



Samsung Renewable Energy Inc. and
Pattern Energy

1 Project Description Report
For
South Kent Wind Project



Samsung Renewable Energy Inc.
and Pattern Energy

1 - Project Description Report

Engineering and Environmental Services
for South Kent Wind Project

H335936-0000-07-124-0001

Rev. 2

April 25, 2012

Report Revisions

Section	Report Date: July 21, 2011	Report Date: February 23, 2012 – Revised Content	Report Date: April 25, 2012 – Revised Content
1	Samsung Renewable Energy and Pattern Energy (hereinafter referred to as the “Proponent”) are jointly proposing to develop the South Kent Wind Project, a 270 MW wind energy Project (hereinafter referred to as the “Project”), consisting of approximately 130 operational wind turbines, as well as supporting infrastructure, including access roads, buried cables and overhead collector lines. A 34 km 230 kV transmission line and two (2) substations are required to step the voltage from 34.5kV to 230 kV to enable connection to the Chatham Switching Station (SS).	Samsung Renewable Energy and Pattern Energy (hereinafter referred to as the “Proponent”) are jointly proposing to develop the South Kent Wind Project, a 270 MW wind energy Project (hereinafter referred to as the “Project”), consisting of approximately 127 operational wind turbines, as well as supporting infrastructure, including access roads, construction and turnaround areas, and buried and/or overhead collection/transmission lines. The collection/transmission line will include approximately 34 km of 230 kV transmission line and two (2) substations to enable step-up of the voltage from 34.5kV to 230 kV to connect to the Chatham Switching Station (SS).	Samsung Renewable Energy and Pattern Energy (hereinafter referred to as the “Proponent”) are jointly proposing to develop the South Kent Wind Project, a 270 MW wind energy Project (hereinafter referred to as the “Project”), consisting of approximately 124 operational wind turbines, as well as supporting infrastructure, including access roads, construction and turnaround areas, and buried and/or overhead collection/transmission lines. The collection/transmission line will include approximately 34 km of 230 kV transmission line and two (2) substations to enable step-up of the voltage from 34.5kV to 230 kV to connect to the Chatham Switching Station (SS).
1	Keith Knudsen Project Representative BowArk Energy Ltd. 915, 530 8th Avenue SW Calgary, Alberta T2P 3S8	Keith Knudsen Project Representative BowArk Energy Ltd. Suite 4301, 400 3rd Ave SW Calgary, Alberta T2P 4H2	
2.2	The proposed Project is a renewable energy generation facility which will use wind turbine generators. Electricity will be generated by approximately 130 Siemens 101 (2.221 MW and 2.126 MW) turbines. These turbines have a blade length of 49.2 m for a rotor diameter of 101 m.	The proposed Project is a renewable energy generation facility which will use wind turbine generators. Electricity will be generated by approximately 127 Siemens SWT – 2.3-101(2.221 MW, 2.126 MW and 1.903 MW) turbines. These turbines have a blade length of 49 m for a rotor diameter of 101m.	The proposed Project is a renewable energy generation facility which will use wind turbine generators. Electricity will be generated by approximately 124 Siemens SWT – 2.3-101(2.221MW, 2.126 MW & 1.903 MW) turbines. These turbines have a blade length of 49 m for a rotor diameter of 101m.

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2.5.5	The 34.1 km transmission line will be located within and/or adjacent to the existing and former railway line (east-west direction) which runs between Tilbury and Ridgetown, until the transmission line is required to head north (on public right-of-ways and/or private land) to connect with the Chatham Switching Station and the Hydro One Networks grid.	The 34.5 km transmission line will be located within and/or adjacent to the existing and former railway line (east-west direction) which runs between Tilbury and Ridgetown, until the transmission line is required to head north (on public right-of-ways and/or private land) to connect with the Chatham Switching Station and the Hydro One Networks grid.	
2.5.7	The Siemens 101 generators are suitable for areas where there are low to medium wind speeds.	The Siemens SWT-2.3-101 generators are suitable for areas where there are low to medium wind speeds.	
2.6		<p>Addition of the following approval:</p> <ul style="list-style-type: none"> Transportation Canada (Marine Safety) Navigable Water Protections Act Approval – required if new crossings of navigable waters required. 	
2.7	The nameplate capacity of the Project will be up to approximately 270 MW, with each individual turbine having a rated capacity of either 2.221 MW or 2.126 MW.	The nameplate capacity of the Project will be up to approximately 270 MW, with each individual turbine having a rated capacity of 2.221 MW, 2.126 MW or 1.903 MW.	
2.9	Additional field investigations and analysis of the environmental features was conducted in Fall 2010 and Spring/Summer 2011 to fulfil the requirements of the O. Reg. 359/09 and the Ministry of Natural Resources' (MNR) Approval and Permitting Requirements Document (APRD) for Renewable Energy Projects.	Additional field investigations and analysis of the environmental features was conducted in 2010 and 2011 to fulfil the requirements of the O. Reg. 359/09 and the Ministry of Natural Resources' (MNR) Approval and Permitting Requirements Document (APRD) for Renewable Energy Projects.	

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2.9.5	Legislated procedures and mitigation measures will be adhered to for the two (2) required water crossings associated with the Project.	Legislated procedures and mitigation measures will be adhered to for the water crossings associated with the Project.	
2.9.7	There are a number of wetlands located within 300 m of some of the Project locations although there were no significant wetlands identified within 120 m of a Project location. The wetlands are not anticipated to be directly affected by Project activities or indirectly affected (dust emissions, sediment and erosion, noise).	There are a number of wetlands located within 300 m of some of the Project locations although there are assumed significant wetlands identified within 120 m of a Project location. The wetlands are not anticipated to be directly affected by Project activities, but may be indirectly affected by dust emissions, sediment and erosion, and surface water runoff. Erosion and sedimentation control measures, such as seeding and control blankets, will be used in those areas cleared and directly adjacent to cleared areas for construction. Dust generated from the movement of construction vehicles could impact the surrounding vegetation (through settling) and will be addressed, as required, through the application of dust suppressants and the limiting of speed of construction vehicles on all roads. There will be no significant alterations to surface water runoff patterns to receiving wetlands/waterbodies.	

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2.9.10	There are valleylands located within 300 m of the Project location in the vicinity of Rondeau Bay although no valleylands were identified within 120 m of a Project location.	There are valleylands located within 300 m of the Project location in the vicinity of Rondeau Bay although no valleylands were identified within 120 m of the Project location.	
2.9.11	<ul style="list-style-type: none"> Herpetofauna – A number of turtle over-wintering habitats were identified within 120 m of the Project locations. Herpetofauna may potentially be affected by increased sedimentation in the drains as a result of exposed soils during Project construction. 	<ul style="list-style-type: none"> Herpetofauna – Amphibian breeding habitats, movement corridors and reptile hibernacula were identified within 120 m of the Project locations. Herpetofauna may potentially be affected by increased sedimentation in the drains as a result of exposed soils during Project construction 	
2.9.11	<ul style="list-style-type: none"> Birds - Open country breeding bird habitat was identified within 120 m of the Project locations as the Project locations overlap with the globally significant Rondeau Bay IBA. Birds may be affected in a variety of ways, including disruption of nests, habitat loss, displacement and disturbance of bird behaviour and finally, bird collisions with turbines and/or power lines. 	<ul style="list-style-type: none"> Birds - Open country breeding bird habitat was identified within 120 m of the Project locations as the Project locations overlap with the globally significant Rondeau Bay IBA. In addition, waterfowl stopover and staging areas and area-sensitive woodland breeding bird habitats were identified on or within 120 m of the Project location. Birds may be affected in a variety of ways, including disruption of nests, habitat loss, displacement and disturbance of bird behaviour and finally, bird collisions with turbines and/or power lines. 	

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2.9.11	The net effects and mitigation measures for terrestrial wildlife and wildlife habitat are identified in Table 2.1 and provided in more detail in Section 4.1 of the EIS (Hatch 2011).	The net effects and mitigation measures for terrestrial wildlife and wildlife habitat are identified in the Natural Heritage EIS (Hatch 2012).	
2.9.12	The Species at Risk (SAR) that may potentially occur within the Project locations include Butternut (<i>Juglans cinerea</i>), American Ginseng (<i>Panax quinquefolius</i>), Climbing Prairie Rose (<i>Rosa setigera</i>), Red-shouldered Hawk (<i>Buteo lineatus</i>), Least Bittern (<i>Ixobrychus exilis</i>), Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>), Grey Fox (<i>Urocyon cinereoargenteus</i>) and Eastern Mole (<i>Scalopus aquaticus</i>).	Several Species at Risk (SAR) may potentially occur within the Project locations.	
2.9.12	A review of SAR and their habitat was conducted during the site investigations with the presence of confirmed SAR within the Project location including Eastern Foxsnake (<i>Pantherophis gloydi</i>) and Bobolink (<i>Dolichonyx oryzivorus</i>). The conduct of surveys and reporting for SAR is not required under REA but instead under MNR's Approval and Permitting Requirements Document (APRD). The presence of these SAR will be documented under a separate report according to the requirements of the APRD, and as such, legislated measures will be undertaken to protect their habitat.	A review of SAR and their habitat was conducted during the site investigations with the presence of confirmed SAR within the Project location including Eastern Foxsnake (<i>Pantherophis gloydi</i>), Bobolink (<i>Dolichonyx oryzivorus</i>), barn swallow (<i>Hirundo rustica</i>), and Butternut (<i>Juglans cinerea</i>). The conduct of surveys and reporting for SAR is not required under REA but instead under MNR's Approval and Permitting Requirements Document (APRD). The presence of these SAR has been documented under a separate report according to the requirements of the APRD, and as such, measures will be undertaken	

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		to ensure protect for these species and their habitat.	
2.9.16	A Stage 1 Archaeological Assessment has been completed for the Project location and the report was accepted by the Ministry of Tourism and Culture (MTC). The Stage 2 Archaeological Assessments have also been completed and the report has also been accepted by MTC.	A Stage 1 Archaeological Assessment has been completed for the Project location and the report was accepted by the Ministry of Tourism, Culture and Sport (MTCS). The Stage 2 Archaeological Assessments have also been completed and the report has been submitted to MTCS for confirmation.	
2.9.16	<p>The cultural heritage assessment concluded that the proposed Project locations are not located on a Protected Property as described in Column 1 of the Table to Section 19 of the REA Regulation. Hatch contacted all of the appropriate people or bodies and has determined that the Project is not located on the applicable type(s) of protected property.</p> <p>In addition, research and agency consultation undertaken as described within the Self-Assessment Checklist has not identified the need for a heritage impact assessment under Section 23 of the O. Reg. 359/09. If undiscovered resources are found during Project activities, mitigation measures consistent with the requirements of the Ministry of Tourism and Culture will be followed.</p>	<p>The proposed Project is not located on a Protected Property as described in Column 1 of the Table to Section 19 of the REA Regulation. A Heritage Assessment has been conducted for the Project to determine built heritage resources and cultural landscape resources found within the study area and to evaluate the impact of the proposed Project as required within MTC's <i>Information Bulletin for Applicants Addressing the Cultural Components of Projects Subject to Ontario Regulation 359/09</i>. This report has been submitted to MTCS for confirmation.</p>	

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2.9.17	The noise report has been determined to be compliant with MOE regulations.	The noise report has determined that the Project as proposed is compliant with MOE regulations.	
3	To date, a Project Notice and Notice of Public Information Centre have been provided to these Aboriginal communities. All Aboriginal communities have been contacted and discussions with several of the Aboriginal communities to identify potential opportunities to participate in the Project are on-going. Notification will also be provided to the Aboriginal communities in advance of the initiation of the Stage3 and Stage 4 archaeological field studies to assess their interest for involvement.	To date, a Project Notice, Notices of Public Information Centres and Project Reports have been provided to these Aboriginal communities. All Aboriginal communities have been contacted and discussions with several of the Aboriginal communities to identify potential opportunities to participate in the Project are on-going. Notifications have also been provided to the Aboriginal communities in advance of the initiation of the Stage3 and Stage 4 archaeological field studies to assess their interest for involvement.	
Table 2.1: Wetlands	There are a number of wetlands located within 300 m of the Project although no significant wetlands were identified within 120 m of any Project components.	Mitigation measures to address indirect effects such as erosion and sedimentation, dust and surface water runoff will be implemented as proposed in the Natural Heritage EIS.	
Table 2.1: Archaeological and Cultural Heritage Resources	Stage 2 archaeological assessments have been completed with further Stage 3 studies recommended for a number of sites. Excavations during Project construction may result in the discovery of archaeological resources. Potential heritage resources will be determined as per the requirements of the Ministry of Tourism and Culture.	Stage 3 and Stage 4 archaeological assessments will be completed and clearance from MTCS received prior to the commencement of Project construction. During construction if an artefact is found, work will stop until a licensed archaeologist has cleared the area and construction can re-commence, in accordance with MTC requirements.	
Figure 1.1		Figure 1.1 has changed	Figure 1.1 has changed
Figure 1.2		Figure 1.2 has changed	Figure 1.2 has changed
Figure 1.3		Figure 1.3 has changed	Figure 1.3 has changed

Project Report

April 25, 2012

Samsung Renewable Energy Inc. and Pattern Energy Engineering and Environmental Services for South Kent Wind Project

Project Description Report

Table of Contents

1. Introduction	1
2. Project Details.....	3
2.1 Energy Sources to Generate Electricity	3
2.2 Facilities, Equipment and Technology	3
2.3 Class of the Renewable Energy Facility	3
2.4 Federal Involvement.....	3
2.5 Project Activities	3
2.5.1 Site Preparation	4
2.5.2 Access Road Construction	4
2.5.3 Installation of Support Structures	4
2.5.4 Collector System and Substation	4
2.5.5 Transmission Line.....	4
2.5.6 Site Security	5
2.5.7 Operation.....	5
2.5.8 Maintenance and Inspection.....	5
2.5.9 Decommissioning	5
2.6 Authorizations Required.....	6
2.7 Nameplate Capacity.....	6
2.8 Ownership of the Land.....	6
2.9 Potential Negative Environmental Effects.....	6
2.9.1 Physiography/Topography	7
2.9.2 Soils	7
2.9.3 Surface Water.....	7
2.9.4 Groundwater.....	8
2.9.5 Aquatic Habitats/Biota.....	8
2.9.6 Areas of Natural and Scientific Interest (ANSI)	9
2.9.7 Wetlands.....	9
2.9.8 Vegetation.....	9
2.9.9 Woodlands.....	9
2.9.10 Valleylands	10
2.9.11 Terrestrial Wildlife/Wildlife Habitat	10
2.9.12 Species at Risk.....	11
2.9.13 Air Quality	11

2.9.14	Land Use.....	11
2.9.15	Radio-communication, Radar and Seismo-acoustic Systems.....	11
2.9.16	Archaeological and Cultural Heritage Resources	11
2.9.17	Sound Levels.....	12
2.9.18	Visual Landscape.....	12
2.9.19	Community Safety	12
2.9.20	Waste Management and Disposal Sites.....	13
2.10	Summary Table for Potential Environmental Effects and Proposed Mitigation Measures.....	13
3.	Aboriginal Consultation	19
4.	Project Location Map	21

Figures

Figure 1.1 – Project Location (Part A)

Figure 1.2 – Project Location (Part B)

Figure 1.3 – Project Location (Part C)

1. Introduction

Samsung Renewable Energy and Pattern Energy (hereinafter referred to as the “Proponent”) are jointly proposing to develop the South Kent Wind Project, a 270 MW wind energy Project (hereinafter referred to as the “Project”), consisting of approximately 124 operational wind turbines, as well as supporting infrastructure, including access roads, construction and turnaround areas, and buried and/or overhead collection/transmission lines. The collection/transmission line will include approximately 34 km of 230 kV transmission line and two (2) substations to enable step-up of the voltage from 34.5kV to 230 kV to connect to the Chatham Switching Station (SS). The Project area is located in the Municipality of Chatham-Kent in southwestern Ontario, south of Highway 401 between the towns of Tilbury and Ridgetown to the west and east, respectively.

As required, the Proponent is commencing with the Renewable Energy Approval (REA) process as described in Ontario Regulation 359/09 (O. Reg. 359) (as amended under O. Reg. 521/10 (January 2011)) under the *Environmental Protection Act*. This Project Description Report has been prepared in accordance with O. Reg. 359/09 and with Technical Bulletin One – Guidance for Preparing the Project Description Report (MOE 2010). It should be noted, that the Project consists of several former projects for which Environmental Screening Reports (ESR) were submitted for a number of these projects to the Ministry of the Environment in 2008 and 2009, under Ontario Regulation 116.

The Project is located within the Municipality of Chatham-Kent, in southwestern Ontario. Further information regarding the Project can be found on-line at: www.southkentwind.ca. See Figures 1.1, 1.2 and 1.3. The Proponent has retained Hatch Ltd. (Hatch) to assist the Proponent in meeting the REA requirements. The Project contact information is as follows:

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2. Project Details

The following sections are intended to satisfy the requirements of Table 1 to O. Reg. 359/09 and Technical Bulletin One – Guidance for Preparing the Project Description Report (MOE 2010). Further details on the design of the Project will be provided in subsequent required reports as per O. Reg. 359/09, including the Construction Plan Report, Design and Operations Report and the Decommissioning Plan Report. Project area is referred to for the purposes of this report as the general overall land area covered by all Project wind turbine locations and associated infrastructure. Project location(s) refers to the area (land or air) in which Project infrastructure is specifically located.

2.1 Energy Sources to Generate Electricity

Wind energy will be used to generate electricity.

2.2 Facilities, Equipment and Technology

The proposed Project is a renewable energy generation facility which will use wind turbine generators. Electricity will be generated by approximately 124 Siemens SWT – 2.3-101(2.221 MW, 2.126 MW and 1.903 MW) turbines. These turbines have a blade length of 49 m for a rotor diameter of 101 m. The tower of the wind turbine is composed of four (4) to five (5) sections and totals 99.5 m in height, with a maximum height of 150.0 m including the blade. Each turbine will be mounted on a concrete foundation with a transformer, located outside of the tower, at its base.

The nacelle houses the electrical and mechanical components for the production of electricity. An asynchronous generator and gearbox with a 3-stage planetary/helical design are located within the nacelle. A lightning rod is also present to ground the turbine in the event of the lightning strike. The nacelle is insulated to minimize noise emissions and further equipped with an anemometer and a wind vane. Additionally, a yawing mechanism allows the turbine to face the wind at any given time.

Electricity generated by the wind turbine generators will be stepped-up from 34.5 kV (via) to 230 kV through two (2) substations prior to being connected to the transmission system.

2.3 Class of the Renewable Energy Facility

The Project is classified as a Class 4 wind facility in accordance with O. Reg 359/09..

2.4 Federal Involvement

No Federal lands or resources will be utilized for the Project and, based on the resources within the Project locations, issues under Federal jurisdiction are not anticipated with the exception of migratory birds and potentially species at risk. However, there is a potential for permits relating to Transport Canada aviation safety perspective. All necessary permits will be obtained.

2.5 Project Activities

The Project activities involved in the construction, operation and decommissioning phases of the Project are outlined in the following sections. It is anticipated that the construction will commence Spring 2012 and will take 15 to 18 months to complete, depending on time of year and various other factors. Prior to construction, the area will be surveyed and existing infrastructure (telecom, pipelines etc.) will be located and considered prior to commencing with site preparation and access road construction.

2.5.1 Site Preparation

Where practical, topsoil will be stripped from temporary access road locations and stored adjacent to the roads. Locations of topsoil and subsoil stockpiles will be determined in consultation with the landowner and not within 30 m of a water body. If topsoil is not stripped, the agricultural crops will be left uncut or shredded and left on the soil surface over the entire working area. Additionally, excavated fill from constructing the base of the wind turbine may be re-deposited on site, if the land owner agrees, otherwise the fill will be transported to an approved off-site location. If necessary to control sedimentation, erosion and sedimentation control measures will be installed.

2.5.2 Access Road Construction

New access roads on private land will be required to allow transport of equipment from the main (municipal) roads to the Project locations. If necessary, the topsoil and subsoil will be removed prior to placement of a granular base. The access road will be built in compliance with Ontario regulations and sized to meet the requirements for equipment and machinery for the Project. These roads will lead to the base of each of the wind turbines. Ditches and culverts will be constructed, if necessary, to maintain site drainage. Erosion and sedimentation control measures (e.g., silt fence barriers, rock flow check dams, etc) will be installed, as necessary.

2.5.3 Installation of Support Structures

Foundations and/or support structures will be required beneath the wind turbine generators, Project substations, and operations and maintenance building. Additionally, a crane pad will be required for construction, which will be composed of the same material as the access roads. The crane pad will be removed after construction according to the Proponent's reclamation strategy.

2.5.4 Collector System and Substation

The collector system will transport the electricity generated at each wind turbine generator to a substation. The collector system is made up of pole mounted overhead collector lines and buried cables. Buried cables can be installed using a simple trenching device, where a slot is open in the ground, the cable is laid and the soil replaced.

Two (2) substations will be required to gather the generated electricity from the wind farm and boost the voltage to that of the neighbouring transmission system. The transformers are required to step-up the voltage from 34.5 kV to 230 kV will also be found in the substation area. The substation locations are approximately 2 ha in size and are located as follows:

- Sattern – Eastern portion of the Project area – east of Mull Road/south of Knights Line
- Railbed – Western portion of the Project area – west of Wellwood Road/north of 7th Line W.

A prefabricated maintenance building will be used to house the Supervision Control and Data Acquisition equipment and for storage.

2.5.5 Transmission Line

The collector system will transport electricity to each of the substations where the voltage will be stepped-up and delivered by 230 kV overhead transmission lines directly to the Hydro One Networks grid. The 34.5 km transmission line will be located within and/or adjacent to the existing and former railway line (east-west direction) which runs between Tilbury and Ridgetown, until the transmission line is required to head north (on public right-of-ways and/or private land) to connect

with the Chatham Switching Station and the Hydro One Networks grid. Specifically, multifunctional protective relays, voltage control equipment and related equipment necessary to meet the requirements of Hydro One and/or the Local Distribution Company will be used during the installation of this transmission line.

2.5.6 Site Security

During construction, signs will indicate that presence of a construction site with additional security measures installed as deemed necessary by the Proponent. This could include fences, security cameras and motion sensor flood lighting. The substations will be fenced to prevent the public from gaining access to the transformer and maintenance equipment.

2.5.7 Operation

The Project will operate year round and generate electricity if wind conditions are suitable. The amount of power generated will depend on daily weather conditions. The Siemens SWT-2.3-101 generators are suitable for areas where there are low to medium wind speeds. The generators require a cut-in or minimum wind speed of 4 m/s or 14.4 km/hr before any power is generated, with an optimal wind speed of 12 to 13 m/s or approximately 45.0 km/hr. The wind turbines will be shut down once the wind speeds reach 25 m/s or 90 km/hr to protect the wind turbines from excessive stresses experienced at these wind speeds. The turbines have been appropriately designed to perform under varying weather conditions. The Project will be operated remotely by way of a 24/7 supervisory control center, with local employees on-site for service, maintenance and inspections.

2.5.8 Maintenance and Inspection

The Project will typically be scheduled for routine maintenance twice per year per turbine. More significant tasks are planned 5, 10, and 15 years into the Projects operation, including a major overhaul after 10 years of operation. Typically, maintenance on one (1) machine can be completed within one (1) to two (2) working days by a crew of two (2) technicians. The Project will employ approximately one (1) crew of two (2) technicians for every ten (10) to fifteen (15) turbines. The teams of technicians will be supervised by an experienced on-site project manager.

2.5.9 Decommissioning

The Project will have a 20-year power purchase contract with the Ontario Power Authority and the useful economic life of the turbines is expected to be 20- to 25-years. At the end of the power purchase contract, the turbines will either be decommissioned or refurbished, depending on market conditions and/or technological changes available at the time.

If a decision is made by the Project to cease operation of the wind farm, the decommissioning process would involve the following:

- Removal of the wind turbine (tower, blade, nacelle), collector system cabling and transmission line. Where possible, these materials will be recycled, with non-recyclables taken to an approved disposal site.
- Removal of support structures and foundations to a depth that would allow for surface activities to occur uninhibited. The materials removed will be recycled where possible.
- Site cleanup and regrading to original contours and any damage to tile drainage system will be repaired/replaced.

Once the Project, other materials and road network are removed from the site, the fields will be returned to their original condition prior to the Project at the discretion of the landowner.

2.6 Authorizations Required

Permits, licenses, authorizations and/or consultations such as those listed below, in addition to the REA may be required for the Project to proceed:

- Building Permit – The local municipality may require a building permit to undertake construction.
- Conservation Authority Permit – Approval from the local Conservation Authority may be required should development occur within the Conservation Authority's Regulated Area.
- Ministry of Natural Resources (MNR) Work Permit and/or Lakes and Rivers Improvement Act Approval – MNR approval will be required should a water crossing be required for the Project.
- Transportation Canada (Aeronautical Safety) Aeronautical Obstruction Clearance (Lighting Scheme).
- Transportation Canada (Marine Safety) Navigable Water Protections Act Approval – required if new crossings of navigable waters required
- Navigation Canada Aviation safety- Land use proposal.
- Navigation Canada Aviation safety review of guyed meteorological towers.
- Canadian Wildlife Service - Permit under Migratory Birds Convention Act to collect dead bird carcasses.

2.7 Nameplate Capacity

The nameplate capacity of the Project will be up to approximately 270 MW, with each individual turbine having a rated capacity of 2.221 MW, 2.126 MW or 1.903 MW.

2.8 Ownership of the Land

The Project will be located on privately owned land. The current land use for the Project locations is predominately agricultural and used to grow a variety of crops including corn, tomatoes, soybeans, various grains, fruits and other vegetables.

2.9 Potential Negative Environmental Effects

Negative environmental effects may occur as a result of construction and operation of the Project. The environmental features and the potential environmental effect of the Project on the environmental features are summarized in Table 2.1. As previously noted, ESRs were previously completed for portions of the Project providing some understanding of the Project area and the corresponding impacts from the Project. Additional field investigations and analysis of the environmental features was conducted in 2010 and 2011 to fulfil the requirements of the O. Reg. 359/09 and the Ministry of Natural Resources' (MNR) Approval and Permitting Requirements Document (APRD) for Renewable Energy Projects. The environmental features are further discussed below.

2.9.1 Physiography/Topography

The leased lands for the Project are located in the St. Clair Clay Plains physiographic region characterized by predominately uniform topography and comprised of several clay plains overlying limestone bedrock, till plains and till moraines.

Grading activities during construction may be required for portions of the Project locations to accommodate the laydown areas, access roads, direct footprint of the wind turbine and the crane pad. This would result in a localized change in the topography within a Project location which may potentially affect the drainage of a localized area immediately in and adjacent to the Project location. The potential environmental effects would be minimized, to the extent possible, through grading only of those areas required for construction of the wind turbines and associated infrastructure within each Project location. The grading would also be completed in a manner to ensure that the natural drainage system of the area is maintained. Re-grading of the area to pre-construction conditions, or as per requirements of the landowner, will be completed following decommissioning of the turbines.

2.9.2 Soils

The soils within the Project area are predominately comprised of clay loam combined with smaller amounts of silt loam and fine sandy loams. The potential exists for a reduction in the quality of the soil and/or loss of soils as a result of:

- soil compaction
- soil erosion
- accidental spills.

Soil compaction refers to a reduction in the pore space of the soils as a result of compaction from heavy machinery and may occur in areas where heavy machinery is used, such as the crane pad and on the access roads. Limiting the movement of the heavy machinery on the Project locations will minimize soil compaction and greatly reduce the potential for increased run-off from the site to adjacent areas also contributing to soil erosion. Additional measures to minimize the effects of soil compaction in the Project locations, where required, may include the scarification/tilling of the soil both following construction (in those areas no longer required for operations) and during decommissioning.

Soil erosion may occur in areas where the topsoil must be stripped for construction, including areas for access roads, the maintenance building, wind turbines, buried collector system cables and for site preparation. Erosion and sedimentation control measures, such as silt fence, sediment traps, etc., and timing of topsoil removal will be implemented to reduce the impact of erosion.

The contamination of soil may occur as a result of an accidental release of fuel/oil/lubricants during construction activities, use of vehicles and equipment, or operation of transformers (located at the base of the turbine and at substations). A spill prevention and management plan will be developed to minimize the potential for the occurrence of spills related to Project activities and the potential environmental effects in the event of a spill.

2.9.3 Surface Water

A number of watercourses and other aquatic habitats are located throughout the Project locations and are regulated by the Lower Thames Valley Conservation Authority (LTVCA). The watercourses

throughout the Project locations consist of mainly drainage features with some isolated ponds. The tributaries of Jeannette's Creek and McGregor Creek are located in and/or adjacent to the Project locations as well as Mill Creek, Flat Creek, Yellow Creek and Baptiste Creek and a number of smaller creeks draining into Rondeau Bay on Lake Erie. There are also a variety of unnamed drains located throughout the Project locations.

Surface water quality may potentially be affected through:

- An increase in sediment entering the water
- Work required within the water
- Accidental release of fuel/oils/lubricants.

An increase in sediment may potentially occur as a result of soil stripping and transport of soil to water features during rain events and snow melt. This impact can be mitigated effectively through the use of erosion and sedimentation control measures such as silt fences, straw bales, rock check dams, and sediment traps.

In-water work, where required, is expected to be confined to drainage ditches. During construction, these activities may increase the turbidity of the water with effects possible further downstream of the work activities. The turbidity of the water may effectively be controlled through the implementation of best management practices including timing of construction activities and working in the dry.

The release of fuel, oil and/or lubricants from construction vehicles and equipment may occur during construction and maintenance activities. These impacts can be mitigated through the implementation of best management practices and through measures identified in a spills prevention and response plan.

2.9.4 Groundwater

Excavations for turbine towers and foundations may potentially intersect with the groundwater table causing seepage of water into the excavations and therefore dewatering of the excavations may be required. Dewatering activities, if required, may potentially affect the availability of groundwater in the immediate area although the effect is expected to be negligible. The potential also exists for spills within the excavated area to affect the groundwater although the implementation of a spills prevention and response plan is anticipated to prevent and mitigate any potential effects.

2.9.5 Aquatic Habitats/Biota

Aquatic habitat and biota could be impacted from water crossings and construction activities resulting in sedimentation. If required, water crossings will be sited to limit the potential impacts on any aquatic habitat and biota, including fish movement. Sedimentation will be mitigated through a variety of sedimentation and erosion control measures, as site conditions dictate.

Information published by the Department of Fisheries and Oceans (DFO) Canada indicates that several aquatic species at risk may be found within the Project locations. These can include: Pugnose Shiner (*Notropis anogenus*), Silver Shiner (*Notropis photogenis*), Eastern Sand Darter (*Ammocrypta pellucida*), Channel Darter (*Percina copelandi*) and the Spotted Gar (*Lepisosteus oculatus*).

Further site investigations will reveal if the correct habitat is found within the Project locations for each of these species at risk. Legislated procedures and mitigation measures will be adhered to for the water crossings associated with the Project.

2.9.6 Areas of Natural and Scientific Interest (ANSI)

There are no ANSI's located within 300 m of the Project locations and therefore no effects on the ANSIs are anticipated.

2.9.7 Wetlands

There are a number of wetlands located within 300 m of some of the Project locations although there are assumed significant wetlands identified within 120 m of a Project location. The wetlands are not anticipated to be directly affected by Project activities, but may be indirectly affected by dust emissions, sediment and erosion, and surface water runoff. Erosion and sedimentation control measures, such as seeding and control blankets, will be used in those areas cleared and directly adjacent to cleared areas for construction. Dust generated from the movement of construction vehicles could impact the surrounding vegetation (through settling) and will be addressed, as required, through the application of dust suppressants and the limiting of speed of construction vehicles on all roads. There will be no significant alterations to surface water runoff patterns to receiving wetlands/waterbodies.

2.9.8 Vegetation

The removal of vegetation to facilitate the Project construction has been minimized to the extent possible through the avoidance of woodlands and hedgerows in siting turbines and the associated Project infrastructure. Work areas will be flagged to limit the clearing to only those areas required for the Project to minimize the vegetation to be cleared. Erosion and sedimentation control measures, such as seeding and control blankets, will be used in those areas cleared and directly adjacent to cleared areas for construction. Dust generated from the movement of construction vehicles could impact the surrounding vegetation (through settling) and will be addressed, as required, through the application of dust suppressants and the limiting of speed of construction vehicles on all roads.

2.9.9 Woodlands

There are woodlands located within 300 m of the Project location. A number of significant woodlands were identified within 120 m of the Project location. The removal of vegetation from these woodlands has been minimized to the extent possible through the siting of Project infrastructure outside of these features, where possible. There is potential for a number of significant woodlands to be indirectly (dust emissions, sediment and erosion, noise) affected due to the proximity of Project activities to the woodlands although no removal of vegetation will be required. Erosion and sedimentation control measures, such as seeding and control blankets, will be used in those areas cleared and directly adjacent to cleared areas for construction. Dust generated from the movement of construction vehicles could impact the surrounding vegetation (through settling) and will be addressed, as required, through the application of dust suppressants and the limiting of speed of construction vehicles on all roads.

The significant woodlands may potentially be directly affected by the removal of vegetation for construction or proximity directly adjacent to Project infrastructure. The removal of vegetation will

be avoided if at all possible, and the mitigation measures and the monitoring of effects identified in Table 2.1 of this report and also provided in the Natural Heritage Environmental Impact Study(EIS) will be implemented as necessary.

2.9.10 Valleylands

There are valleylands located within 300 m of the Project location in the vicinity of Rondeau Bay although no valleylands were identified within 120 m of the Project location.

2.9.11 Terrestrial Wildlife/Wildlife Habitat

The Project has an ability to affect the terrestrial wildlife and wildlife habitat, including:

- Mammals
- Herpetofauna
- Birds
- Bats.

The Project is located on a variety of agricultural fields, largely under active cultivation, and therefore the wildlife habitat contained in these areas may potentially be affected. The loss of wildlife habitat and potential wildlife avoidance of the Project locations during construction and operation may occur as a result of the disturbance. Terrestrial wildlife and wildlife habitat was identified within 300 m of the Project locations. The criteria for establishing significant wildlife habitat was based on the Significant Wildlife Habitat Technical Guide (SWHTG) (MNR, 2000) which identifies four (4) broad categories (seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of species of conservation concern, and animal movement corridors). The following significant wildlife habitats have been identified and are discussed in more detail in the EIS.

- Mammals – A number of animal movement corridors were identified within 120 m of the Project locations. Mammals utilizing the area may potentially be affected by the increase in noise and dust due to the presence of construction vehicle and activities in the vicinity of the Project locations.
- Herpetofauna – Amphibian breeding habitats, movement corridors and reptile hibernacula were identified within 120 m of the Project locations. Herpetofauna may potentially be affected by increased sedimentation in the drains as a result of exposed soils during Project construction
- Birds - Open country breeding bird habitat was identified within 120 m of the Project locations as the Project locations overlap with the globally significant Rondeau Bay IBA. In addition, waterfowl stopover and staging areas and area-sensitive woodland breeding bird habitats were identified on or within 120 m of the Project location. Birds may be affected in a variety of ways, including disruption of nests, habitat loss, displacement and disturbance of bird behaviour and finally, bird collisions with turbines and/or power lines.
- Bats - Bat maternity roosts and habitat for bat species of concern were identified within 120 m of the Project locations. Bat population can be impacted by habitat loss and collisions with operational turbines. A number of significant woodlands were identified as significant habitat due to the large abundance of snags and location within 5 km of S1-S3 ranked bat species observations recorded in previous studies.

Mitigation measures will be implemented to avoid, or minimize, where possible, any potential effects to significant wildlife habitat that may result from direct encroachment of a feature, fugitive dust generation, changes in surface water runoff, and changes in ground water. The net effects and mitigation measures for terrestrial wildlife and wildlife habitat are identified in the Natural Heritage EIS (Hatch 2012).

2.9.12 Species at Risk

Several Species at Risk (SAR) may potentially occur within the Project locations. Protection of the individual SAR and their respective habitat is provided by the Endangered Species Act, 2007 (ESA 2007) (June 30, 2008) for those species listed as endangered or threatened and identified on the Species At Risk in Ontario (SARO) List (<http://www.e-laws.gov.on.ca/navigation?file=home&lang=en>).

A review of SAR and their habitat was conducted during the site investigations with the presence of confirmed SAR within the Project location including Eastern Foxsnake (*Pantherophis gloydi*), Bobolink (*Dolichonyx oryzivorus*), barn swallow (*Hirundo rustica*), and Butternut (*Juglans cinerea*). The conduct of surveys and reporting for SAR is not required under REA but instead under MNR's Approval and Permitting Requirements Document (APRD). The presence of these SAR has been documented under a separate report according to the requirements of the APRD, and as such, measures will be undertaken to ensure protect for these species and their habitat.

2.9.13 Air Quality

An increase in dust and particulate emissions (from construction vehicles) during construction and decommissioning is anticipated although the effects will be temporary. Standard best management practices and mitigation measures to control dust and emissions will be utilized to maintain good air quality during construction, in accordance with provincial requirements and regulations. Overall, no negative effect on air quality is expected.

2.9.14 Land Use

The potential effect on land use will be limited to the footprint of the wind turbines and associated infrastructure as all areas used for construction, and no longer required, will be returned to its original use and rehabilitated accordingly. It is anticipated that the land utilized for the wind turbines and associated infrastructure will be returned to pre-construction use upon decommissioning of the Project.

2.9.15 Radio-communication, Radar and Seismo-acoustic Systems

There is a potential for wind turbines to cause interference with radio and radar signals. Therefore, an investigation is being conducted to determine where any areas of concern are located and identify them in relation to the Project locations. A determination of the potential effects and interference to these systems will be determined, if required, and appropriate mitigation measures will be explored.

2.9.16 Archaeological and Cultural Heritage Resources

A Stage 1 Archaeological Assessment has been completed for the Project location and the report was accepted by the Ministry of Tourism, Culture and Sport (MTCS). The Stage 2 Archaeological Assessments have also been completed and the report has been submitted to MTCS for confirmation. A number of Project locations were identified that would have development restrictions until appropriate archaeological site avoidance or mitigation measures can be developed and

implemented. Should previously undocumented archaeological resources be discovered, the person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act.

The Cemeteries Act, R.S.O. 1990, c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must immediately notify the police or coroner and the Registrar of cemeteries, Ministry of Consumer Services.

The proposed Project is not located on a Protected Property as described in Column 1 of the Table to Section 19 of the REA Regulation. A Heritage Assessment has been conducted for the Project to determine built heritage resources and cultural landscape resources found within the study area and to evaluate the impact of the proposed Project as required within MTC's *Information Bulletin for Applicants Addressing the Cultural Components of Projects Subject to Ontario Regulation 359/09*. This report has been submitted to MTCS for confirmation.

2.9.17 Sound Levels

Sounds levels are expected to increase during both the construction and decommissioning phases. Sound levels during both construction and decommissioning will be temporary in nature and will occur from the use of construction vehicles.

A noise study has been completed for the project as per O. Reg. 359/09 requirements. The sound pressure levels at the points of reception located within 1500 m from any of the Project turbines and within 1000 m from any of the Project substations were estimated using the CADNA-A model based on ISO 9613-2. The performance limits used for receptor points correspond to Class 3 areas (rural areas) with a 40.0 dBA limit. The noise report has determined that the Project as proposed is compliant with MOE regulations.

2.9.18 Visual Landscape

A change in the visual landscape will occur during the construction, operation and decommissioning phase of the Project. After the life span of the Project, the visual landscape is expected to return to the original vista.

2.9.19 Community Safety

Community safety may potentially be affected during the construction and decommissioning stage due mainly to the increase in construction vehicle traffic in, and adjacent to the Project location. Standard construction practices will be enforced (speed limits, authorized construction routes, etc.), along with the placement of signs to notify residents of the presence of construction traffic in order to avoid any potential accidents. The public will be prohibited from accessing the various Project locations and substations through the use of fencing, gates, etc. to prevent access to equipment, machinery and limit exposure to construction activities. Personnel will be provided with safety training prior to commencement of work on-site. The implementation of these mitigation measures is anticipated to ensure community safety is not affected by the Project.

Local traffic is expected to increase within the Project location specifically during the construction and decommissioning phase. Traffic routes will be identified to limit the impact of the local traffic

flow. During operations it is not anticipated that there will be an effect on traffic due to the occasional nature (once every 6 months to a year) of the maintenance activities where only one or two smaller vehicles will be required to complete this work.

2.9.20 Waste Management and Disposal Sites

The Project is anticipated to generate waste during the construction, operation, and decommissioning phases of the Project. The disposal and proper storage of wastes and recyclables will occur in accordance with municipal and provincial requirements and regulations. Any industrial liquids such as paints, sealants, fuels and lubricating fluids will be stored in a secure containment area and disposed in accordance with provincial liquid waste disposal regulations relating to hazardous wastes (e.g., *Environmental Protection Act* and Ontario Regulation 347).

2.10 Summary Table for Potential Environmental Effects and Proposed Mitigation Measures

Table 2.1 provides a brief review of the above sections. The residual effects column provides the anticipated effects after mitigation measures have been incorporated.

Table 2.1 Potential Environmental Effects and Proposed Mitigation Methods

Environmental Component		Potential Environmental Effect	Proposed Mitigation	Residual Effect
Natural Environment	Physiography/Topography	Re-grading of excavated soils and some minor alterations to local topography may occur during construction.	Decommissioning of the Project location will include re-grading to original conditions, to the extent possible.	No residual effect.
	Soils	Potential reductions in soil quality/loss of soils as a result of accidental spills, erosion and soil compaction during construction.	Erosion sedimentation control measures will limit the impact due to erosion, spill control measures and required clean up will limit impact on quality of soils, no soil will be removed off site and de-compaction will occur, where necessary.	No residual effect on soil quality/quantity is expected.
	Surface Water	Surface water quality of watercourses could be impaired due to contamination from accidental spills or increased turbidity due to site erosion.	A 30-m setback will be put in place from all water bodies in accordance with provincial requirements and regulations. As well, erosion and sedimentation control measures and spill prevention and response measures will decrease any further impacts.	No residual effect in surface water quality is expected.
	Groundwater	Excavations may result in a minor decrease in the local availability of groundwater due to dewatering. In addition, groundwater may also be impaired by contamination due to accidental spills, or changes in ground water recharge.	Groundwater withdrawals are not anticipated, but if required, withdrawals will be minimized to limit changes in groundwater availability, in accordance with provincial requirements. The implementation of spill response measures will prevent any accidental spills.	No residual effect is expected for groundwater.
	Aquatic Habitats/Biota	Project development activities may result in negative impacts to fish and fish habitat, if watercourse crossings are required.	A 30 m setback from all watercourses will protect fish habitat, in accordance with provincial requirements and regulations. Erosion and sedimentation controls and spill prevention and response measures will limit any potential impact.	No residual effect is expected for aquatic habitats/biota.
	Wetlands	There are a number of wetlands located within 300 m of the Project, and assumed significant wetlands were identified within 120 m of any Project components.	Mitigation measures to address indirect effects such as erosion and sedimentation, dust and surface water runoff will be implemented as proposed in the Natural Heritage EIS.	No residual effect to the wetlands is anticipated.

Environmental Component		Potential Environmental Effect	Proposed Mitigation	Residual Effect
	Vegetation	Vegetation clearing on agricultural land as well as within natural vegetation communities will be required.	Work areas will be flagged to limit the clearing and prevent the encroachment of construction activities into areas not required by Project. Revegetation, as required, will occur following construction (for areas no longer required for development) and final Project decommissioning.	Loss of some vegetation on-site. At least a 30 m watercourse buffer will be retained.
	Woodlands	There are numerous woodlands located on and within 300 m of the Project locations with significant woodlands identified within 120 m of the Project location. An EIS will be completed for woodlands considered to be significant. Clearing of the woodlands for Project components may be required. Woodlands adjacent to the Project locations may be indirectly affected by Project activities, such as the generation of dust during construction which could impact vegetation communities.	Mitigation measures proposed in the EIS and monitoring of effects will occur, throughout the life of the Project, to limit any detrimental impacts on any significant woodlands. Dust control measures will be implemented. Revegetation, as required, will occur after decommissioning.	Loss of some vegetation during life of Project; however, regeneration will occur following decommissioning.
	Valleylands	There are some valleylands located within 300 m of the Project locations although no valleylands are located within 120 m of any Project locations.	Mitigation measures proposed in the EIS and monitoring of effects will occur. This would include erosion and sedimentation control measures.	No residual effects are anticipated following mitigation.
	Terrestrial Wildlife/ Wildlife Habitat (including species at risk)	Potential loss of wildlife habitat and potential wildlife avoidance of the Project locations during construction and operation may occur as a result of disturbance associated with Project activities. Potential loss of birds and bats during operations.	Work areas will be clearly marked and areas outside of this area will not be disturbed. Disturbed areas will be seeded to support local wildlife communities following construction, for those areas no longer required for Project operations. Measures to mitigate the potential loss of birds and bats during operations will be examined in the REA process. An Environmental Effects Monitoring Plan (EEMP) will be initiated during construction to ensure the protection of the environment to the extent possible. Additional details on the EEMP are provided in the Construction Plan Report	Reduced wildlife habitat during the life of the Project can be expected; however, re-establishment will occur after decommissioning. Potential loss of birds and bats during operations.

Environmental Component		Potential Environmental Effect	Proposed Mitigation	Residual Effect
	Air Quality	Reductions in local air quality as a result of air emissions from operation of construction equipment and generation of dust may occur due to vehicle traffic.	The use of standard best management practices and mitigation measures to suppress dust and limit vehicle emissions will be implemented to maintain good air quality during construction, in accordance with provincial requirements and regulations.	No residual effects anticipated to air quality.
Social Environment	Land Use	Current land use will be discontinued within the Project footprint.	None	The land use within the footprint of the Project will change for the lifetime of the Project. Land use is anticipated to return to pre-Project use following decommissioning.
	Radio-communication Radar and Seismoacoustic Systems	Interference to communication systems.	Conduct of a thorough review with Industry Canada.	No residual effects are expected.
	Archaeological and Cultural Heritage Resources	Stage 1 and Stage 2 archaeological assessments have been completed with further Stage 3 and Stage 4 studies recommended for a number of sites. Excavations during Project construction may result in the discovery of archaeological resources. Potential heritage resources have been determined as per the requirements of the Ministry of Tourism, Culture and Sport.	Stage 3 and Stage 4 archaeological assessments will be completed and clearance from MTCS received prior to the commencement of Project construction. During construction if an artefact is found, work will stop until a licensed archaeologist has cleared the area and construction can re-commence, in accordance with MTC requirements.	No residual effects are expected.
	Sound Levels	Temporary disturbance to neighbouring residents may occur during construction. The operation of transformers may result in increased ambient sound levels. However, noise studies in accordance with O. Reg. 359/09 are required to meet sound levels established by the MOE.	Measures to meet MOE sound levels for the closest receptor will be implemented.	No residual effect is expected for sound levels.
	Visual Landscape	Project development will result in a change to the local landscape.	None	The landscape will return to pre-Project conditions following decommissioning.

Environmental Component		Potential Environmental Effect	Proposed Mitigation	Residual Effect
	Community Safety	Construction of the Project will result in a risk to community and workforce safety. Potential risks to public safety are limited during operation.	Safety procedures will be implemented in accordance with applicable regulations and best management practices to ensure both worker and public safety. The public will not be allowed access to the site during construction, operations or decommissioning. Signage will be erected to inform the local community of construction areas and potential encounters with construction vehicles.	No residual effect is expected in response to community safety.
	Local Traffic	Construction of the Project may result in increased local area traffic and temporary disruption along routes used resulting in delays to the local community traffic, and increased traffic as a result of equipment delivery to the Project locations.	Transportation routes will be determined during detailed design to minimize the impact on local traffic.	A temporary increase in construction vehicles is anticipated during Project construction. Otherwise, no residual effect is expected.
	Waste Management and Disposal Sites	Construction and operation of the Project will likely result in the generation of recyclable material, and municipal and sanitary waste.	The disposal and proper storage of wastes and recyclables will occur in accordance with municipal and provincial requirements and regulations.	No residual effect is expected.

3. Aboriginal Consultation

Aboriginal consultation was initiated with the following communities based on a Ministry of Environment letter entitled Director's Aboriginal Communities List – South Kent Wind Project dated 23 September 2010. The Aboriginal communities include:

- Bkejwanong Territory (Walpole Island First Nation)
- Aamjiwnaang First Nation
- Chippewas of the Thames First Nation
- Chippewas of Kettle and Stony Point
- Caldwell First Nation
- Oneida Nation of the Thames
- Delaware Nation (Moravian of the Thames)
- Munsee-Delaware First Nation
- Six Nations of the Grand River (Part) 40
- Six Nations of the Grand River (Haudenosaunee Confederacy)
- Wahta Mohawks
- Mohawks of the Bay of Quinte
- Mohawks of Akwesasne (Part) 59.

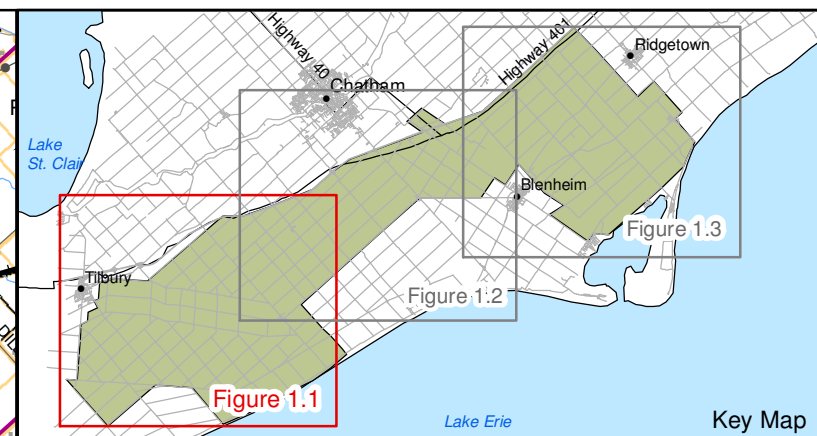
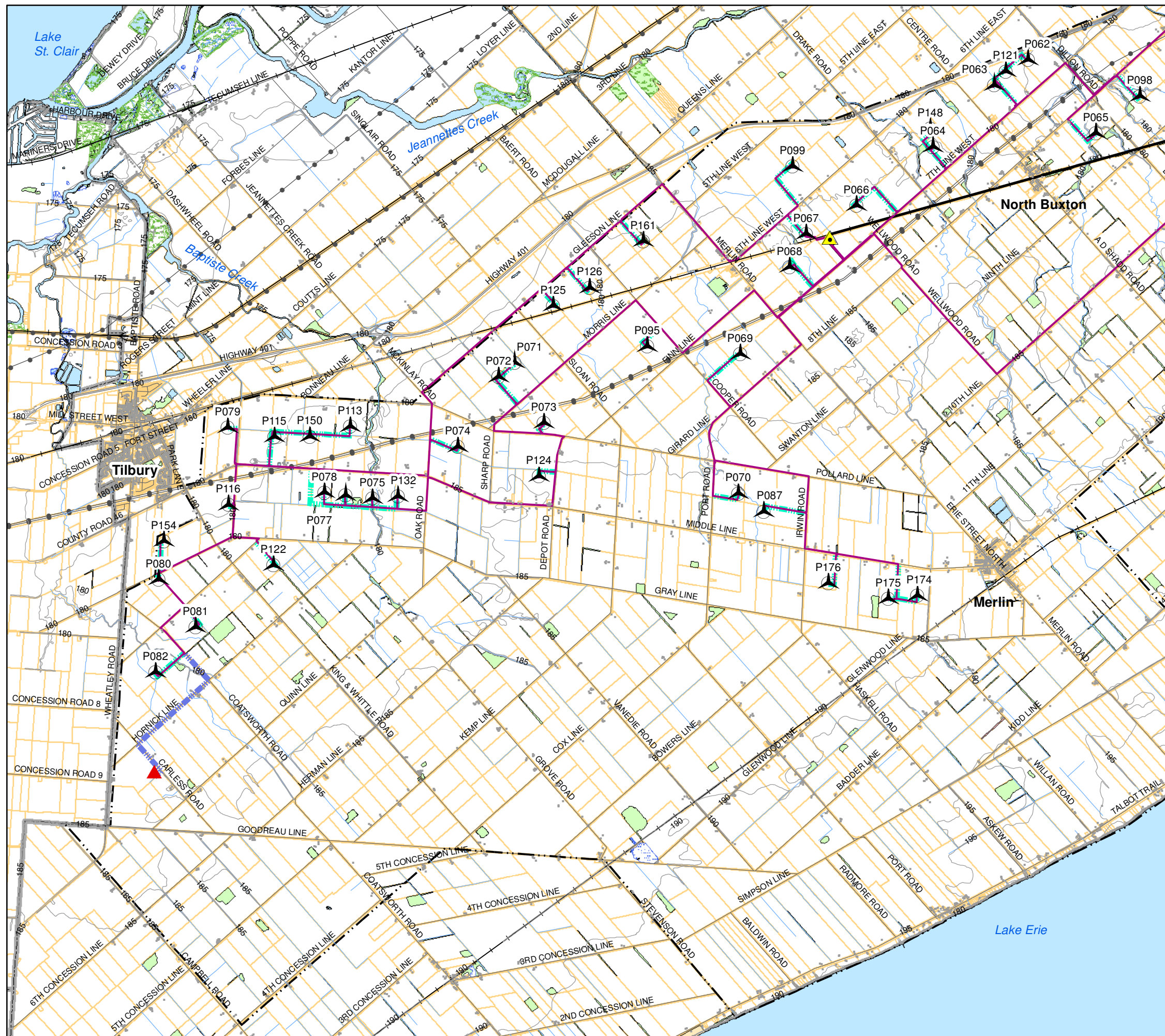
Additionally, consultation has also been initiated with the Windsor- Essex Métis Council, and the Métis Nation of Ontario, Consultation Unit.

To date, a Project Notice, Notices of Public Information Centres and Project Reports have been provided to these Aboriginal communities. All Aboriginal communities have been contacted and discussions with several of the Aboriginal communities to identify potential opportunities to participate in the Project are on-going. Notifications have also been provided to the Aboriginal communities in advance of the initiation of the Stage3 and Stage 4 archaeological field studies to assess their interest for involvement. All notices and reports will also be provided to the communities as per O. Reg. 359/09.

4. Project Location Map

As required in Table 1 of O. Reg. 359/09, three (3) unbound, legible and reproducible project location maps (Figures 1.1, 1.2 and 1.3) showing the Project location are enclosed.

Figures



Legend

- Building
- Roads
- Rail
- Hydro Line
- Topographic Contour (5m Interval)
- Intermittent Watercourse
- Watercourse
- Parcel
- Project Area
- Waterbody
- Unevaluated Wetland
- Significant Wetland
- Wooded Area

Project Components

- Proposed Turbine
- MET Tower
- Substation
- 230 kV Distribution Line
- Access Road
- Cabling
- Fibre Optic Cable

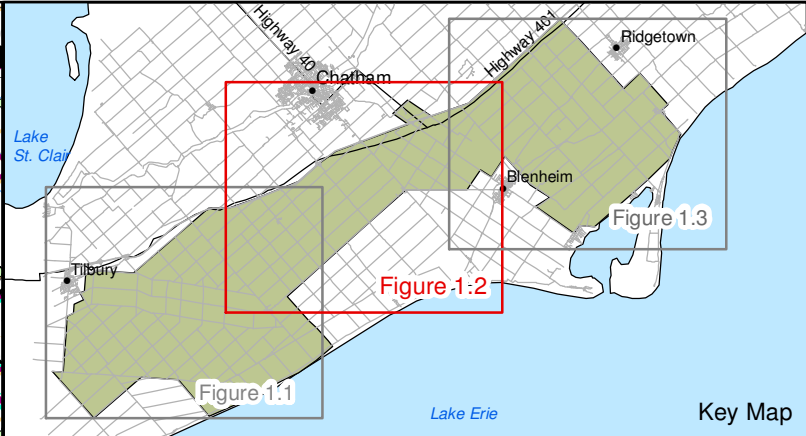
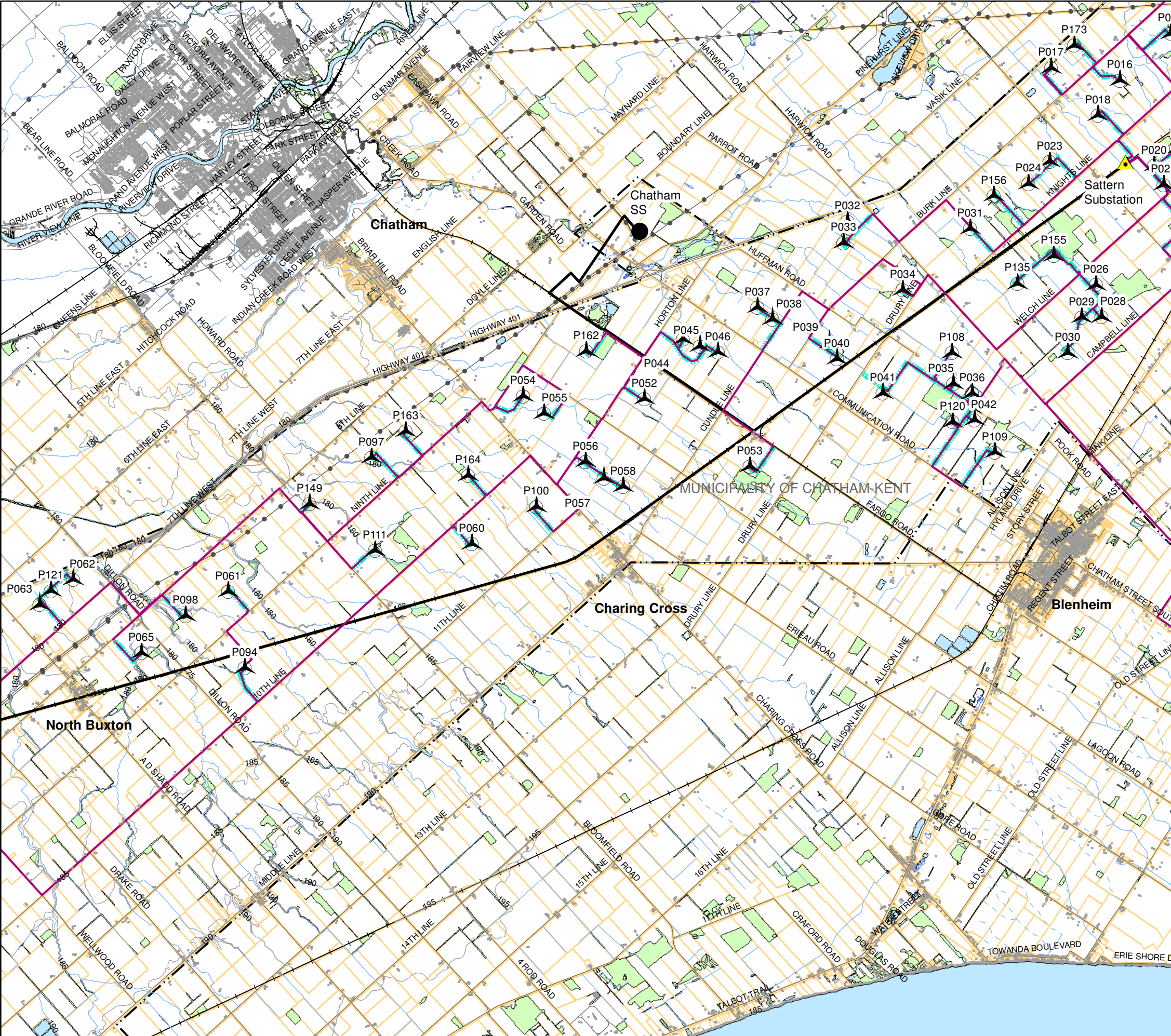
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Notes:
1. Base and environmental data downloaded from LIO with permission.
2. Spatial referencing UTM NAD83.
3. Parcel data obtained from Teranet, Feb. 2011.

Figure 1.1
Pattern Wind Energy Development Inc.
South Kent Wind Project
Project Location (Part A)

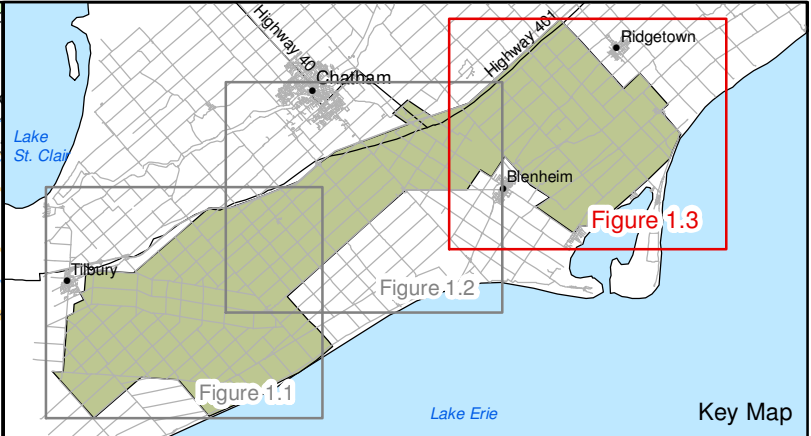
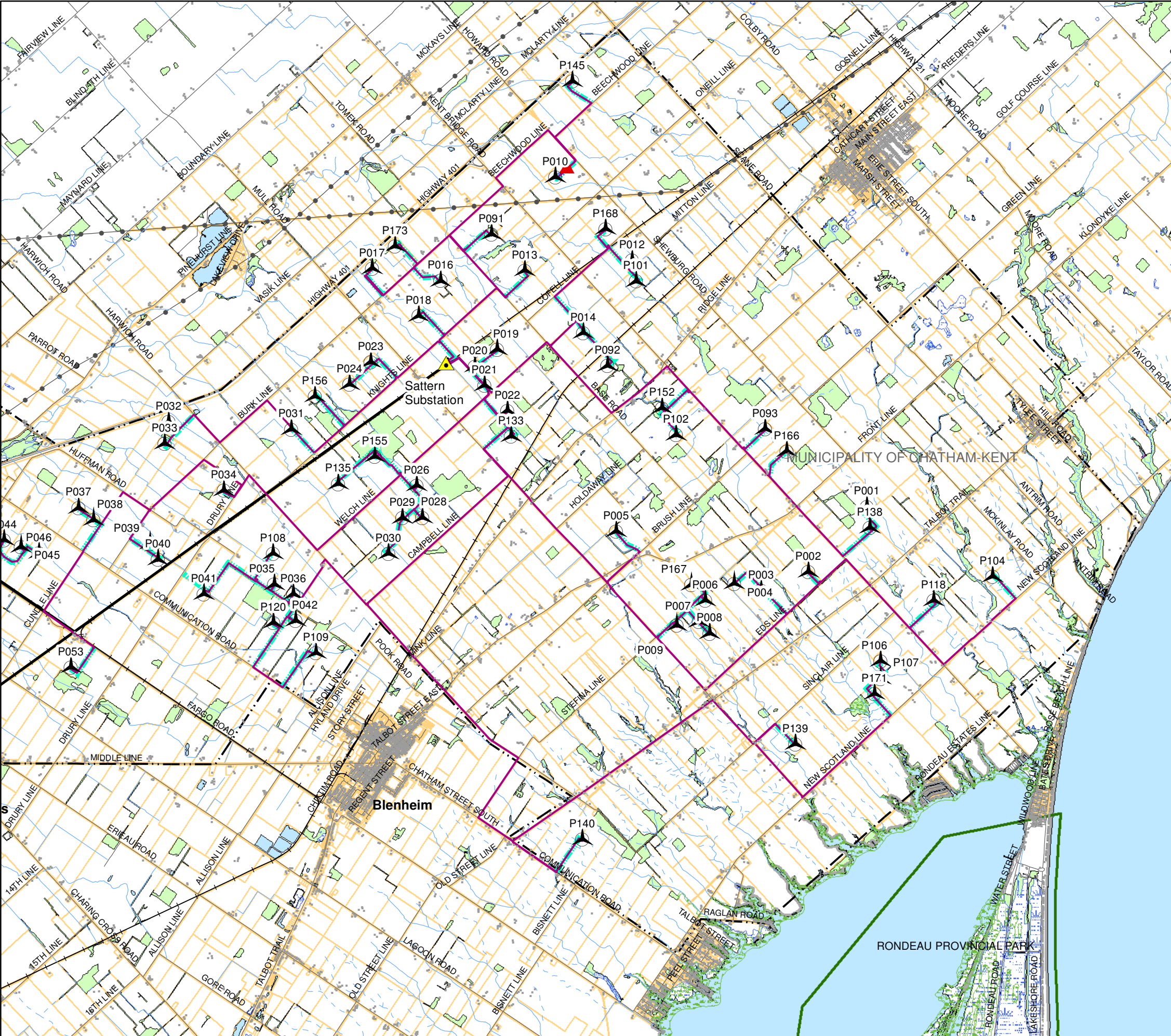




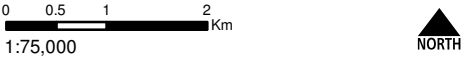
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