Canopy |
| 5 Rotor hub | 10 Coupling | 15 Yaw ring | 20 Generator fan |

Plate 2: Nacelle Arrangement (Siemens, 2009)



4.0 FACILITY OPERATIONS PLAN

4.1 Turbine Operation and Monitoring

The Operations Phase will be approximately 25 years. Operations and maintenance will require six to eight full-time trained technical and administrative staff to maintain and operate the facility. The primary workers will be windsmiths, turbine maintenance technicians, and a site supervisor.

The wind turbines should be operating when the wind speed is within the operating range for the turbine and there are no component malfunctions (see Table 6 in Section 3 for cut-in and cut-out wind speeds). Each turbine has a comprehensive control system that monitors the subsystems within the turbine and the local wind conditions to determine whether the conditions are suitable for operation. If an event occurs which is considered to be outside the normal operating range of the turbine (such as low hydraulic pressures, unusual vibrations or high generator temperatures), the wind turbine will immediately take itself out of service and report the condition to the Supervisory Control and Data Acquisition (SCADA) system. A communication line connects each turbine to the operations building (at the transforming substation), which closely monitors and, as required, controls the operation of each turbine. The wind turbines will also be monitored and operated 24/7 remotely by the Fleet Performance and Diagnostic Center located in Juno Beach, Florida. This real-time monitoring of turbine functioning is essential to reduce unplanned outage events and duration by detecting incipient changes to the turbine performance as well as resetting turbines remotely after they've faulted, mitigate risks of fire, or structural instability. Sections 4.2 and 5.8 contain additional details on operations and monitoring related to icing of turbines during winter, storms/high winds, and lightning strikes.

Initial testing and inspection of electrical, mechanical and communications operability required at commissioning will occur during Post Installation Activities in the Construction Phase. For further details, see the Construction Plan Report.

4.2 Meteorological Data

Monitoring of meteorological data at the operations building allows operations staff to adapt turbine(s) operation during storm events that may include high winds and lightning strikes. How the Siemens 101 and Siemens 93 wind turbines are able to respond to these meteorological conditions are described in the sections below.

4.2.1 Storms and High Wind Conditions

The Siemens 101 and Siemens 93 wind turbines are designed to operate between wind speeds of 4 m/s and 25 m/s. However, at wind speeds of greater than 13 m/s, the blades will feather out of the wind and the yaw system on the turbine nacelle will rotate the turbine out of the prevailing wind direction. The turbines are also equipped with a secondary safety braking mechanism, mounted on the high-speed shaft connecting the gearbox to the generator, in the event that there are operational difficulties with the blade pitching and yaw controls.



4.2.2 Lightning Strikes

The wind turbines are equipped with lightning protection which protects the entire turbine from the tip of the blades to the foundation. The system enables the lightning current to by-pass all vital components within the blade, nacelle and tower, therefore limiting the potential for damage. As an extra safety precaution, the control units and processors in the nacelle are protected by an efficient shielding system. The lightning protection is designed according to IEC 61024 – “Lightning Protection of Wind Turbine Generators”.

Lightning detectors are mounted on all three rotor blades. Data from the detectors are logged and enable the operator to identify which blade(s) were hit, the exact time of the strike and how powerful the lightning strike was. These data are useful for making a remote estimate of possible damage to the turbine and evaluating the need for inspection.

The lightning protection system design is based on and complies with the following international standards and guidelines:

- IEC 62305-1 Ed. 1.0: Protection against Lightning – Part 1: General principles;
- IEC 62305-3 Ed. 1.0: Protection against lightning – Part 3: Physical damage to structures and life hazard;
- IEC 62305-4 Ed. 1.0: Protection against lightning – Part 4: Electrical and electronic systems within structures;
- IEC/TR 61400-24. First edition. 2002–2007. Wind turbine generator systems – Part 24: Lightning protection;
- IEC 60364-5-54. Second edition 2002–2006. Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors; and
- IEC 61936-1. First edition. 2002–2010. Power installations exceeding 1kV a.c. – Part 1: Common rules.

4.3 System Maintenance

The Siemens 101 and Siemens 93 wind turbines selected for the Project are automated and have few maintenance requirements. They require no fuel to produce power, but oil and oil filters in the gearbox and hydraulic systems need to be changed at prescribed intervals, and maintenance such as cleaning gearboxes and replacing worn parts needs to be completed periodically as per manufacturer specifications. Scheduled maintenance activities include a complete inspection of the turbine’s components and the tower, functionality testing, replacement of worn parts, bolt tightening and lubrication of moving parts. For further details on turbine maintenance activities, see the Wind Turbine Specifications Report.

Initial maintenance on turbine generators will be approximately 500 hours after initial commissioning, and routine preventative maintenance activities will be scheduled as required in accordance with manufacturer requirements. Maintenance is done by removing the turbine from service and having windsmiths climb the tower to spend a full day carrying out maintenance activities.



Following all maintenance work on turbines, areas will be thoroughly cleaned to ensure a safe operating environment, safe footing for all personnel and to minimize the risk of fire. All items left in the turbine will be packed and secured. All surplus lubricants and grease-soaked rags will be removed and disposed of in a prescribed manner. All maintenance activities will adhere to the same waste disposal and spill prevention industry best practices undertaken during the Project construction activities (see Construction Plan Report).

The above ground collector lines and substation will require periodic preventative maintenance activities. Routine maintenance will include condition assessment and protective relay maintenance of the substation as well as vegetation control.

Access roads will be periodically maintained to ensure that the roads are maintained over the life of the Project. By installing geotextiles, where necessary, into the structure of the access roads, the roads are expected to require minimal maintenance during operation of the Project.

4.3.1 Unplanned Turbine Maintenance

Modern wind turbines are very reliable and the major components are designed to operate for approximately 25 years. However, wind turbines are large and complex electromechanical devices with rotating parts and many components, and with large numbers of turbines it is inevitable that minor component failures will occur despite the high reliability of the turbines fleet wide. Most commonly, the failure of small components such as electronic cards, switches, fans, or sensors will take the turbine out of service until the faulty component is replaced. These repairs can usually be carried out by two or more technicians visiting the turbine for several hours.

Events involving the replacement of a major component such as a gearbox or rotor are not typical. If they do occur, the use of light 4x4 trucks, vehicles, ATVs and large equipment, sometimes as large as that used to install the turbines, is required.

It is possible that an access road, built for construction, partially reclaimed and returned to farmland when the construction and installation activities are completed, would need to be reconstructed to a maximum of its original size (or less) to carry out repairs to a damaged turbine. Typically only a small percentage of turbines would need to be accessed with large equipment during their operating life.

For a description of equipment and procedures in the case of major component replacement (i.e., turbine disassembly and assembly) and access road construction, refer to the Construction Plan Report.

4.4 Water Taking

The Project will not require any water takings during the Operations Phase.

4.5 Sewage/Stormwater Management

The Project operations building (located with the transforming substation) will have washroom facilities connected to municipal sewage systems, if available, or self sufficient septic drain field or as deemed



appropriate by local building code. No other component of the Project will generate any sewage or require any specific sewage management processes.

An area around turbine foundations will have pit run gravel, which will receive any precipitation run-off from turbine towers and allow for infiltration into the ground. Run-off from towers is expected to be negligible compared to the existing run-off within the Project Area, and since this does not represent a measurable difference, no additional stormwater management systems will be used.

Potential sources of sedimentation during Operations will be limited to unpaved access roads. As the access roads will be gravel based with adjacent and appropriately sized run-off swales, sedimentation is predicted to be lower than the agricultural fields where the roads are constructed, and in particular compared to times of year when crops are off or are not sufficiently mature to control erosion. Therefore, additional sedimentation measures are deemed unnecessary.

4.6 Air Quality

During the Operations Phase of the Project, activities requiring the use of motorized vehicles (e.g., transportation of maintenance personnel to turbine sites) will have infrequent and short-term emissions of low levels of greenhouse gases (GHGs) and other compounds. These emissions will be negligible compared to normal operation of motorized vehicles in the Project Area.

Operation and maintenance activities are not anticipated to generate any odour emissions.

4.7 Waste Management

The operation of a wind farm does not generate a large amount of waste. Oil and filters used in gearboxes and hydraulic systems will need to be changed periodically as per manufacturer specifications. Lubricants required for wind turbines include gear oil, hydraulic oil, selected grease (main bearing, blade bearing, cardan shaft, yaw bearing and generator) and open gear grease (yaw-gear). Used oil, filters, contaminated rags and other wastes will be disposed of at an approved facility following each maintenance visit.



5.0 ENVIRONMENTAL EFFECTS MONITORING PLAN

The creation of O. Reg. 359/09 was envisioned by the Province to result in a streamlined process of assessment for renewable energy projects, including wind projects. This process has resulted in a focussed assessment that concentrates on aspects of renewable energy projects that require management in order to ensure that adverse environmental effects are mitigated to the extent possible.

In accordance with the requirements of O. Reg. 359/09, the environmental monitoring plan laid out in this section deals with the following environmental considerations:

- Heritage and archaeological resources;
- Natural heritage features;
- Water bodies;
- Noise;
- Air quality; and
- Provincial and Local Infrastructure

Table 3 in Section 2 of this Report summarizes features located within the Project Area and the sources used for setback distances from Project components. Although the Project meets many of the setback requirements, the Project still has the potential to interact with some of these features during the Operations Phase.

The sections below provide a summary of all potential negative environmental effects caused by the Project (outlined in the Project Description Report), with content following REA Technical Bulletin Two: Guidance for preparing the Design and Operations Report (MOE, 2010). This includes details on the following:

- Performance objectives in respect of each potential negative effect, where performance is defined such that in achieving the objective the negative effect will be mitigated;
- A description of all mitigation strategies planned to achieve performance objectives;
- A description of how the Project will be monitored to ensure that mitigation strategies are meeting performance objectives, in cases where there is an ongoing risk of potential negative environmental effects; and
- Contingency measures that will be undertaken should monitoring reveal that negative effects are occurring.

For potential environmental effects where monitoring plans are proposed, tables at the end of each section summarize the above information, and further levels of detail are referenced in the applicable reports included with the REA Application.



5.1 Heritage and Archaeological Resources

5.1.1 Potential Effects

During the Operations Phase of the Project, no negative effects on heritage or archaeological resources are anticipated. Therefore, the performance objective of protecting identified heritage or archaeological resources will be met as a result of the mitigation strategies described below.

5.1.2 Mitigation Strategy

Previously surveyed archaeological resources were identified in the Stage 1 Archaeological Assessment completed as part of the REA application. Stage 2, Stage 3 and Stage 4 assessments will be completed prior to construction with the associated Stage 2, Stage 3 and Stage 4 reports to be reviewed and approved by MTC. All significant archaeological resources will be either avoided or effects on these resources will be mitigated during construction of the Project.

Heritage resources on participating properties and severed properties adjacent to participating properties were identified. In addition, heritage resources on properties that have already been designated under the *Ontario Heritage Act* and adjacent to participating properties were included. These heritage resources are discussed in the Heritage Assessment Report.

5.1.3 Monitoring Plan and Contingency Measures

As there is no on-going risk of potential negative environmental effects on heritage and archaeological resources, no environmental effects monitoring plans are proposed. As a contingency, in the event that any operations related land disturbances are required to repair or replace components of the Project, NextEra Energy Canada will contact a licensed archaeologist to determine if an archaeological or heritage assessment is required and then undertake any studies as may be required.

5.2 Natural Heritage Resources

5.2.1 Potential Effects

The identification and assessment of effects on all natural features within 120 m of the Project Location including disturbance areas, as well as an evaluation of their significance is provided in the Natural Heritage Assessment Report. The assessment is based on the boundaries and attributes of these features as determined during the Records Review, Site Investigations and Evaluation of Significance. Where the Project Location was within 120 m of natural heritage features that were known or were predicted to be significant by Golder, an Environmental Impact Study (EIS) was completed. The EIS included an effects assessment, determination of appropriate mitigation measures, and evaluation of residual effects and identification of environmental effects monitoring plans.

Information obtained in the Records Review (see Natural Heritage Assessment Report) indicates that there are two known significant natural features within 120 m of the Project Location. The Sandusk Creek Floodplain Woods, which has been designated as an Environmentally Sensitive Area (provincial designation), and an



Environmentally Significant Site/Life Science Site (municipal designation); and the other is one of four wetlands comprising the SAC10 – Wetland, which is a non-Provincially Significant Wetland complex made up of four individual wetlands.

Negative environmental effects during the Operations Phase are generally limited to sensory disturbance to wildlife from operating turbines and to potential mortality associated with bird or bat impacts with the turbine blades, the turbine tower or permanent meteorological masts. Work activities during the Operations Phase are primarily associated with routine maintenance activities with travel occurring on established access roads using light trucks. Monitoring of bird and bat mortality is to occur through carcass search programs at selected turbine sites initiated in the first year of operations. The scope and duration of the carcass search programs will be provided in the Environmental Effects Monitoring Plan for Birds and Bats (Golder 2011 in progress) and agreed to with MNR following established MNR guidance documents.

The overall performance objective for natural heritage resources during the Project is to construct, operate and decommission the Project resulting in no significant residual effects to natural heritage features, fauna or systems. More information on these natural heritage features, including a complete EIS for significant features within 120m of the Project Location, is included in the Natural Heritage Assessment Report.

5.2.2 Mitigation Strategy

The Project layout was developed to avoid significant natural features, as outlined in Table 3 in Section 2 of this Report. Where candidate significant features could not be avoided, an EIS was conducted to assess negative environmental effects. This information is provided in the Natural Heritage Assessment Report.

With the exception of additional pre and post construction monitoring for three woodlots containing significant landbird migratory stopover area (as agreed with and confirmed by MNR) no additional ongoing operational mitigation strategies are proposed for the identified significant features located in or within 120m from the Project Location. However, should a valid concern relating to credible and observed effects to a significant feature be identified through monitoring, NextEra Energy Canada will undertake appropriate studies to verify the cause of the concern and the significance of the effect, and develop and undertake a mitigation strategy to address the specific issue and in consultation with the agency having jurisdiction.

To mitigate identified risks to birds and bats within the Project Area, bird and bat surveys, including winter bird surveys, bird spring migration surveys, breeding bird surveys, and June bat monitoring, were undertaken to determine the number of avifauna and bats observed to utilize the area during peak times (migration and breeding). June 2010 surveys of potentially significant bat roosting areas, as determined by Golder, were completed. Details on these surveys can be found in the Natural Heritage Assessment Report.

For further discussion of mitigation strategies related to natural heritage resources, refer to the Natural Heritage Assessment Report.



5.2.3 Monitoring Plan and Contingency Measures

As there is negligible on-going risk of potential negative environmental effects on significant wildlife habitats, significant valleylands, significant woodlands, water bodies or Provincially Significant Wetlands, environmental effects monitoring plans for the Operations Phase, beyond that noted above, are not proposed.

Though turbine siting has considered avian and bat use patterns, collisions with avifauna and turbine components may still occur. As detailed below, operational monitoring of bird and bat strikes using carcass searches will be conducted for a period of up to 3 years for birds and up to 3 years for bats, consistent with Ministry of Natural Resources (MNR) and Canadian Wildlife Service (CWS) guidelines, where mortality thresholds have not been exceeded. A threshold for the number of bird mortalities associated with turbine collisions will be set out in MNR Guidance documents which Golder understands are to be introduced by MNR this fall.

Four landbird migratory stopover habitat features, 113, 138, 147b and 126 / 241 / 242 as discussed in the EIS section of the Natural Heritage Assessment Report. These features were conservatively assumed to be significant, based on habitat characteristics, in consultation with OMNR (OMNR, 2011d).

One of these, feature 113 is within 120m of access road and underground cable but not the turbine; the road and underground cable are not expected to result in negative effects to landbird migration and no further mitigation or pre or post construction monitoring is required. Based on consultation with the MNR (OMNR, 2011d), additional studies to further assess utilization by landbird species pre and post construction for this type of habitat has been agreed to by NextEra Energy Canada in instances where the outermost extent of the turbine, including to the tip of the blade, is within 120m of the landbird migratory stopover habitat feature (features 138, 147b and 126/241/242).

To build on previous avian studies conducted, and to develop a baseline for the utilization of these habitats by landbirds during the migration season, area searches will be conducted in the Fall of 2011 and Spring of 2012 prior to construction activities occurring within 120 metres of the features. These area searches will be conducted in accordance with the following methods:

- Routes will be selected to incorporate all microhabitats within the natural feature where accessible;
- Each transect will be up to 500m long;
- Transects will be walked twice per week during the first 4 hours of daylight;
- The Fall season will include 10 weeks from mid August to end of October;
- The Spring season will include 10 weeks from late March to end of May; and
- Observers will record the total number of birds by species.

These methods will be repeated as part of the post-construction follow-up monitoring in conjunction with the carcass searching and the EEMP. This information will be used to determine the effects of the project on bird habitat use. Annual reports will be prepared to present this data to the MNR for at least three years.

The monitoring window for bats is May 1 through to September 30. Visits would need to occur every 3 days, and would need to be done at 10 turbines or 30% of the total number of turbines, whichever is more. Additional



monitoring periods might be required for specific bird windows (i.e., winter raptors, tundra swans). These searches would also be accompanied by scavenger impact trials (SIT) and searcher efficiency trials (SET).

Using carcass searches, a total of 10 bat carcasses per turbine per year, corrected, is proposed as acceptable, above which a change in turbine cut-in speeds to stop the turbine rotation when wind speeds are below 5.5 m/s at hub height, during the night and between July 15 and September 15 will be considered.

A meeting will be held with and an annual report will be provided to MNR and CWS over this period detailing the outcomes of the monitoring and, if necessary, proposed operational changes. Pending outcomes of their review, the program methodologies, frequencies and durations may be reasonably modified to better reflect the findings and goals of the monitoring programs.

Since the Project has been largely sited outside of vegetated areas (on cultivated agricultural lands), potential effects to birds and bats, and other wildlife, will likely be temporary until the turbines become part of the environmental “background”. However, it is possible that some residual effects associated with sensory disturbance will persist where turbines are located adjacent to woodlots, particularly for area-sensitive and forest interior species that are more sensitive to such effects.

In addition, turbine and other required lighting will be in a manner that is least likely to attract birds/bats, while maintaining compliance with regulatory requirements. Golder is not aware of any studies that indicate negative effects from turbine lighting on collision rates of birds or bats.

Table 7 contains a summary of the environmental effects monitoring plan proposed for potential negative effects on natural heritage resources. For further details on these monitoring plans, refer to the Natural Heritage Assessment Report.



SUMMERHAVEN DESIGN AND OPERATIONS REPORT

Table 7: Summary of Natural Heritage Environmental Effects Monitoring Plan

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
Bird mortality from collision with operational turbines	Number of bird carcasses found around turbine sites during carcass surveys within tolerance limits to be agreed upon with MNR.	<ul style="list-style-type: none"> Results of winter bird surveys, spring migration surveys and breeding bird surveys were used to develop Project layout 	<ul style="list-style-type: none"> Mortality monitoring for birds at a subsample of turbines throughout the year for up to three years of operation Point count-based breeding bird study to assess disturbance effects and changes in bird composition and distribution for up to three years of operation Searcher efficiency and scavenger trials conducted each year according to Environment Canada's protocols <p><u>Contingency Measures:</u></p> <ul style="list-style-type: none"> If carcasses in excess of the tolerance limit are reported after mortality surveys have concluded, consultation with MNR will be initiated Suspending operation of turbines pending further study if significant new mortalities are observed
Bat mortality from collision with operational turbines	Number of bat carcasses found around turbine sites during carcass surveys within MNR tolerance limit of ≤10 bats.	<ul style="list-style-type: none"> Results of bat migration surveys were used to develop Project layout 	<ul style="list-style-type: none"> Mortality monitoring for bats at a subsample of turbines throughout the year for the first 2 years of operation <p><u>Contingency Measures:</u></p> <ul style="list-style-type: none"> If carcasses in excess of the tolerance limit are reported after mortality surveys have concluded, consultation with MNR will be initiated Suspending operation of turbines pending further study if significant new mortalities are observed
Negative effects on landbird migratory stopovers with turbines situated within 120m of natural feature boundary	Determine sensory effects and any significant changes in bird use within landbird migratory stopover areas with turbines within 120m of feature boundary.	<ul style="list-style-type: none"> Conduct additional preconstruction and follow up monitoring within landbird migratory stopover areas and identify is significant changes in pre/post development 	<ul style="list-style-type: none"> Survey routes will be selected to incorporate all microhabitats within the natural feature where accessible; Each transect will be up to 500m long, will be walked twice per week during the first 4 hours of daylight for 10 weeks in the fall season, 10 weeks in the spring season recording the total number of birds by species.



SUMMERHAVEN DESIGN AND OPERATIONS REPORT

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
		use occur.	<ul style="list-style-type: none">■ Surveys repeated for up to three years post construction with results presented in annual report.■ Annual consultation with MNR after each year of survey. <p><u>Contingency Measures:</u></p> <ul style="list-style-type: none">■ Modification to study design as agreed to with MNR within an Adaptive management approach.■ Potential curtailment if statistically and biologically significant impacts observed.



5.3 Water Bodies

5.3.1 Potential Effects

During Project operations, the increased volume or changes in timing of stormwater runoff are not predicted to cause sedimentation of water bodies, watercourses or wetlands. Run-off from turbine towers, access roads, and other Project components areas represent <1.3% of the total area of optioned lots, effects are considered negligible.

The locations and setbacks of Project components in relation to water bodies are detailed in the Water Assessment Report.

5.3.2 Mitigation Strategy

Potential effects to water bodies will be mitigated during the operations period through the maintenance of ditches, tiles and other drainage control structures remaining after the construction period. Operations staff for the Project will also assess potential drainage issues during field visits. Drainage related issues conveyed to NextEra Energy Canada by the public will be assessed and responded to. Permits and approvals for works in or near streams will be obtained if unforeseen works or maintenance within waterbodies are required. Maintenance activities in fish habitat will conform to applicable DFO Operational Statements (e.g. timing windows, culvert maintenance, maintenance of riparian vegetation in existing rights of way). All works constructed in waterbodies that contain fish habitat will be overseen by a qualified environmental inspector or environmental monitor.

5.3.3 Monitoring Plan and Contingency Measures

Any unanticipated works that are required adjacent to or over water bodies will incorporate mitigation strategies, monitoring plans and contingency measures that are consistent with those identified in the Construction Plan Report.

5.4 Air Quality

5.4.1 Potential Effects

During the Operations Phase of the Project, any emissions (dust or tailpipe) related to the operation of small numbers of light trucks are expected to be negligible compared to agricultural activities occurring within the Project Area. Operation of the substation and wind turbines will not generate significant fugitive dust emissions.

Therefore, the performance objective of no reduction in air quality, and no generation of fugitive dust emissions will be met.

5.4.2 Mitigation Strategy

No mitigation strategies are proposed related to fugitive dust emissions.



5.4.3 Monitoring Plan and Contingency Measures

As there is no on-going risk of potential negative environmental effects related air quality, no environmental effects monitoring plans are proposed.

5.5 Noise

5.5.1 Potential Effects

The operation of wind turbines and the Project substation will generate noise. The performance objective is 40.0 dBA at non-participating receptors. It has been determined through noise modelling completed in accordance with O. Reg. 359/09 requirements that the predicted noise levels at all non-participating Points of Reception will not exceed 40.0 dBA (see Noise Study Report).

5.5.2 Mitigation Strategy

As required by O. Reg. 359/09, turbines will be located a minimum of 550 m from non-participating noise receptors (i.e., sensitive Points of Reception). The Noise Study Report demonstrates that the operation of the Project complies with MOE noise guidelines based on predictive modelling. Through adherence to MOE noise guidelines, operations-related noise that may be perceptible to nearby residents will not represent a significant adverse effect.

5.5.3 Monitoring Plan and Contingency Measures

Table 8 contains a summary of the environmental effects monitoring plan proposed to address potential negative effects on noise receptors.

Table 8: Summary of Noise Environmental Effects Monitoring Plan

Table with 4 columns: Potential Negative Effect, Performance Objective, Mitigation Strategy, and Monitoring Plan and Contingency Measures. The table details noise monitoring and mitigation for wind turbines.



Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
			determined to be out of compliance until they can be fixed

5.6 Land Use and Resources

5.6.1 Potential Effects

There will be a temporary loss of agricultural lands as a result of the construction of the Project and infrastructure which will remain during Operations. The portion of agricultural land temporarily removed from production represents approximately 1.2% of the agricultural land in the Project Area.

The Project is not predicted to affect the use of the Lake Erie shoreline for recreation; however, use of the land in the immediate area of the turbine, substation, switchyard area will not be available for hunting for safety purposes and to protect from potential damage to infrastructure. These areas are, however, situated on private lands under lease from landowners that are participating in the Project.

A separate justification report was conducted by IBI Group entitled “Summerhaven Wind Energy Centre – Parcel Setback Reduction Analysis”, to address Section 53 of O. Reg. 359/09 (see Appendix A). This section of the regulation requires a written assessment of the possible impacts and preventative measures to address any change in impact, where turbines are located less than the required distance of “hub height” (i.e., tower minus blades). This report analyzed 20 such proposed turbine locations and determined that any potential impacts would be restricted to crop and or tree damage as a result of turbine malfunction or failure. Given the low likelihood of such events occurring it was determined that there would be no adverse impacts as a result of the setback reductions, and that standard preventative measures implemented through best management practices would address any change in impacts that may be encountered at the reduced “hub height” setback.

The presence of the Project could positively or negatively affect residents or visitors’ attitudes or behaviours with respect to the use of other recreational resources in the Project Area, such as the use of Public trails, parks or conservation areas. The Project, however has been situated outside of O. Reg. 359/09 setbacks from Parks, Conservation Reserves and other identified recreational areas present on Public or non-participating lands. Renewable energy facilities such as wind farms have been shown to attract tourists in other parts of Canada, but some individuals could be discouraged from utilizing certain recreational resources during the operations period. Considering that the Project is sited primarily on private lands, no significant adverse effect on recreation is expected to result from this Project.

Therefore, the performance objective of no significant negative impacts to local businesses (agriculture or tourism) will be met.

5.6.2 Mitigation Strategy

The financial loss of agricultural lands on participating land parcels is offset through compensation received by the landowner via their lease agreement with NextEra Energy Canada. No ongoing mitigation strategies are proposed related to land use and resources as the use of the lands to operate the Project will have been



deemed acceptable under O. Reg. 359/09 by NextEra Energy Canada upon receiving a REA. Should any operational maintenance activities require additional land use, the participating landowners involved will be compensated on an area basis for the additional loss of productive agricultural land or crop damage, as the case may be.

5.6.3 Monitoring Plan and Contingency Measures

Although there will be no on-going risk of potential negative environmental effects related to land use and resources, communication plans and emergency response procedures are proposed (see Section 6).

5.7 Provincial and Local Infrastructure

5.7.1 Potential Effects

The performance objective for potential effects to local traffic is no reported significant disruptions. However, only a small number of light trucks will be used during regular Project operations and therefore no significant negative effects are predicted.

Though the location of telecommunications services has been considered in the siting of turbines and the substation, and the Project Location of these components was determined by following the Radio Advisory Board of Canada guidelines through the consultation process, Electromagnetic (EM) interference from the Project still has the potential to affect telecommunications infrastructure near the Project Area (e.g., disruption to television). The performance objective for telecommunications infrastructure is no unresolved complaints regarding EM interference received through the operations staff contact number or by mail.

5.7.2 Mitigation Strategy

NextEra Energy Canada will log interference complaints as part of the communications plan so that complaints to be addressed in a timely and appropriate manner (see Section 6). This process will include an operations staff contact number, a complaint logging and tracking system, use of independent EM interference consultants where necessary and implementation of appropriate mitigation strategies where appropriate. In these circumstances, the Radio Advisory Board of Canada will be consulted about existing telecommunications services, how EM interference may be occurring, and how this could be resolved.

In order to mitigate the complaint and understand the cause of the problem, NextEra Energy Canada will consult with service providers and government agencies to confirm that it is the operation of the wind farm that is directly causing interference with an existing system and is not attributable to another source. NextEra Energy Canada will liaise with service providers and government agencies operating systems identified in the area prior to construction and installation activities to ensure they have received appropriate contact details and will work closely with service providers to resolve interference issues (see Section 6).

5.7.3 Monitoring Plan and Contingency Measures

Table 9 contains a summary of the environmental effects monitoring plan proposed for potential negative effects on provincial and local infrastructure.



Table 9: Summary of Provincial and Local Infrastructure Environmental Effects Monitoring Plan

Potential Negative Effect	Performance Objective	Mitigation Strategy	Monitoring Plan and Contingency Measures
Electromagnetic (EM) interference from operation of the wind farm impacting local telecommunications infrastructure	No unaddressed complaints of EM interference	<ul style="list-style-type: none">■ Consultation with the Radio Advisory Board of Canada guidelines about existing telecommunications structures near the Project Area	<ul style="list-style-type: none">■ Monitoring complaints through an operations staff contact number (see Section 6.3) <p><u>Contingency Measures:</u></p> <ul style="list-style-type: none">■ Working with local service providers and government agencies to resolve interference issues■ Modifying operational parameters, if feasible and necessary, to reduce interference



6.0 COMMUNICATIONS AND EMERGENCY RESPONSE PLANS

Prior to commencing construction and installation activities, NextEra Energy Canada will make copies of detailed emergency response plans available to the appropriate regulatory agencies, Haldimand County, local residents and Aboriginal communities. The emergency response plan will be approved by the County Emergency services representatives on the Planning and Development Committee, and by County Council if required. The emergency Response Plan will also be provided to relevant Provincial ministries (e.g. MOE). NextEra Energy Canada routinely creates detailed Emergency Action Plans for all of its operating facilities to protect its workers, the Public and the environment. The Plan content is subject to local requirements, but typically includes the following information:

- Designation of facility emergency coordinators;
- Process description;
- Objectives;
- Administration;
- Regulatory references;
- Training requirements;
- Facility locations information and 911 addresses;
- Facility emergency procedure;
- Immediate site evacuation procedure;
- Delayed site evacuation procedure;
- Response to Personnel injuries/serious health conditions;
- Fire response plan;
- Chemical/oil spills, releases and reporting; and
- Weather-related emergencies.

The Emergency Action Plans are comprehensive enough to include procedures applicable to the Construction and Installation, Operations and Decommissioning Phases of the Project, and contain means to test and augment channels of communication to regulatory agencies and the public and update the Plan, if deemed necessary by NextEra Energy Canada or the local emergency services representatives acting on behalf of the County or the Province.

6.1 Emergency Communications

If there is an emergency, local emergency responders (Police, Fire, Ambulance) will be contacted via the 911 Operator. Emergency responders will then be expected to respond following their established procedures and guidelines, referring to the Emergency Action Plan agreed to with NextEra Energy Canada. In the rare instance



that the wind power facility exceeds operational parameters and a potentially unsafe situation may arise, the person observing the situation may report the circumstance to 911, or alternatively will contact a designated NextEra Energy Canada representative. For the purpose of the REA, questions regarding emergency communications may be directed to:

Thomas Bird, Environmental Services Project Manager
NextEra Energy Canada, ULC
5500 North Service Rd., Suite 205
Burlington, Ontario, L7L 6W6
Phone: 1-877-257-7330
Fax: 905-335-5731
Email: Thomas.bird@nexteraenergy.com

Prior to construction commencing, permanent emergency contact signs will be posted, and 911 numbers will be established as agreed to with the County.

Should an incident occur, the following will be contacted by the NextEra Energy Canada representative by phone within 4 hours of the occurrence of the operational exceedance/emergency:

- The Ministry of the Environment (including the Spills Action Centre, if applicable);
- Haldimand County (including local road and service boards);

Followed by a hard copy incident response report provided within 24 hours of phone or e-mail contact noting:

- The parameter exceeded;
- The magnitude of the exceedance; and
- Mitigative measures implemented, including details of First Responders contact, if required.

The following will be contacted within 4 - 8 hours of the operational exceedance/emergency:

- Stakeholders and local community members as applicable; and
- Aboriginal communities as applicable.

Local community members will be notified at the discretion of NextEra Energy Canada through media advertisements, mailings, local newspapers, letters, direct contact or a combination thereof, depending on the actual or perceived risk level. Aboriginal communities will be contacted to determine a designated person or persons for NextEra Energy Canada to contact for emergency purposes and information will be made available to the local band office.

In the case of an emergency reported directly by NextEra Energy Canada staff or their subcontractors or subconsultants that requires First Responders (e.g., fire department, emergency medical services), NextEra Energy Canada will contact the 911 Operator upon discovery of the emergency, and the Emergency Action Plan will be initiated.



6.2 Non-Emergency Communications

Regulatory agencies, Haldimand County, local residents and Aboriginal communities will be notified through mailings of Project activities and changes to procedures, including:

- Commencement of the Project Construction Phase and stages of construction and installation activities;
- Any maintenance activities outside of routine maintenance (e.g., turbine disassembly or replacing collector or transmission lines);
- Any changes in regulatory procedures that affect the operation of the Summerhaven Wind Farm Project;
- Results of ongoing monitoring of the Project, if applicable;
- Commencement of the Project Decommissioning Phase and stages of decommissioning activities; and
- Any other information about the Project that NextEra Energy Canada feels is of public interest.

Stakeholders and Aboriginal communities identified above will be notified by mail. In situations where advanced notification is feasible, the letter will identify in detail the activity being carried out, the anticipated schedule of the activity and contact information for receiving any concerns and/or complaints. If notification is required after an unanticipated event, the letter will describe the event, mitigation strategies to prevent future occurrences and contact information for receiving concerns and/or complaints.

6.3 Receiving Communications from Public and Stakeholders

As discussed above, a mailing address will be established for operations staff to receive communications from the public, stakeholders, Aboriginal communities, businesses, and regulatory agencies.

A notice will be mailed to all stakeholders prior to engaging in Project construction and installation activities, which provides information on how they will be notified by NextEra Energy Canada of the following:

- Changes to the Project, or other relevant matters;
- How stakeholders can contact NextEra Energy Canada for information or to relay concerns about the Project; and
- How NextEra Energy Canada will handle input from stakeholders.

An electronic communications database will be used to record information from calls and/or received mailings. In the case of complaints related to Project activities, the complainant will be asked to provide the following information:

- Name / Address / Phone number / e-mail address (if possible);
- Time and date of complaint;
- Location of problem;
- Details on the problem or complaint, including frequency; and



- Any other details.

Complainants will be provided information during the call about the following:

- What actions will be taken to remediate the cause of the complaint; and
- Proposed actions to prevent similar occurrences in the future.

In addition, the District Manager of the Ministry of the Environment will be notified, in writing, of each environmental complaint. The notification will include:

- All of the information recorded about the complaint (listed above);
- Wind direction at the time of the incident related to the complaint;
- Actions taken to remediate the cause of the complaint, and
- Proposed actions to prevent similar occurrences in the future.

Specifically for noise issues, after multiple complaints and/or comments are logged, a specific on-site noise audit will be conducted. It should be noted that at the time of writing this report, the MOE is developing a protocol to audit noise from wind farms. This protocol, if available, will be the basis for assessing noise from the wind farm operations. If the test confirms an exceedance, as defined by the MOE, appropriate contingency measures will be implemented (see Section 5.5.3). Records of all complaints, actions taken and communications with the Ministry of the Environment will be kept in the communications database.



7.0 REFERENCES

- Golder Associates Ltd. 2010a. Stage 1 Archaeological Assessment Report. Prepared for: Ministry of Tourism and Culture and Ministry of the Environment.
- Golder Associates Ltd. 2011a. Construction Plan Report. Prepared for: Ministry of the Environment.
- Golder Associates Ltd. 2011b. Decommissioning Plan Report. Prepared for: Ministry of the Environment.
- Golder Associates Ltd. 2011c. Project Description Report. Prepared for: Ministry of the Environment.
- Golder Associates Ltd. 2011d. Wind Turbine Specifications Report. Prepared for: Ministry of the Environment.
- Golder Associates Ltd. 2011e. Natural Heritage Assessment Report. Prepared for: Ministry of Natural Resources and Ministry of the Environment.
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Report Signature Page

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Project Director

JR AE RC/JW AC/am

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FIGURE 1

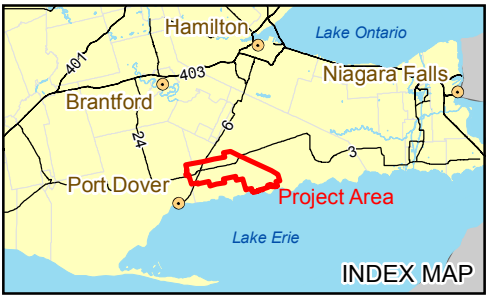
Project Area

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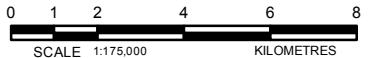
LEGEND

- Community
- Highway
- Major Road
- Local Road
- Water
- Project Area
- Project Location
- Wooded Area
- Haldimand Tract
- Provincial Park
- Conservation Area
- Municipal Boundary



REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2008.4
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2009
 Projection: UTM Datum: NAD 83 Coordinate System: UTM Zone 17



PROJECT		Summerhaven Wind Energy Centre	
TITLE		PROJECT AREA	
<p>Golder Associates Mississauga, Ontario</p>	PROJECT NO. 10-1151-0035	SCALE AS SHOWN	REV.
	DESIGN PP 7 Apr. 2010		
	GIS BC 26 Sep. 2010		
	CHECK PP 26 Sep. 2010		
	REVIEW JW 26 Sep. 2010		
FIGURE: 1			



APPENDIX A

Summerhaven Wind Energy Centre - Parcel Boundary Setback Reduction Analysis



NextEra Energy Canada, ULC

SUMMERHAVEN WIND FARM - PARCEL BOUNDARY SETBACK REDUCTION ANALYSIS

JUSTIFICATION REPORT

APRIL 2011



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1. INTRODUCTION

1.1 Purpose

The purpose of this report is to provide an assessment of proposed wind turbine locations within the Summerhaven Wind Farm that do not meet the required setback of “turbine height minus blades” from the base of the wind turbine to the boundary of parcels of land on which the turbine is located.

IBI Group was retained by NextEra Energy Canada, ULC to undertake an analysis of 20 turbines within the Summerhaven Wind Farm. The analysis will look at what impacts the reduced setback may have on nearby business, infrastructure, properties or land use activities, and will describe any required preventative measures to be used to address any adverse impacts.

From an agricultural planning perspective, it is generally considered advantageous to farmers to have turbines located as close as possible to lot lines (or fencelines located between fields), in order to cause the least amount of disruption to farming practices, in particular field crop planting and harvesting. This coincides with traditional locations for farm access roads along fencelines, which in turn are preferred locations for new or improved turbine access roads. To this point, the Haldimand County Official Plan states in Section 3.A.5)10. that Wind Energy Generation Systems should be “designed to limit the footprint on the land and minimize disruption to normal farm practices”.

1.2 Legislation

Ontario Regulation 359/09 outlines the regulations for the development and approval of renewable energy projects within the Province of Ontario. Section 53 of the regulation outlines setback requirements for Class 3, 4, and 5 wind facilities, with the Summerhaven Wind Farm being a Class 4 wind facility. It states in subsection 53 (1) (b) that no person shall erect a Class 4 wind facility unless:

the distance between the base of the wind turbine and all boundaries of the parcel of land on which the wind turbine is constructed, installed or expanded is equivalent to, at a minimum, the height of the wind turbine, excluding the length of any blades.

Furthermore, subsection 53 (2) states the above described distance does not apply:

in respect of a boundary of the parcel of land on which the wind turbine is constructed, installed or expanded if the abutting parcel of land on that boundary is,

(a) owned by the person who proposes to engage in the renewable energy project in respect of the wind turbine; or

(b) owned by a person who has entered into an agreement with the person mentioned in clause (a) to permit the wind turbine to be located closer than the distance specified in clause (1) (b).

And furthermore under subsection 53 (3), states that clause 53 (1) (b) does not apply if the distance from the base of the turbine to the property boundary is at least blade length plus 10 metres and:

as part of an application for the issue of a renewable energy approval or a certificate of approval in respect of the construction, installation or expansion of the wind turbine, the person who is constructing, installing or expanding the wind turbine submits a written assessment,

(i) demonstrating that the proposed location of the wind turbine will not result in adverse impacts on nearby business, infrastructure, properties or land use activities, and

(ii) describing any preventative measures that are required to be implemented to address the possibility of any adverse impacts mentioned in subclause (i).

This report is intended to fulfill the above requirements of subsection 53 (2) and (3) of Ontario Regulation 359/09.

1.3 Project Description

The Summerhaven Wind Farm is a 135 MW wind energy project proposing the use of Fifty-eight (58) 2.221 MW Siemens 101 Low Noise and one (1) 2.221 MW Siemens 93 Low Noise wind turbine generators with a total installed nameplate capacity of 131.04 MW, and located along the north shore of Lake Erie, in Concessions 1-7, between Highway 6, and Bains Road, in the County of Haldimand. The proposed turbines have a hub height of 80 metres, with a blade length of 50.5 metres. Based on this turbine model the minimum setback from a property boundary that is not owned by the same owner or has a signed agreement as per subsection 53(2) as described above, would be 60.5 metres (blade length + 10 metres).

For this project there are twenty (20) turbines which have lot line setbacks of less than 80 metres and therefore require an explanation and/or justification for the reduced property boundary setback.

2. ANALYSIS

The methodology for this report was to identify turbines that were less than 80 metres from a lot line; undertake an analysis of the local surrounding land use characteristics; determine the potential impacts of the wind turbine on the surrounding land uses; and discuss what if any preventative measures should be employed to mitigate such impacts. Note that the attached map schedules

include the distance used in this analysis as the central node of the proposed turbine base. However the regulations require the distance from the edge of the base of the turbine. The proposed turbine base will have an approximate base diameter of five metres.

2.1 Turbine 3 – Part Lot 7 & 8, Conc. 7 Walpole

2.1.1 DESCRIPTION

Turbine 3 is located 54 metres from the closest lot line (westerly side lot line) which is 26 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and are used for field crop purposes with no buildings, structures, or infrastructure located on the lands. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 3 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.2 Turbine 4 –Part Lot 9, Conc. 7 Walpole

2.2.1 DESCRIPTION

This turbine is located 70 metres from the closest lot line (easterly side lot line) which is 10 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are cash crop agricultural fields, bisected by an agricultural drain approximately 200 metres northeast of the proposed turbine. The closest buildings are approximately 500 metres northeast, and are part of the overall project. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities. (See Turbine 4 Map in Appendix 1).

2.2.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel to the east from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 10 metres. There is no adverse impact on nearby properties or land use activities.

2.2.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops, and reduce risk to human safety include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures

are standard best practices and no additional preventative measures are required for the change in setback.

2.3 Turbine 5 –Part Lot 11, Conc. 7 Walpole

2.3.1 DESCRIPTION

This turbine is located 68 metres from the closest lot line (rear lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is only 12 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are characterized as cropped agricultural fields in their entirety. There are no buildings, structures, or infrastructure located on the adjacent lands or within 550 metres of the proposed turbine. Land use within the vicinity of the proposed turbine would likely be restricted to seasonal farming activities (See Turbine 5 Map in Appendix 1).

2.3.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 12 metres. There is no adverse impact on nearby properties or land use activities.

2.3.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.4 Turbine 6 – Part Lot 14, Conc. 7 Walpole

2.4.1 DESCRIPTION

This turbine is located 27 metres from the closest lot line (westerly side lot line) which is 53 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and mostly used for field crop purposes with no buildings, structures, or infrastructure located within 550 metres of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 6 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.5 Turbine 7 –Part Lot 16, Conc. 7 Walpole

2.5.1 DESCRIPTION

This turbine is located 22 metres from the closest lot line (rear lot line) which is 58 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and used entirely for field crop purposes with no buildings, structures, or infrastructure on either the subject or abutting lands. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 7 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.6 Turbine 8 – East Part Lot 18, Conc. 7 Walpole

2.6.1 DESCRIPTION

This turbine is also located 22 metres from the closest lot line (westerly side lot line) which is 58 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and used entirely for field crop purposes with a small hedgerow between the properties, and no buildings, structures, or infrastructure within 700 metres of the proposed turbine. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 8 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.7 Turbine 9 –Part Lot 2, Conc. 6 Rainham

2.7.1 DESCRIPTION

This turbine is located 77 metres from the closest lot line (westerly side lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is only 3 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are characterized as mostly cash crop fields, with a small woodlot approximately 500 metres northwest of the proposed turbine, as well as a small grassed aircraft landing strip running south of the proposed turbine (75 metres) in an east-west direction. The nearest farm buildings on the

adjacent lands are located approximately 550 metres from the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities (See Turbine 9 Map in Appendix 1). It should be noted that the aircraft landing strip is unused, partly located on the subject lands, and previously used by a participating landowner within the project area who does not have issue with the turbine location.

2.7.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of only 3 metres. There is potential for impacts to takeoff and landing of small aircraft, but this risk is essentially eliminated by non-use of the landing strip by the owner or abutting landowner.

2.7.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.8 Turbine 12 –Part Lot 2 & 3, Conc. 6 Walpole

2.8.1 DESCRIPTION

This turbine is located 64 metres from the closest lot line (rear lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is 16 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are mostly used for field crop purposes with no buildings, structures, or infrastructure located on-site. There is a woodlot over 400 metres southeast of the proposed turbine site. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 12 Map in Appendix 1).

2.8.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 16 metres. There is no adverse impact on nearby properties or land use activities.

2.8.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.9 Turbine 20 –Part Lot 5, Conc. 5 Walpole

2.9.1 DESCRIPTION

This turbine is located 73 metres from the closest lot line (rear lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is just 7 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are mostly used for field crop purposes with no buildings, structures, or infrastructure located on-site. Immediate surrounding lands are characterized as a woodlot which extends onto the subject lands as well as other neighbouring surrounding parcels of land. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities and woodland harvesting with otherwise minimal human activities (See Turbine 20 Map in Appendix 1).

2.9.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to trees as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 7 metres. There is no adverse impact on nearby properties or land use activities.

2.9.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring trees include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.10 Turbine 21 – Part Lot 11 & 12, Conc. 5 Walpole

2.10.1 DESCRIPTION

This turbine is located just 16 metres from the closest lot line (westerly side lot line) which is 64 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced

setback, and mostly used for field crop purposes with no buildings, structures, or infrastructure within 1km of the proposed turbine. Immediate surrounding lands are characterized as a cropped field which extends approximately 200 metres westerly to a wooded area. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 21 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.11 Turbine 27 – Part Lot 1, Conc. 4 Rainham

2.11.1 DESCRIPTION

This turbine is located just 26 metres from the closest westerly side lot line and 27 metres from the rear lot line, which is 53-54 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback, and mostly used for field crop purposes with no buildings, structures, or infrastructure within 500 metres of the proposed turbine. Immediate surrounding lands are characterized as a cropped field which extends approximately 200 metres in all directions. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 27 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.12 Turbine 31 – Part Lot 5 & 6, Conc. 3 Rainham

2.12.1 DESCRIPTION

This turbine is located just 47 metres from the closest lot line (rear lot line), which is 33 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and mostly used for field crop purposes with no buildings, structures, or infrastructure within 600 metres of the proposed turbine. Immediate surrounding lands are characterized as a cropped field which extends approximately 200 metres in all directions. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 31 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.13 Turbine 32 – Part Lot 8, Conc. 3 Rainham

2.13.1 DESCRIPTION

This turbine is located 60 metres from the closest lot line (westerly side lot line), which is 20 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and entirely used for field crop purposes with no buildings, structures, or infrastructure on the abutting lands. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 32 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.14 Turbine 35 – Part Lot 8, Conc. 2 Rainham

2.14.1 DESCRIPTION

This turbine is located just 17 metres from the closest lot line (rear lot line) and 79 metres from the next closest lot line (easterly side lot line), which is 63 metres and 1 metre less than required respectively as the standard setback without undertaking any further analysis. The northerly adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback. Based on the above noted agreement being in place, no further analysis of the northerly lands is required as per subsection 53(2) of Ontario Regulation 359/09.

The easterly abutting lands are characterized as cropped fields with a woodlot approximately 100 metres from the proposed turbine site. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 35 Map in Appendix 1).

2.14.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 1 metre. There is no adverse impact on nearby properties or land use activities.

2.14.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather

instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.15 Turbine 37 – Part Lot 5 & 6, Conc. 2 Rainham

2.15.1 DESCRIPTION

This turbine is located 61 metres from the closest lot line (westerly side lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is 19 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are mostly used for field crop purposes with no buildings, structures, or infrastructure located within 650 metres of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 37 Map in Appendix 1).

2.15.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 19 metres. There is no adverse impact on nearby properties or land use activities.

2.15.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.16 Turbine 38 – Part Lot 7 & 8, Conc. 2 Rainham

2.16.1 DESCRIPTION

This turbine is located just 34 metres from the closest lot line (easterly side lot line), which is 46 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and almost entirely used for field crop purposes with no buildings, structures, or infrastructure within 550 metres of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 38 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.17 Turbine 41 – Part Lot 7 & 8, Conc. 2 Rainham

2.17.1 DESCRIPTION

This turbine is located just 33 metres from the closest lot line (easterly side lot line), which is 47 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; and almost entirely used for field crop purposes with no buildings, structures, or infrastructure within 700 metres of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 41 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.

2.18 Turbine 42 – Part Lot 12, Conc. 2 Rainham

2.18.1 DESCRIPTION

This turbine is located 63 metres from the closest lot line (westerly side lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is 17 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are mostly used for field crop purposes with no buildings, structures, or infrastructure located within 500 metres of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 42 Map in Appendix 1).

2.18.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 17 metres. There is no adverse impact on nearby properties or land use activities.

2.18.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather

instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.19 Turbine 48 – Part Lot 4 & 5, Conc. 1 Rainham

2.19.1 DESCRIPTION

This turbine is located 75 metres from the closest lot line (rear lot line) which exceeds the absolute minimum requirement of blade length plus 10 metres (60.5 metres) and is 5 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are mostly used for field crop purposes with a large woodlot dividing the parcel into a large northerly field, and a smaller field adjacent to the proposed turbine location. There are no buildings, structures, or infrastructure located within 900 metres of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 48 Map in Appendix 1).

2.19.2 POTENTIAL IMPACTS

Adverse impacts to the neighbouring parcel from the reduced setback may include damage to crops as a result of turbine failure. However, this impact is already present at an 80 metre setback and is not enhanced significantly by requesting a reduction of 5 metres. There is no adverse impact on nearby properties or land use activities.

2.19.3 PREVENTATIVE MEASURES

Preventative measures to address potential damage to neighbouring crops include certification of the wind turbine by professional engineers; ongoing regular maintenance and monitoring of the wind turbine by operations staff; and shutdown mechanisms and protocols in extreme weather instances to prevent damage to wind turbines. All of these measures are standard best practices and no additional preventative measures are required for the change in setback.

2.20 Turbine 55 – Part Lot 15, Conc. 1 Rainham

2.20.1 DESCRIPTION

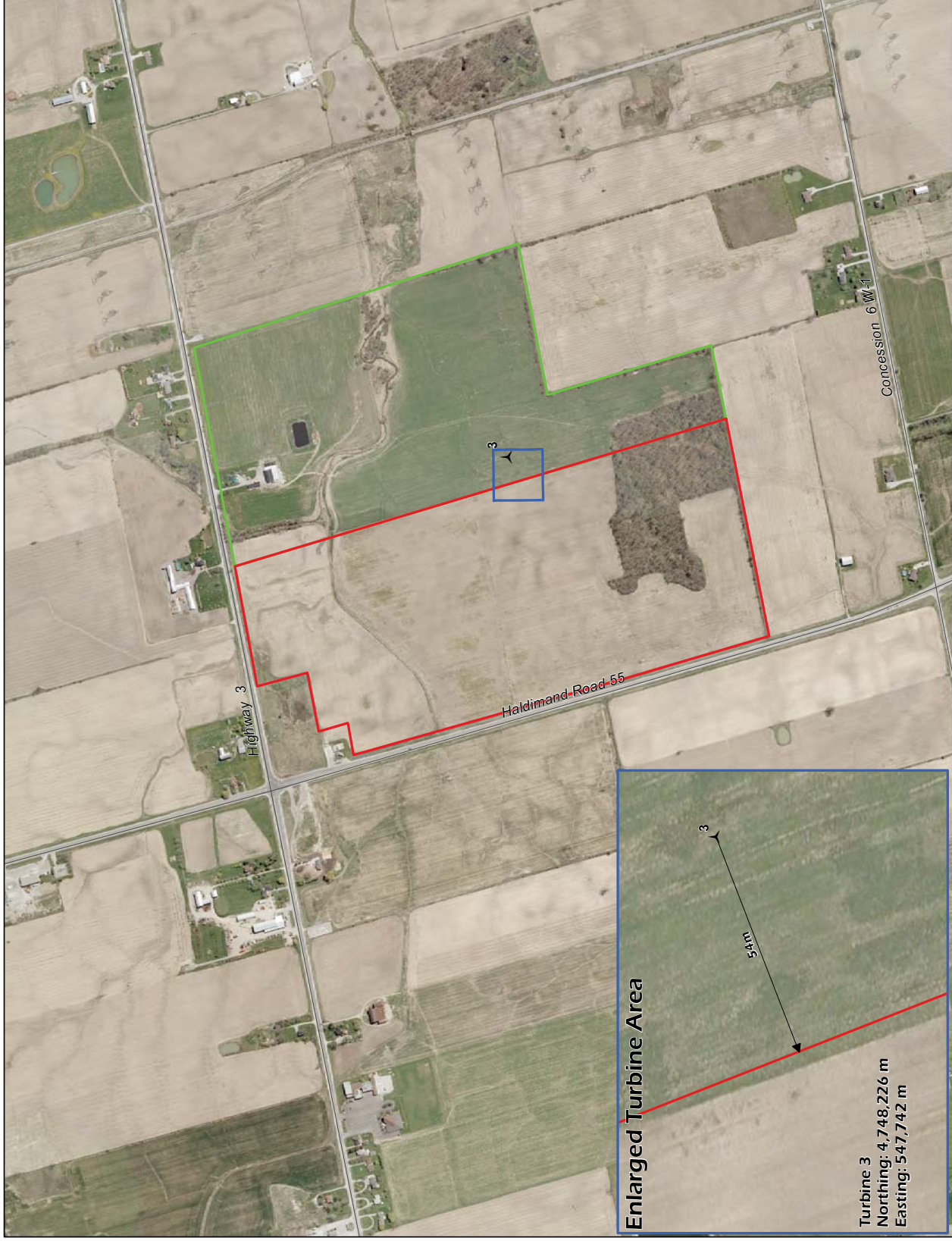
This turbine is located 23 metres from the closest lot line (easterly side lot line), which is 57 metres less than required as the standard setback without undertaking any further analysis. The adjacent lands are owned by a person(s) who will enter into an agreement to permit the reduced setback; include project infrastructure (Turbine 56); and almost entirely used for field crop purposes with no buildings, structures, or infrastructure within 1km of the proposed turbine location. Land use within the vicinity of the proposed turbine would be restricted to seasonal farming activities with otherwise minimal human activities (See Turbine 55 Map in Appendix 1).

Based on the above noted agreement being in place, no further analysis is required as per subsection 53(2) of Ontario Regulation 359/09.




3. CONCLUSION

Based on the preceding analysis of the proposed twenty (20) turbine locations considered for reduced setbacks from property boundaries, a total of eleven (11) turbines were adjacent to lands that were under same ownership or owned by a person who will enter into an agreement for reduced setback, and as such did not require further justification as per Section 53(2) of Ontario Regulation 359/09. It is our opinion that the remaining nine (9) turbines would create no adverse impacts as a result of the setback reductions, and that standard preventative measures implemented through best practices address any change in impacts that may be encountered.

Appendix 1 – Individual Map Schedules



Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 7-8, Con 7 W/1pole
Pt 1 & 2 18R4380
-  Neighbouring Land Parcel
Pt Lot 7 Con 7 W/1pole

Turbine 3

Non Participating Lot Line
Hub Height (80m) Setback



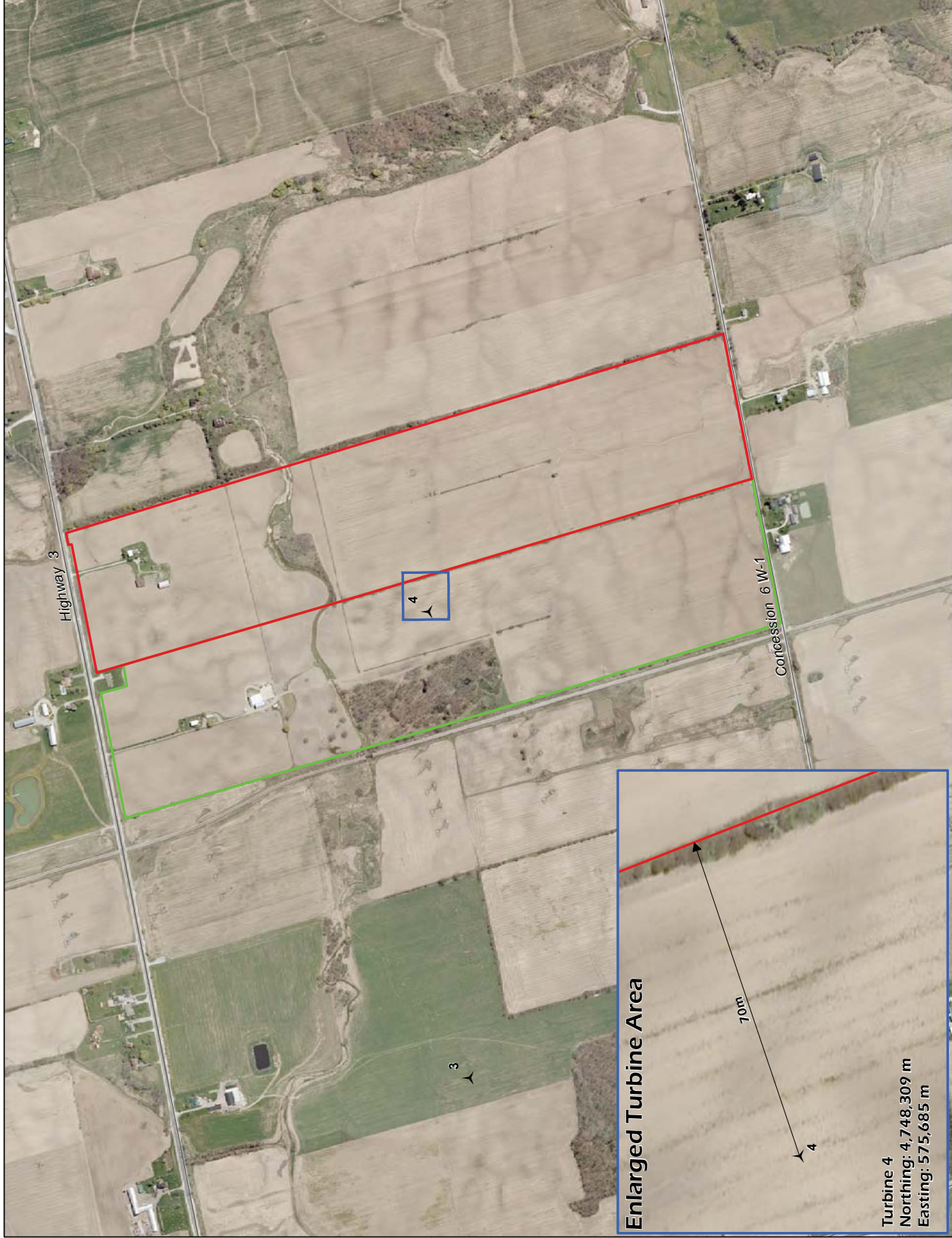
1:7,500

NAD 1983 UTM Zone 17N

Enlarged Turbine Area

54m

Turbine 3
Northing: 4,748,226 m
Easting: 547,742 m



Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 9 Con 7 Walpole
Except Pt 1
-  Neighbouring Land Parcel
Pt Lot 9 Con 7 Walpole
Except Pt 1

Turbine 4

**Non Participating Lot Line
Hub Height (80m) Setback**



1:7,500

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Enlarged Turbine Area

70m

Turbine 4
Northing: 4,748,309 m
Easting: 575,685 m



Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 11 Con 7 Walpole
Except Pt 1 & 2 18R6337
-  Neighbouring Land Parcel
Pt Lot 11 Con 7 Walpole
Except Pt 1 & 2 18R6337

Turbine 5

Non Participating Lot Line
Hub Height (80m) Setback






1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
PT Lot 14 Con 7 Waipole
Except PT 1 18R6448 & PT 1
18R6358
-  Neighbouring Land Parcel
PT Lot 14-13 Con 7 Waipole
PT 1 18R6448

Turbine 6

Non Participating Lot Line
Hub Height (80m) Setback






1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 16 Con 7 Waipole
-  Neighbouring Land Parcel
Pt Lot 16 Con 7 Waipole

Turbine 7

Non Participating Lot Line
Hub Height (80m) Setback



1:7,500

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Enlarged Turbine Area

22m

Turbine 7
Northing: 4,749,156 m
Easting: 579,869 m



Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 18 Con 7 Walpole
Except Pt 1 18R6362
-  Neighbouring Land Parcel
Pt Lot 16-17 Con 7 Walpole

Turbine 8

Non Participating Lot Line
Hub Height (80m) Setback






1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
PT Lot 2 Con 6 Rainham
-  Neighbouring Land Parcel
PT Lot 1 Con 6 Rainham

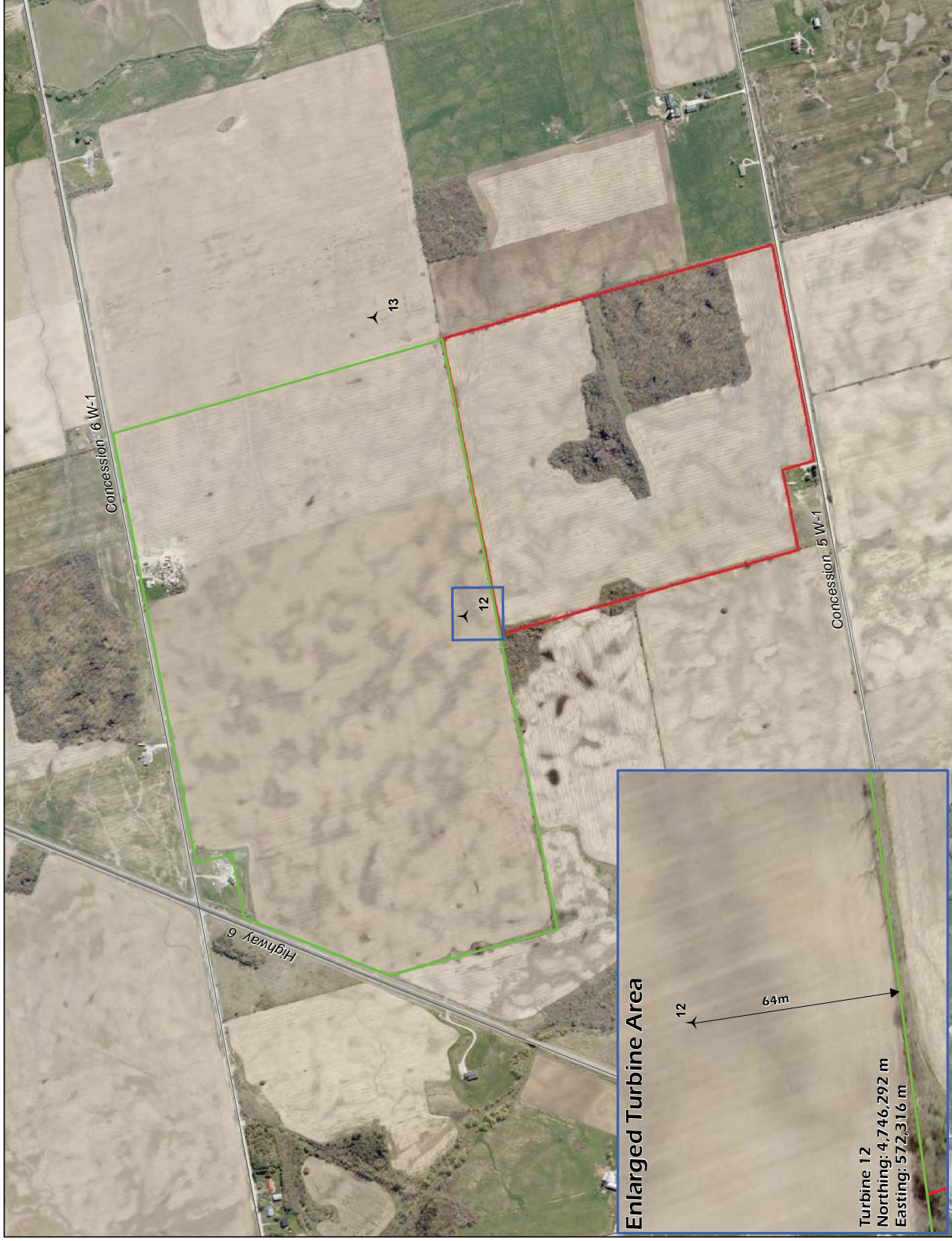
Turbine 9

Non Participating Lot Line
Hub Height (80m) Setback



1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 2-3 Con 6 Walpole
-  Neighbouring Land Parcel
Pt Lot 3 Con 6 Walpole

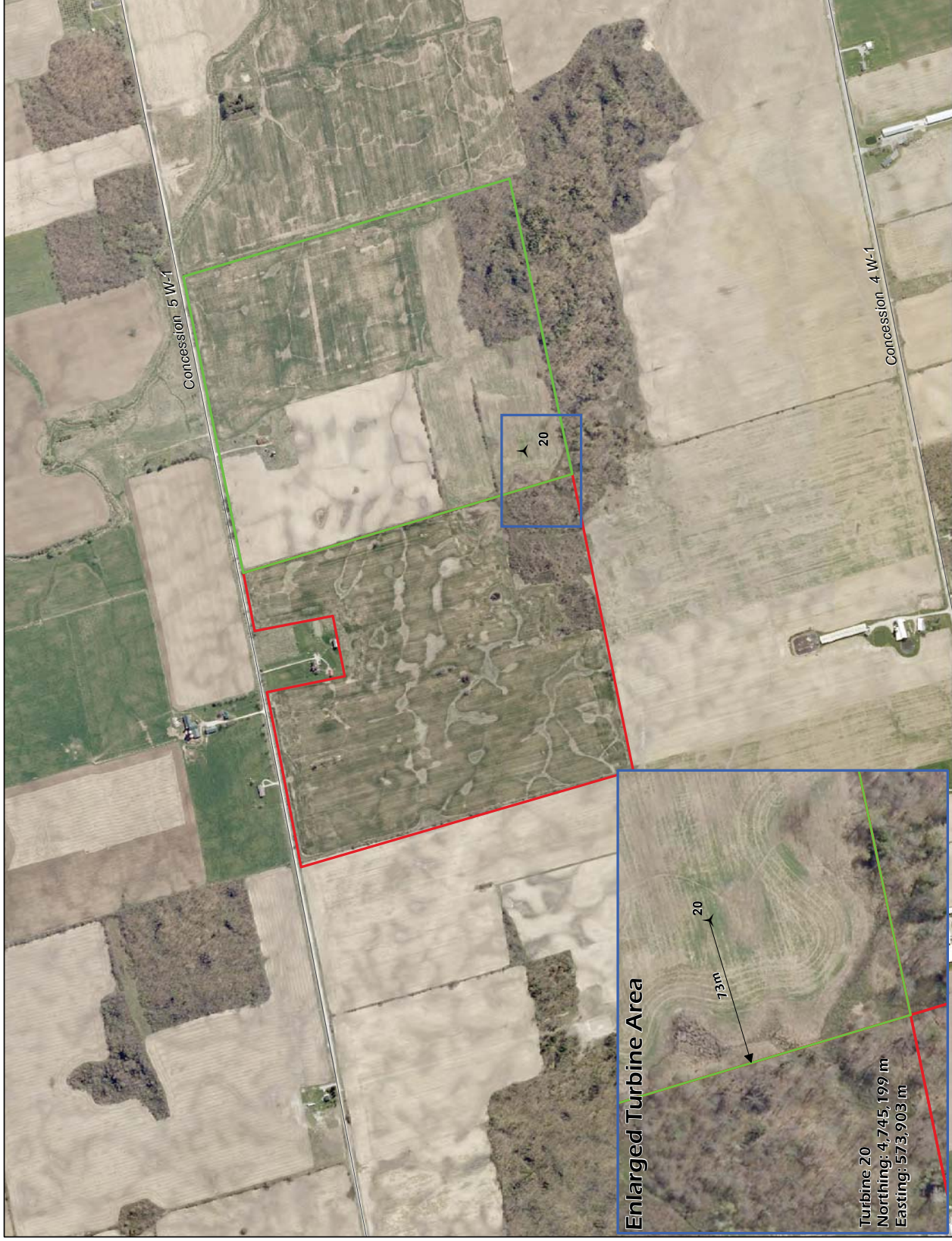
Turbine 12

Non Participating Lot Line
Hub Height (80m) Setback






1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 5 Con 5 Walpole
-  Neighbouring Land Parcel
N 1/2 Lot 4 Con 5 Walpole Except
Pt 1 18R2566 & Pt 1 18R3398

Turbine 20

Non Participating Lot Line
Hub Height (80m) Setback

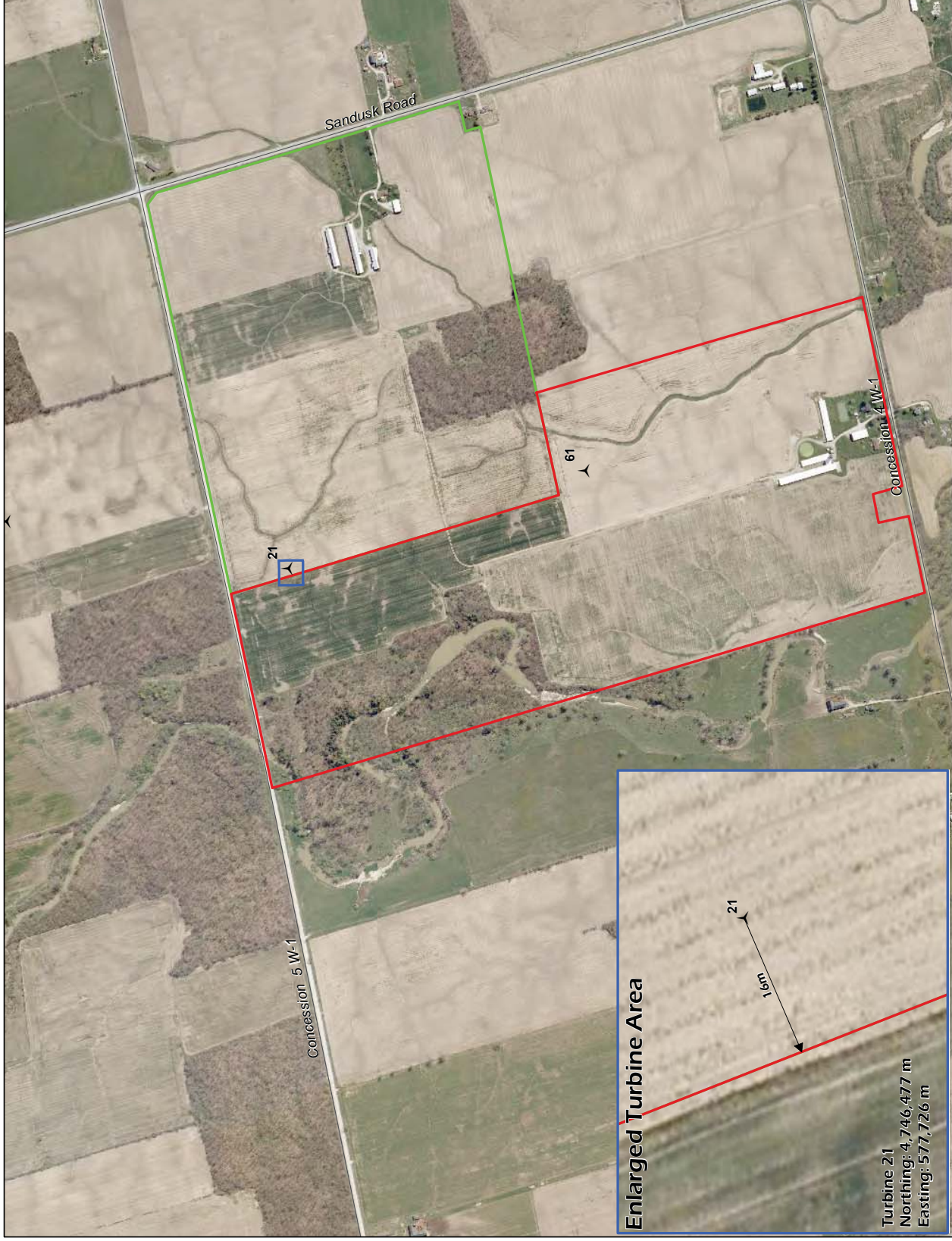


1:7,500

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Enlarged Turbine Area

Turbine 20
Northing: 4,745,199 m
Eastng: 573,903 m



Legend

-  Turbine Location
-  Host Land Parcel
Pt Lot 11-12 Con 5 Walpole
-  Neighbouring Land Parcel
Pt Lot 11 Con 5 Walpole

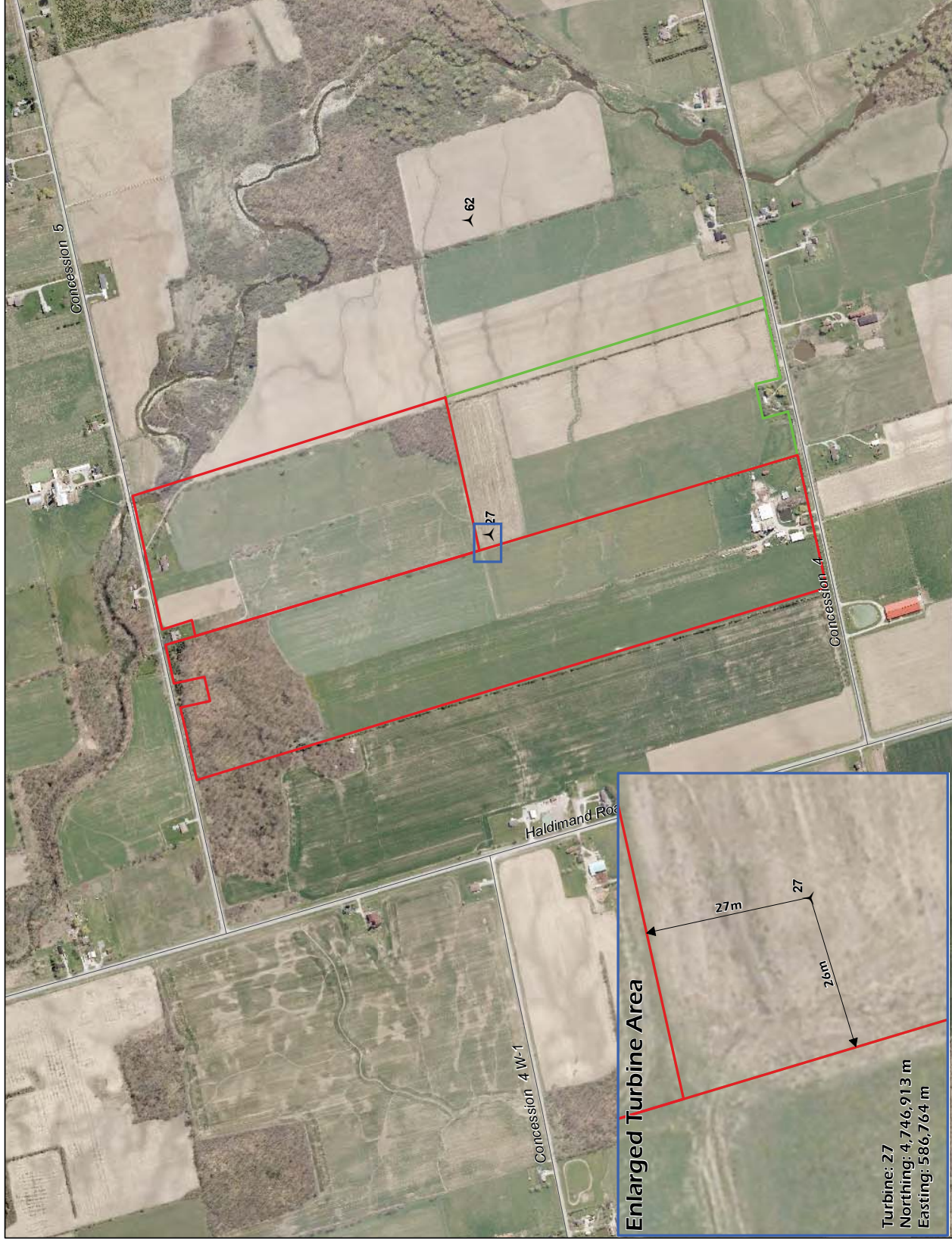
Turbine 21

Non Participating Lot Line
Hub Height (80m) Setback






1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
PT Lot 1 Con 4 Rainham;
PT S 1/2 Lt 2 Con 4 Rainham
-  Neighbouring Land Parcel
PT Lot 1 Con 4 Rainham;
PT S 1/2 Lt 2 Con 4 Rainham;
PT N 1/2 Lt 2 Con 4 Rainham

Turbine 27

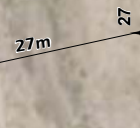
**Non Participating Lot Line
Hub Height (80m) Setback**



1:7,500

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Enlarged Turbine Area



Turbine: 27
Northing: 4,746,913 m
Easting: 586,764 m



Legend

-  Turbine Location
-  Host Land Parcel
PLT 5-6 Con 3 Rainham
Pt 1 18R4904 Save & Except
Pt 1 18R6710
-  Neighbouring Land Parcel
Legal Desc. Unknown

Turbine 31

Non Participating Lot Line
Hub Height (80m) Setback



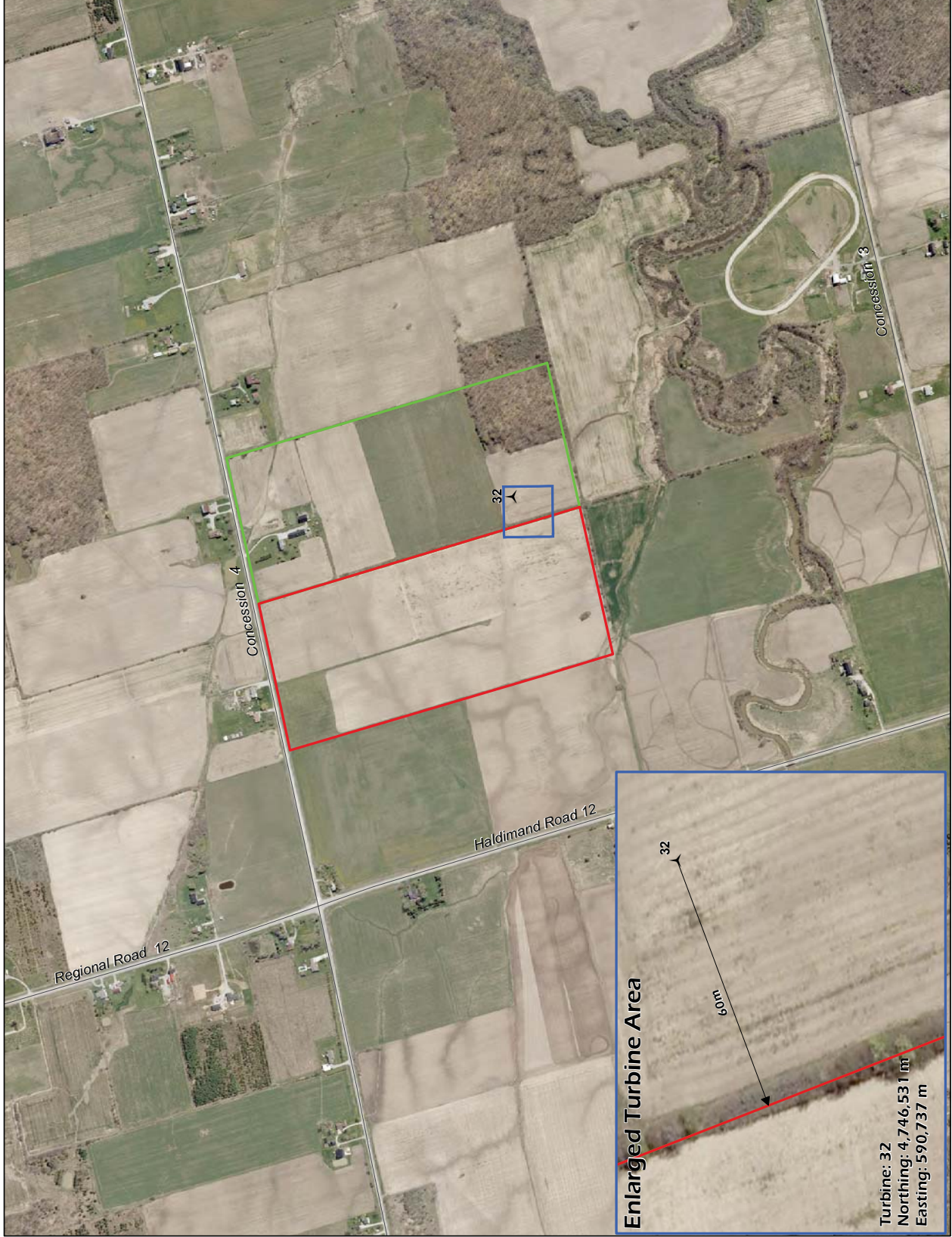
1:7,500

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Enlarged Turbine Area

31
47m

Turbine: 31
Northing: 4,746,128 m
Easting: 589,357 m



Legend

-  Turbine Location
-  Host Land Parcel
P/Lt 8 Con 3 Rainham
-  Neighbouring Land Parcel
P/Lt 7 Con 3 Rainham

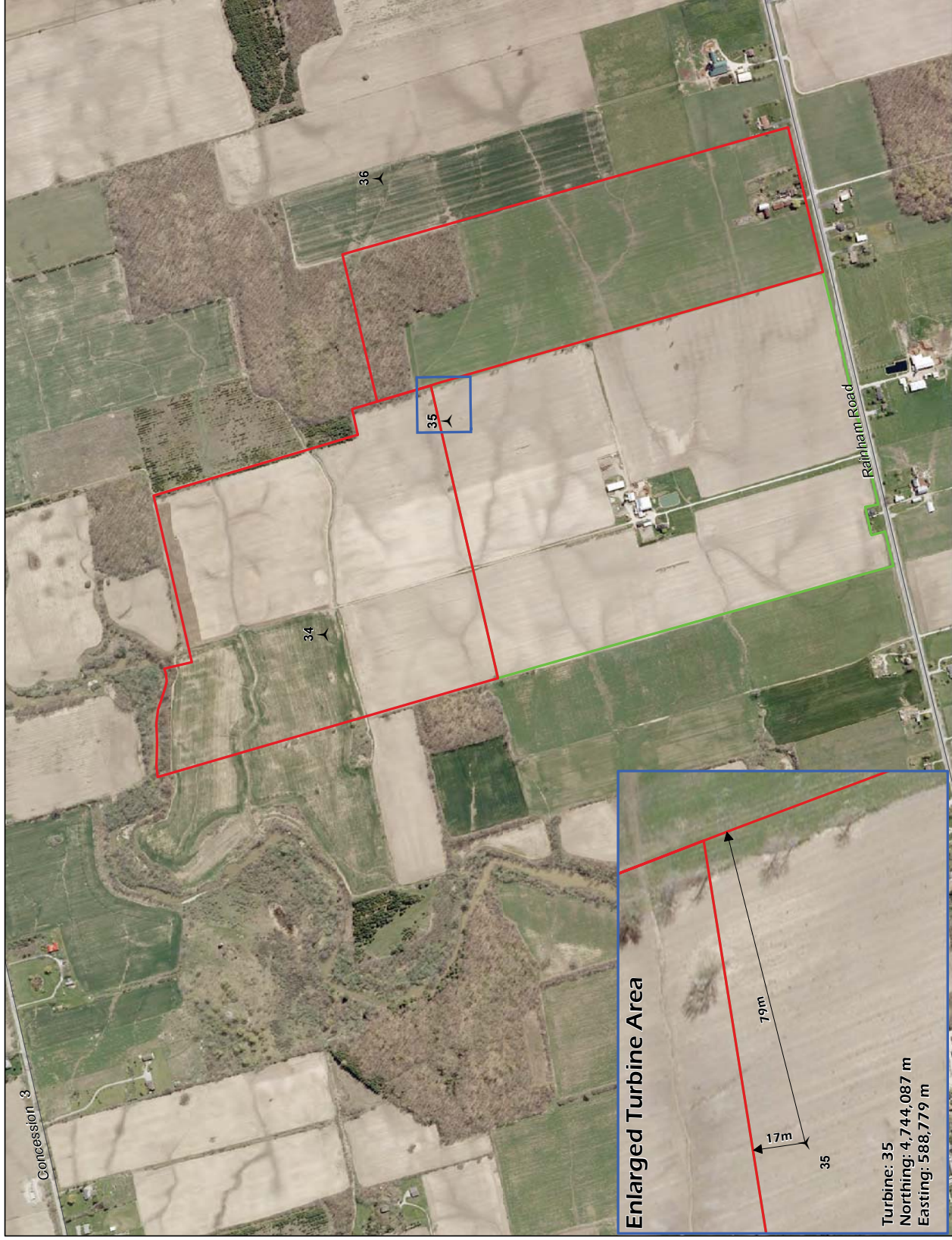
Turbine 32

**Non Participating Lot Line
Hub Height (80m) Setback**



1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
P/LT 3 Con 2 Rainham
-  Neighbouring Land Parcel
P/LT 3 Con 2 Rainham;
P/LT 4 Con 2 Rainham

Turbine 35

Non Participating Lot Line
Hub Height (80m) Setback



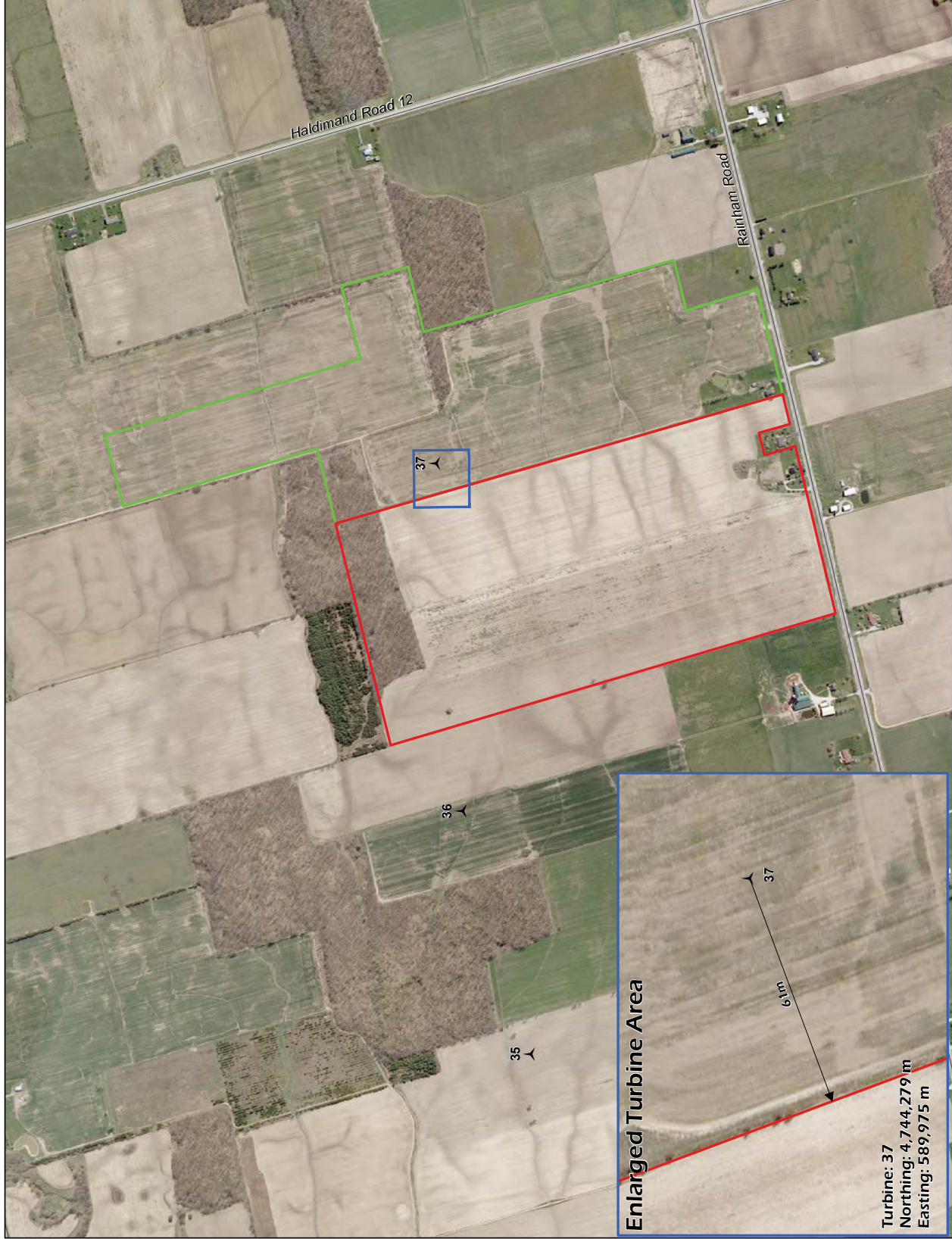
1:7,500

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Enlarged Turbine Area

17m
79m

Turbine: 35
Northing: 4,744,087 m
Easting: 588,779 m



Legend

-  Turbine Location
-  Host Land Parcel
PT S Pt Lt 5 Con 2 Rainham;
Pt Lt 6 Con 2 Rainham
-  Neighbouring Land Parcel
PT S Pt Lt 5 Con 2 Rainham;
Pt Lt 4 Con 2 Rainham
Except Pt 1 18R2053

Turbine 37

**Non Participating Lot Line
Hub Height (80m) Setback**



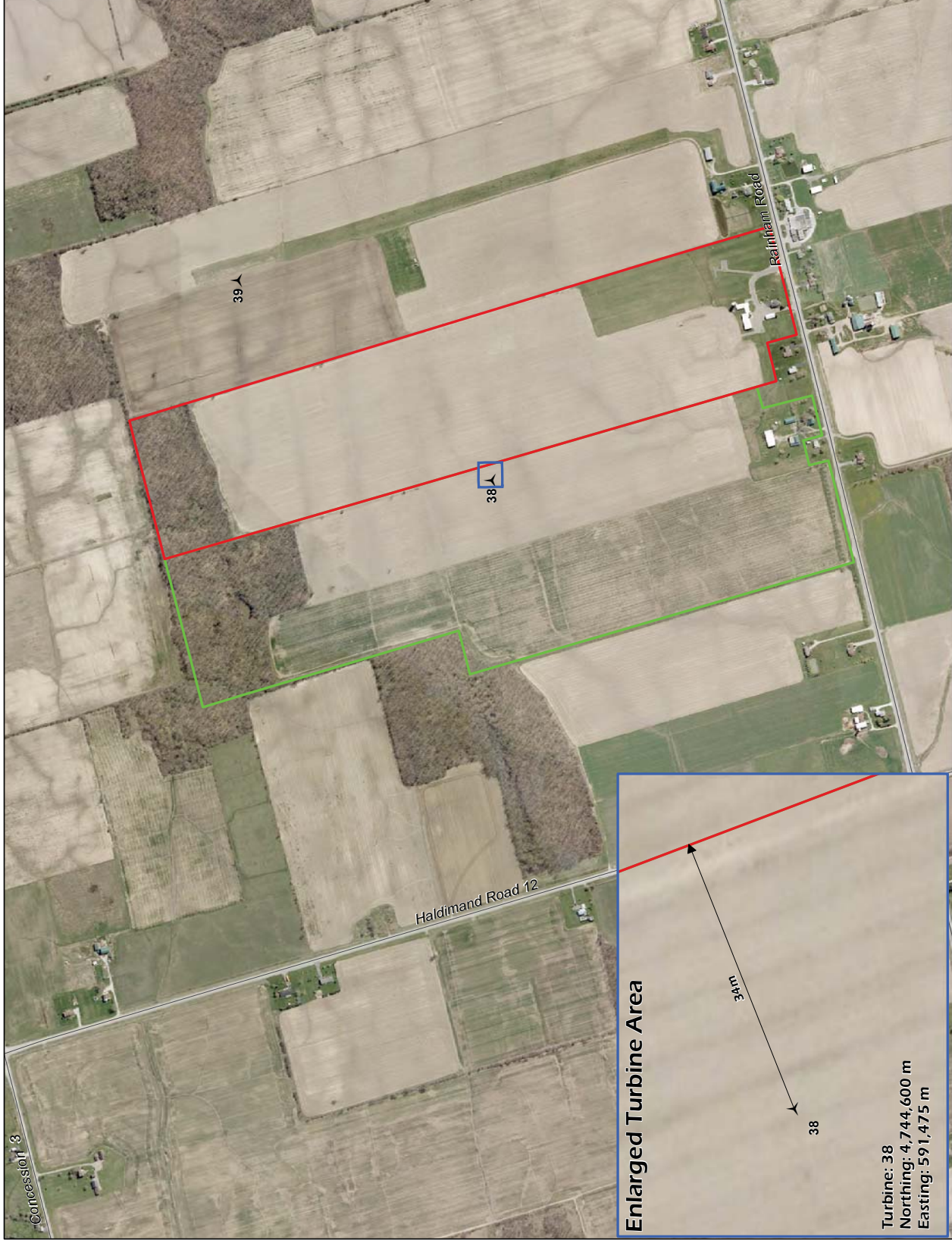
1:7,500

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Enlarged Turbine Area

Turbine: 37
Northing: 4,744,279 m
Easting: 589,975 m

61m



Legend

-  Turbine Location
-  Host Land Parcel
Pt Lt 7-8 Con 2 Rainham
Pt 1 14R1804
-  Neighbouring Land Parcel
Pt Lt 9 Con 1 Rainham

Turbine 38

**Non Participating Lot Line
Hub Height (80m) Setback**



1:7,500

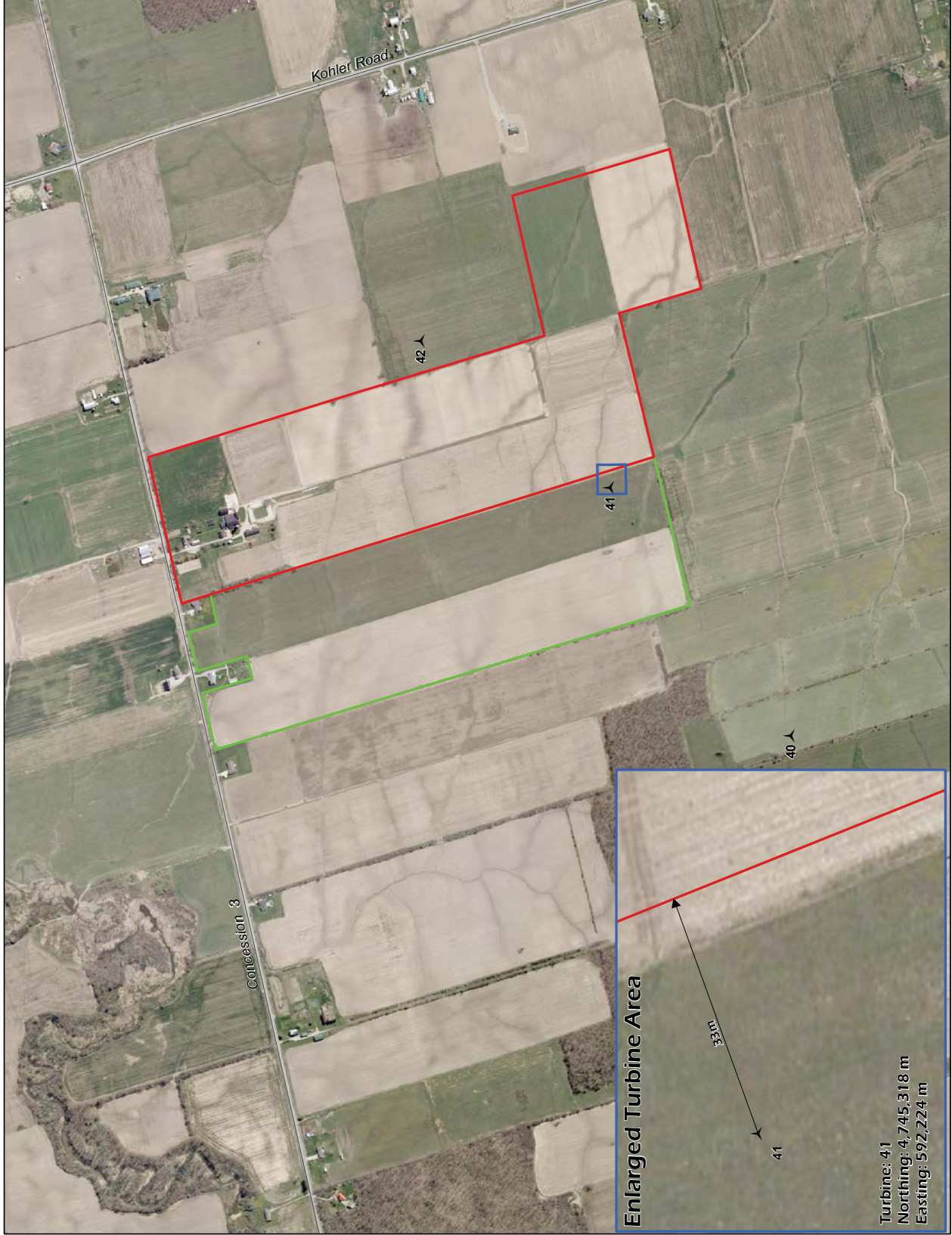
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Enlarged Turbine Area




34m

38

Turbine: 38
Northing: 4,744,600 m
Easting: 591,475 m



Legend

-  Turbine Location
-  Host Land Parcel
PT Lt 11 Con 2 Rainham
PT 1 18R5570
-  Neighbouring Land Parcel
PT Lt 11-12 Con 2 Rainham

Turbine 41

**Non Participating Lot Line
Hub Height (80m) Setback**



1:7,500

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Enlarged Turbine Area

Turbine: 41
Northing: 4,745,318 m
Easting: 592,724 m

333m

41

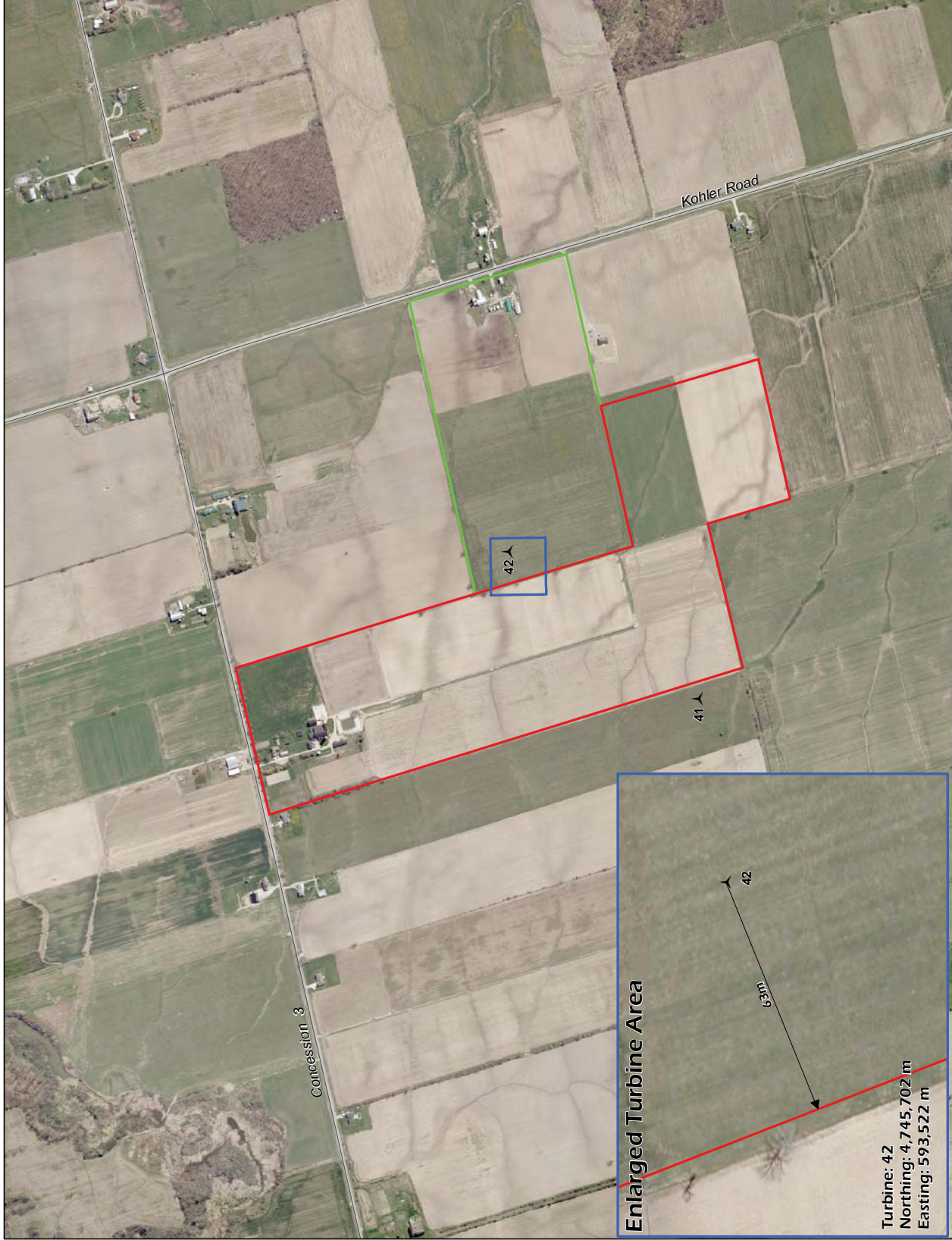
40

41

42

Kohler Road

Concession 3



Legend

-  Turbine Location
-  Host Land Parcel
P/LT 12 Con 2 Rainham
-  Neighbouring Land Parcel
P/LT 11-12 Con 2 Rainham

Turbine 42

**Non Participating Lot Line
Hub Height (80m) Setback**



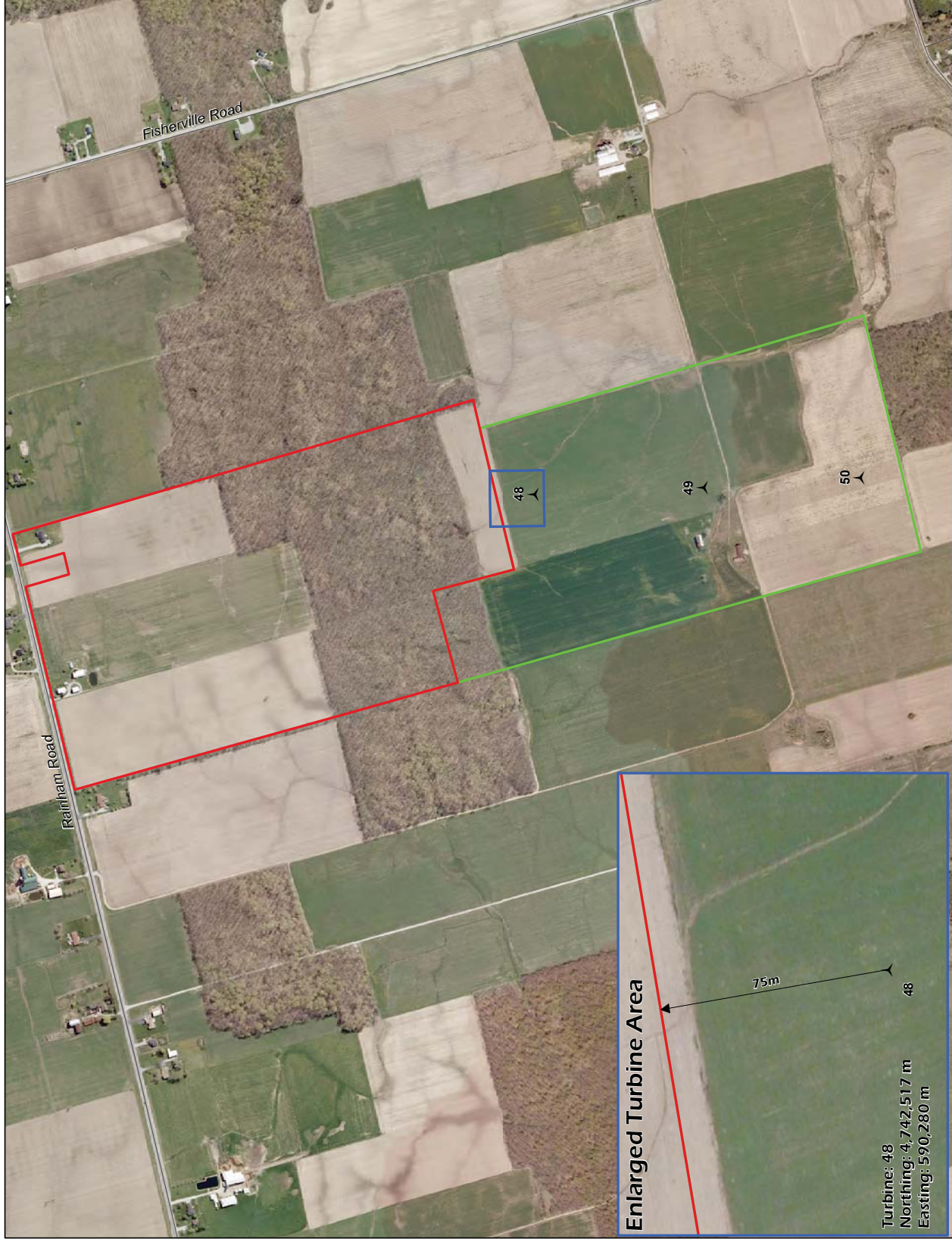
1:7,500

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Enlarged Turbine Area

42
63m

Turbine: 42
Northing: 4,745,702 m
Easting: 593,522 m



Legend

-  Turbine Location
-  Host Land Parcel
P/LI 4-5 Con 1 Rainham
-  Neighbouring Land Parcel
P/LI 5 Con 1 Rainham
Except Pt 1 18R5590

Turbine 48

**Non Participating Lot Line
Hub Height (80m) Setback**






1:7,500

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Legend

-  Turbine Location
-  Host Land Parcel
PT Lt 15 Con 1 Rainham;
PT W 1/2 Lt 16 Con 1 Rainham
-  Neighbouring Land Parcel
PTE 1/2 Lt 16 Con 2 Rainham

Turbine 55

Non Participating Lot Line
Hub Height (80m) Setback



1:7,500

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Enlarged Turbine Area

23m

Turbine: 55
Northing: 4,743,995 m
Easting: 596,817 m

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