Heritage Impact Assessment, Grand Renewable Energy Park, Haldimand County, ON

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Ontario

April 19, 2011

Marnie Dawson
Manager, Renewable Energy Approvals
Samsung Renewable Energy
55 Standish Court
Mississauga, Ontario
L5R 4B2

RE: **Grand Renewable Energy Park**

Various Lots located within the area bounded by Townline Road, Haldimand Road 20, Grand River, and Lake Erie, County of Haldimand

MTC DPR file no. 28EA021

Dear Ms. Dawson:

This letter constitutes the Ministry of Tourism and Culture's written comments as required by s. 23(3)(a) of O. Reg. 359/09 under the *Environmental Protection Act* regarding heritage assessments undertaken for the above project.

Based on the information contained in the reports you have submitted for this project, the Ministry is satisfied with the heritage assessments. Please note that the Ministry makes no representation or warranty as to the completeness, accuracy or quality of the heritage assessment reports.*

The reports recommend the following:

Protected Properties Assessment Section 6: Study Results and Recommendations:

A total of four (4) municipally designated properties were identified within a reasonable zone of influence of Project components (Figure 4-1). Each of these properties has been assessed for potential Project-related negative impacts. Evaluation of impacts included: destruction, alteration, shadows, isolation, direct or indirect obstruction of views, and change in land use.

No potential negative impacts of significant magnitude have been identified.

Heritage Impact Assessment Section 5: Study Results and Recommendations:

A total of 85 properties and seven cultural landscapes within the Project's zone of influence were evaluated as being significant in terms of their heritage value. All of the significant properties and cultural landscapes were assessed for potential Project-related negative impacts.

No significant resources will be destroyed by the proposed Project.

No significant resources will be altered by the proposed Project.

No significant resources will have shadows cast on them by the proposed Project.

No significant resources will be isolated by the proposed Project.

No views of significant resources and/or their value-defining features will be obscured in an invasive manner.

Based on the current Site Plan, no further mitigation is recommended.

The Ministry is satisfied with these recommendations.

This letter does not waive any requirements which you may have under the Ontario *Heritage Act*. Also, this letter does not constitute approval of the renewable energy project. Approvals of the project may be required under other statutes and regulations. It is your responsibility to obtain any necessary approvals or licences.

Please feel free to contact me if you have questions or require additional information.

Sincerely,

Laura Hatcher
Heritage Planner

cc. Christienne Uchiyama, Archaeologist and Heritage Planning Consultant
Stantec

Colin Varley, Senior Archaeologist and Heritage Planning Consultant
Stantec

Chris Schiller, Manager, Culture Services Unit
Programs and Services Branch, Ministry of Tourism and Culture

* In no way will the Ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

FINAL REPORT
Heritage Impact Assessment,
Grand Renewable Energy Park,
Haldimand County, ON

Prepared for:
Samsung Renewable Energy Inc.
55 Standish Court, Mississauga, ON L5R
4B2 (905) 542-3535

Prepared by:
Stantec Consulting Ltd
2781 Lancaster Rd., Suite 200
Ottawa, ON K1B 1A7

April 11, 2011

Project No.: 161010624

EXECUTIVE SUMMARY

Samsung C&T (Samsung), Korea Power Electric Corporation (KEPCO), and Pattern Energy (Pattern) plan to build and operate the world's largest renewable energy cluster in Southern Ontario (Ontario Alternative Energy Cluster). Samsung has previously launched Korea's first solar energy project and built the world's largest skyscraper (Dubai). KEPCO is one of the world's top power utilities and develops low-carbon power generation and smart grid technologies. Pattern Energy develops, constructs, owns and operates clean energy and transmission assets in the United States, Canada and Latin America. Together, these companies (referred to herein as "SPK") will be involved in the development of the first phase of the energy cluster development.

The Grand Renewable Energy Park (the Project) is proposed within the County of Haldimand and is generally bounded by Townline Road to the north, Haldimand Road 20 to the west, the Grand River to the east and Lake Erie to the south. It consists of a 153.1 MW (nameplate capacity) wind project, a 100 MW (nameplate capacity) solar project located on privately owned and Ontario Realty Corporation (ORC) managed lands and a transmission line to convey electricity to the existing power grid. According to subsection 6(3) of O. Reg. 359/09, the wind component of the Project is classified as a Class 4 Wind Facility and the solar component of the Project is classified as a Class 3 Solar Facility.

The basic components of the Project include 69 wind turbines, approximately 425,000 photovoltaic (PV) solar panels installed on fixed ground-mounted racking structures organized into 100 1 MW solar units, a collector sub-station, interconnect station and Operations and Maintenance building, temporary storage and staging areas, approximately 19 km of 230 kV transmission lines along Haldimand Road 20, approximately 96 km of new overhead 34.5 kV collector lines along public roads, approximately 45 km of new underground collector lines along turbine access roads, approximately 43 km of turbine access roads and 40 km of solar panel maintenance roads.

SPK has retained Stantec Consulting Ltd. (Stantec) to prepare a Renewable Energy Approval (REA) application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O. Reg. 359/09). Specific sections of O. Reg. 359/09, pertain to Heritage Resources, specifically built heritage resources and cultural heritage landscapes. In order to meet the conditions O. Reg. 359/09, Stantec conducted a Heritage Assessment of the location of the proposed Project in Haldimand County, Ontario.

A Preliminary Heritage Inventory was prepared in July, 2010 which encompassed the general Project area, consisting of the Townships of Dunn, Rainham, South Cayuga, North Cayuga and Walpole (Stantec, 2010). The inventory presented the results of historical research and a windshield survey in July, 2010. A total of 609 built heritage resources of potentially significant heritage value were identified in the inventory.

All of the potential significant built heritage resources and cultural heritage landscapes within a 1km radius of Project infrastructure, including turbines, access roads and solar panel, were evaluated for heritage significance as per O.Reg. 359/09, s.23 (1)(a)(i) using criteria outlined under O.Reg 9/06 *Criteria for Determining Cultural Heritage Value or Interest* under the *Ontario Heritage* Act.

The following report presents the results of an evaluation of 85 of the previously inventoried built heritage resources and seven cultural heritage landscapes which fall within the zone of influence of Project infrastructure and an assessment of potential Project-related negative impacts based on the locations of Project components. The impact assessment of significant resources satisfies O.Reg.359/09, s.23 (1)(a)(i) and was carried out using the Ontario Ministry of Tourism and Culture's Info Sheet #5 *Heritage Impact Assessments and Conservation Plans* (MTC, 2006b).

No irreversible impacts of significant magnitude have been identified based on the locations of Project components.

Based on the current Site Plan, no further mitigation is recommended.

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PROJECT PERSONNEL

Project Director	Colin Varley, M.A., R.P.A.
Archival Research	Tavis Maplesden, B.A. (Hons)
	Stephen Jarrett, B.A. (Hons)
	Colin Varley, M.A., R.P.A.
Field Reconniassance	Tavis Maplesden, B.A. (Hons)
	Christienne Uchiyama, B.A. (Hons)
	Stephen Jarrett, B.A. (Hons)
	Colin Varley, M.A., R.P.A.
Report	Christienne Uchiyama, B.A. (Hons)
	Tavis Maplesden, B.A. (Hons)
	Colin Varley, M.A., R.P.A.

1 INTRODUCTION

Samsung C&T (Samsung), Korea Power Electric Corporation (KEPCO) and Pattern Energy (Pattern) plan to build and operate the world's largest renewable energy cluster in Southern Ontario (Ontario Alternative Energy Cluster). Together these companies (herein referred to as "SPK" are proposing to develop, construct, and operate the Grand Renewable Energy Park (the "Project") as the development of the first phase of the energy cluster development.

Stantec Consulting Ltd. (Stantec) was retained by SPK to prepare a Renewable Energy Approval (REA) Application, as required under *Ontario Regulation 359/09 – Renewable Energy Approvals under Part V.0.1 of the Act* of the *Environmental Protection Act (O.Reg. 359/09)*. This Heritage Impact Assessment (HIA) satisfies requirements under O.Reg. 359/09, s.23.

In July, 2010 a Preliminary Heritage Inventory was prepared which encompassed the general Project area, consisting of the Townships of Dunn, Rainham, South Cayuga, North Cayuga and Walpole (Stantec, 2010). The inventory presented the results of historical research and a windshield survey in July, 2010. A total of 609 built heritage resources of potentially significant heritage value were identified in the inventory.

The following report presents the results of an evaluation of 85 of the previously inventoried built heritage resources and seven cultural heritage landscapes which fall within a reasonable zone of influence of Project infrastructure. Evaluations of heritage resources were carried out as per O.Reg. 359/09, s.23(1)(a)(i) using criteria outlined in O.Reg.9/06 (*Criteria for Determining Cultural Heritage Value or Interest under the Ontario Heritage Act*). The assessment of potential negative impacts have been carried out as per O.Reg. 359/09, s.23(1)(a)(ii). The HIA was prepared by Christienne Uchiyama, B.A., Archaeologist and Heritage Planning Consultant with Stantec. Colin Varley, M.A., R.P.A., Senior Archaeologist and Heritage Planning Consultant with Stantec acted as Senior Reviewer.

1.1 Project Description

The Project is proposed within the County of Haldimand and is generally bounded by Townline Road to the north, Haldimand Road 20 to the west, the Grand River to the east and Lake Erie to the south. It consists of a 153.1 MW (nameplate capacity) wind power, a 100 MW (nameplate capacity) solar power located on privately owned and Ontario Realty Corporation (ORC) managed lands and a transmission line to convey electricity to the existing power grid.

The basic components of the Project include 69 wind turbines, approximately 425,000 photovoltaic (PV) solar panels installed on fixed ground-mounted racking structures organized into 100 1 MW solar units, a collector sub-station, interconnect station and Operations and Maintenance building, temporary storage and staging areas, approximately 19 km of 230 kV transmission lines along

Haldimand Road 20, approximately 96 km of new overhead 34.5 kV collector lines along public roads, approximately 45 km of new underground collector lines along turbine access roads, approximately 43 km of turbine access roads and 40 km of solar panel maintenance roads.

Turbine and solar panel schematics are included in Appendix A.

1.2 Assessment Methodology

The Heritage Impact Assessment (HIA) study was composed of a program of archival research and visual assessment of potential built heritage resources and potential components of cultural heritage landscapes within the vicinity of the Project area. To familiarise the study team with the Project area local historical societies were consulted, archival documents were reviewed and a summary historical background of the local area was prepared. Listings of provincially and locally designated built heritage sites, districts and easements and buildings of architectural or historical interest were reviewed in order to compile a catalogue of existing identified heritage resources.

Available historical maps and local histories were consulted to identify the locations of 19th century buildings and potential identifiable pre-contact resources and where available Census records were consulted for material of construction and scale of residential buildings. A visual survey was conducted of the general study area on July 6 and 7, 2010. The Project area was surveyed for extant buildings, outbuildings or other built heritage remains. During the site visit potential built heritage resources and components of potential cultural heritage landscapes were photographed. The Project area was also assessed for groupings of resources and environs that might potentially constitute cultural heritage landscapes as defined in InfoSheet #2 in *Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (MTC, 2006).

Results of the archival research and visual survey were presented in the July, 2010 Built Heritage and Cultural Landscape Inventory (Stantec, 2010). The inventory listed a total of 609 heritage resources of potential significance in terms of their heritage values.

Based on the January, 2011 Site Plan the inventory was narrowed to include only those buildings within the vicinity of Project infrastructure including: solar panels, wind turbines and access roads (Figure 1-1). All resources within a radius of 1 km of visible Project components were assessed. A buffer zone of 1 km was chosen as it encompasses those resources that may experience direct impacts as well as those which might experience indirect impacts as a result of the Project. A buffer zone of 500 m has been illustrated on figures within this report in order to illustrate the zone of potential direct impacts. Locations of all Project components were taken into account and have been identified in Figure 1-2. In general, where locations of existing roads and transmission lines will be used for the proposed Project, no negative impacts are expected. A total of 85 properties and seven cultural heritage landscapes have been included in this HIA (Figure 1-2).

As per O.Reg.359/09, s.23(1)(a)(i), each of the properties was evaluated using criteria set out under O.Reg 9/06 of the *Ontario Heritage Act* (*OHA*). A property meeting one or more of the following criteria is considered by this study to be of significant heritage value.

1. The property has design value or physical value because it,
   i. is a rare, unique, representative or early example of a style, type, expression, material or construction method,
   ii. displays a high degree of craftsmanship or artistic merit, or
   iii. demonstrates a high degree of technical or scientific achievement.
2. The property has historical value or associative value because it,
   i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,
   ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or
   iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.
3. The property has contextual value because it,
   i. is important in defining, maintaining or supporting the character of an area,
   ii. is physically, functionally, visually or historically linked to its surroundings, or
   iii. is a landmark. O. Reg. 9/06, s. 1 (2).

During the site visit in July, 2010 the Project area was assessed for groupings of resources and environs that might potential constitute cultural heritage landscapes as defined by the *Ontario Provincial Policy Statement, Mandatory Standards and Guidelines for Provincial Heritage Properties, under Part III, 1 of the OHA* (MCL, 2005).

Cultural Heritage Landscapes for the purposes of this study are: “a defined geographical area of heritage significance which has been modified by human activities and is valued by a community. A landscape involves a grouping(s) of individual heritage features such as structures, spaces, archaeological sites and natural elements, which together form a significant type of heritage form, distinctive from that of its constituent elements or parts” (MAH 2005).

In order to satisfy O.Reg.359/09, s.23(1)(a)(ii) potential negative impacts were identified for each of the significant properties and landscapes. Assessment of potential negative impacts was carried out as per InfoSheet #5 in *Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (MTC, 2006b).

Assessment of potential direct or indirect impacts of the Project on identified built heritage resources in the Project area considered Ministry of Tourism and Culture guidelines concerning *Heritage Impact Assessments and Conservation Plans* (MTC, 2006b).

The Ministry of Tourism and Culture outlines seven (7) potential negative impacts on heritage resources:

- **Destruction** of any, or part of any, *significant heritage attributes* or features;

- **Alteration** that is not sympathetic, or is incompatible, with the historic fabric and appearance;
- **Shadows** created that alter the appearance of a *heritage attribute* or change the viability of a natural feature or plantings, such as a garden;
- **Isolation** of a *heritage attribute* from its surrounding environment, context or a *significant* relationship;
- **Direct or indirect obstruction** of *significant* views or vistas within, from, or of built and natural features;
- **A change in land use** such as rezoning a battlefield from open space to residential use, allowing new *development* or *site alteration* to fill in the formerly open spaces; and
- **Land disturbances** such as a change in grade that alters soils, and drainage patterns that adversely affect and *archaeological resource*.

Land disturbances are being assessed in a separate Stage 1 Archaeological Assessment and have not been included in the current evaluation.

Mitigation measures were recommended in response to identified potential project-related negative impacts.

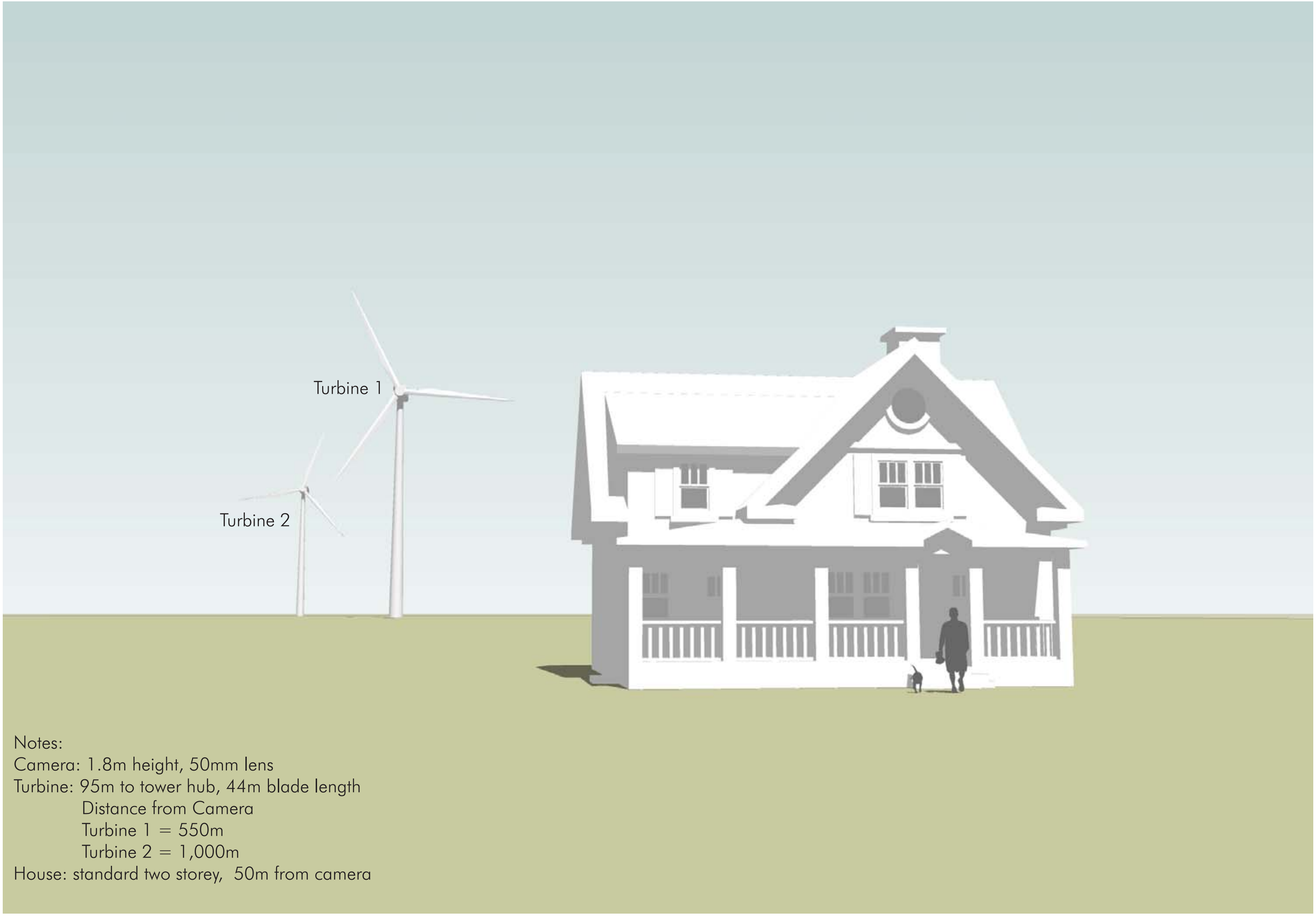
Assessment of potential impacts on protected properties and potential archaeological resources have been carried out but are not included in the current report.

1.3 Visual Simulations

A series of visual simulations and modelling exercises were undertaken in order to determine the magnitude of potential visual impacts of highly visible Project components (*i.e.,* turbines and solar panel fields). Where applicable, these visual aids have been included in the text of this report.

As discussed in Section 1.2, this assessment includes all significant resources located within 1km of visible Project components. The distance of wind turbines to significant resources, in particular, was considered to be an important factor in the measurement of potential negative impacts. Visual Aid 1 illustrates the scale of a wind turbine in relation to a typical 2 storey residential building at distances of 550m and 1000m.

A large number of identified significant resources are shielded by mature trees. In these cases, there has been an attempt to show tree cover in accompanying photographs. Visual Aid 2 illustrates the impact of tree cover in softening or even blocking views of wind turbines.



WIND TURBINE SCALE SCHEMATIC, MARCH 2011

VISUAL AID 1

Notes:
Camera: 1.8m height, 50mm lens
Turbine: 95m to tower hub, 44m blade length
Distance from Camera
Turbine 1 = 550m
Turbine 2 = 1,000m
House: standard two storey, 50m from camera
Trees: 13-15m (40-50’) height, forest 300m from camera

WIND TURBINE SCALE SCHEMATIC, MARCH 2011

Visual Aid 2

2 PROJECT AREA

The Project area is composed of developed and undeveloped land contained within the townships of North Cayuga, South Cayuga, Rainham, Dunn and Walpole in the Regional Municipality of Haldimand County (Figure 1-1). Project components are located primarily in Dunn, South Cayuga and North Cayuga Townships (Figure 1-1).

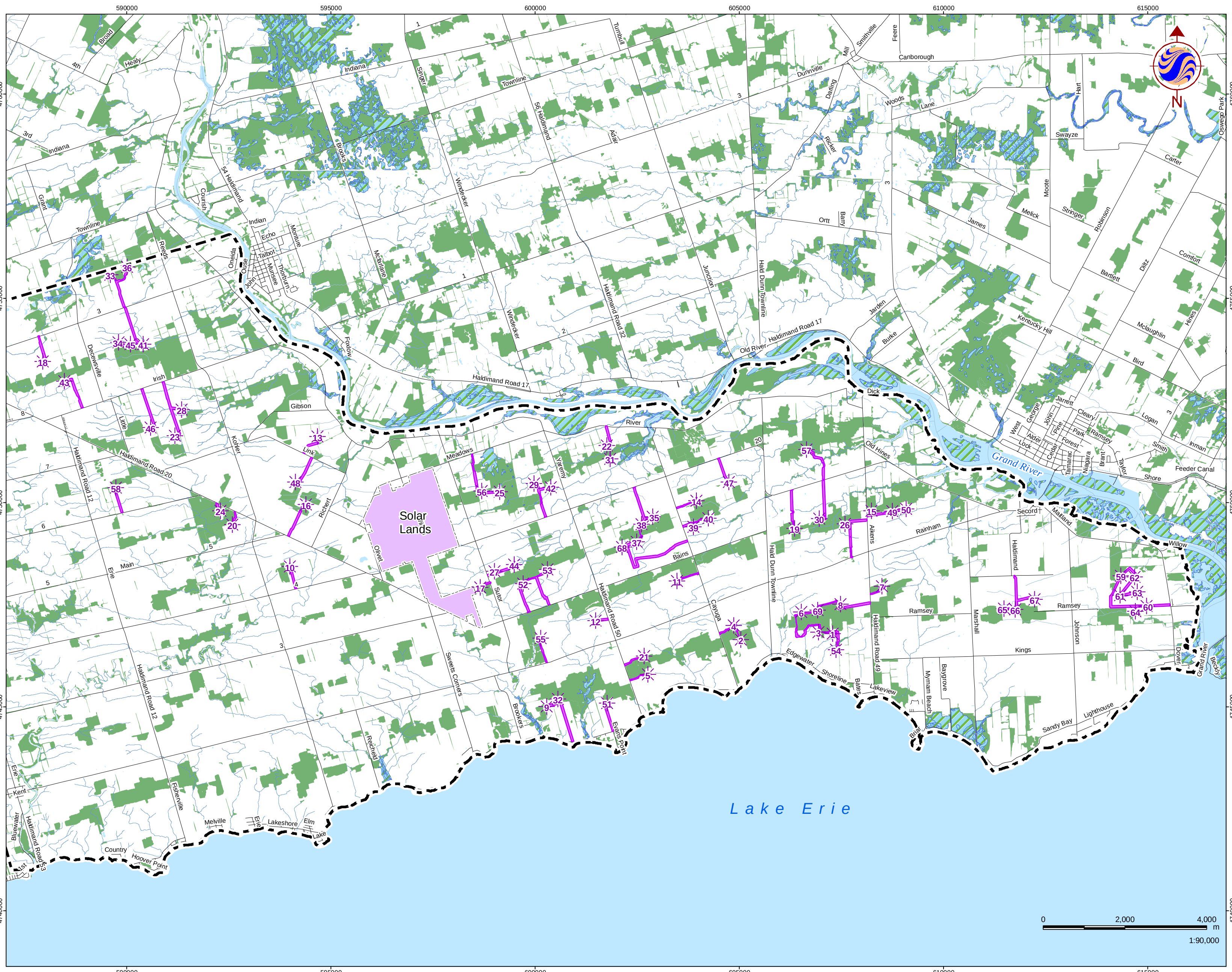
The topography of the Project area is generally flat with some gently rolling areas. The Project area is located in the Haldimand Clay Plain physiographic region, a large region that occupies the majority of the Niagara Peninsula south of the Escarpment down to Lake Erie. It is a region of approximately 1,350 square miles characterized by recessional moraines in the northern part, deep river valley in the middle, and flat and low lying ground to the south (Chapman and Putnam, 1984).

The closest major topographic features to the Project area are Lake Erie which is located directly to the south and the Grand River which runs to the north and east of the Project (Figure 1-1). Lake Ontario is located as close as 28 km to the northeast.

2.1 The Grand River

The Grand River, a Canadian Heritage River, runs along the north and east of the Project area. The river was nominated in 1990 and accepted by the Canadian Heritage Rivers Board in 1994 following completion of *The Grand Strategy* (Grand River Conservation Authority, 2011). Within the Project area, the portion of the Grand River around Dunnville possesses an outstanding combination of both natural and human heritage features including riverboat locks and feeder canals (Heritage Resource Centre, 1989).

Human heritage resources located along the Grand River were recorded during the July, 2010 windshield survey. Views to and from the river were considered in this assessment as were views from the opposite shore, facing the Project area; however, no turbine locations are proposed to be constructed within 1km of the Grand River and no visual impacts of significant magnitude have been identified.



Legend

- Wind Turbine Location
- Road
- Watercourse
- Waterbody
- Wetland
- Woodlot
- Planned Constructable Areas
- Solar Lands
- Project Location

Map Area

Notes

1. Coordinate System: UTM Zone 17 NAD 83.
2. Data Sources: Ontario Ministry of Natural Resources
   © Queens Printer Ontario, 2009; © GREP, 2010;
   © Samsung, 2010.
3. Image Sources: © Google Earth Pro, 2010
   (© First Base Solutions, 2010; © TeleAtlas, 2010 -Imagery Date: April 7, 2006)

Stantec

January 2011
Project No. 161010624

Client/Project

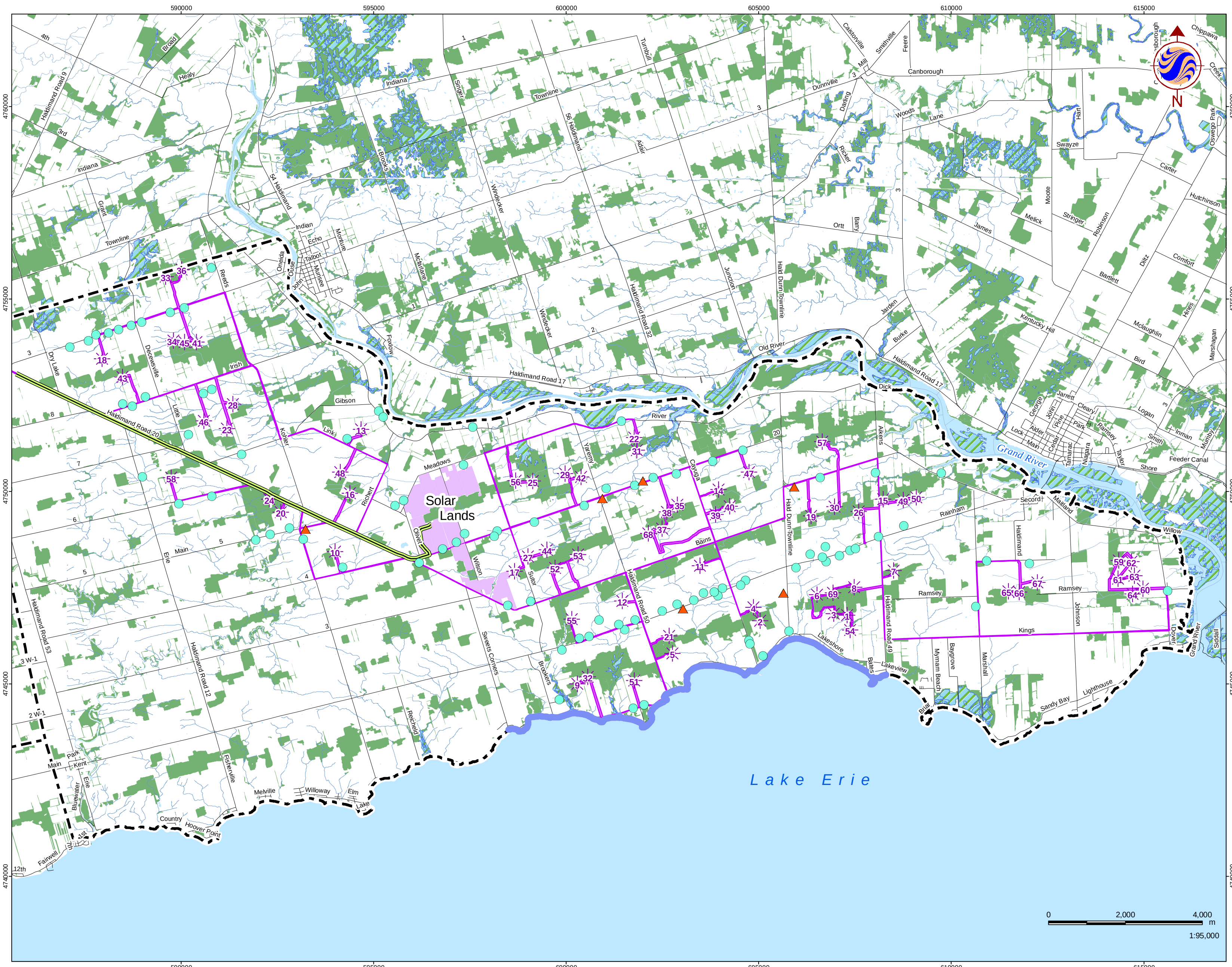
SAMSUNG C & T
GRAND RENEWABLE ENERGY PARK

Figure No.

1-1

Title

SITE PLAN



Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Planned Constructable Areas
- Cultural Heritage Landscape
- Transmission Line
- Road
- Watercourse
- Waterbody
- Wetland
- Woodlot
- Project Location

Project Area

Notes

1. Coordinate System: UTM Zone 17 NAD 83.
2. Data Sources: Ontario Ministry of Natural Resources © Queens Printer Ontario, 2009; © GREP, 2010; © Samsung, 2010.
3. Image Sources: © Google Earth Pro, 2010 (© First Base Solutions, 2010; © TeleAtlas, 2010 -Imagery Date: April 7, 2006)

Stantec

March 2011
Project No. 161010624

Client/Project

SAMSUNG C & T
GRAND RENEWABLE ENERGY PARK

Figure No.

1-2

Title

LOCATION OF SIGNIFICANT HERITAGE RESOURCES

3 HISTORICAL CONTEXT

Named after Sir Frederick Haldimand, a German mercenary soldier fighting for the British in the American War of Independence and later Governor of Quebec, Haldimand County was originally created as part of Norfolk County in 1792 from lands originally seeded to Joseph Brant and the Six Nations Iroquois in 1784, but sold back to, and taken back by, the Crown. Haldimand County was designated as its own county in 1800 (Brueton, 1967). Originally, the land given to the Six Nations was an area of six miles on either side of the Grand River, from its head to its mouth at Lake Erie. Brant, who had fought for and alongside the British in the American War of Independence subsequently leased tracts of the land to allies of the Six Nations, particularly members of the 'Butler's Rangers', a Loyalist unit that fought for the British. These men were the first European settlers in the county.

The county was officially opened for settlement by the Government in 1832 but settlement was slow due to the unforgiving conditions of the heavily forested, and sometimes swampy, lands. The land was so poor in spots that it had been largely unused by Native populations since the destruction and dispersion of the Neutral tribe by the Iroqouis in the mid-15th Century (Harper, 1950). Like much of Ontario, settlers were a mix of United Empire Loyalists (UEL) fleeing the post-revolution United States and immigrants from Britain and other European countries. In Haldimand County, these settlers found that the waterfront (front) of the county was far more acceptable than the interior and tended to set up residence close to the banks of Lake Erie. Even though grants were given for Lots in the rear of the County, it would take a much longer time for these to be cleared and settled (Nelles, 1905).

4 BUILT HERITAGE RESOURCES

A total of 85 resources of significant heritage value and seven significant Cultural Heritage Landscapes (CHLs) are presented in this report. The evaluations and impact assessments of the resources are presented in the following sixteen (16) sections. Each section is preceded by a map of the area and locations of the resources to be discussed. In general, the Project will not have any impacts on any of the heritage resources in terms of destruction, alteration, isolation, or change in land use. A 500 m zone of influence is shown on each of the figures to highlight the area where one might expect direct Project-related negative impacts and indirect impacts of a greater magnitude; however, all significant resources within 1 km of Project infrastructure have been included.

4.1 Area 1

Area 1 is roughly bounded by Highway 3 to the north, Irish Line to the South, and Reeds Road to the east. The area extends approximately 1500 m west of Decewsville Road (Figure 4-1). Area 1 includes evaluations of the following properties:

- 4344 Highway 3
- 4400 Highway 3
- 4438 Highway 3
- 4540 Highway 3
- 4608 Highway 3
- 165 Reeds Road

Table 4-1 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 1 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

Four of the properties; 165 Reeds Road, and 4344, 4400 and 4438 Highway 3 are located more than 500 m from Project components. None of the properties are located less than 500 m from a wind turbine location.

Built heritage resources at 4540 and 4608 Highway 3 were considered to be within a zone of influence for negative impacts of significant magnitude, since both are located within 500 m of Project components. A turbine access road is located between the two properties (Figure 4-1). The access road will not have a negative impact on any of the value-defining features of either building and is not likely to be invasively visible within the viewshed of either property. Turbines 34, 45 and 41 are located more than 750 m south of the properties and, at that distance, are not expected to be invasive. Trees located immediately south of the turbine locations are not visible when viewing the properties from Highway 3 suggesting that turbines may, likewise, not be visible from Highway 3 or that there visual impact will be minimal in terms of obscuring viewscapes of 4540 and 4608 Highway 3.

No further mitigation has been recommended.

Table 4-1 Summary of Area 1 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 4344 Highway 3	Two storey redbrick farmhouse with rectangular plan and symmetrical design. Hip roof. Three openings on first and second storey. Doors at centre. **Criteria met:** 1(i) Representative of local Georgian style in red brick with three openings over three openings. First and second storey doors are central and are flanked by elongated windows. 3(i) Visually linked to the development of Haldimand County along the Highway 3 landscape.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 4400 Highway 3	One and a half storey Ontario Gothic Revical Cottage. Porch across front. Tall, slender one-over-one windows. **Criteria met:** 1(i) Relatively early example of Ontario Gothic Revival Cottage Style. Porch is representative of local style as are the slender, rectangular windows.3(i) Visually linked to the development of Haldimand County along the Highway 3 landscape.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-1 Summary of Area 1 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 4438 Highway 3	One and a half storey ell-shaped Ontario Gothic Revical Cottage with metal roof. Dichromatic brick work, red with yellow details. Voussoirs above windows and door, rounded on second storey and flat on first storey. Protruding sills. Two-over-two paned windows. Sheltered by tree cover. **Criteria met:** 1(i) Good example of dichromatic brickwork on a ell-shaped Gothic Revival Cottage style residence. 3(i) Visually linked to the development of Haldimand County along the Highway 3 landscape.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-1 Summary of Area 1 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 4540 Highway 3	Stone cottage-style farmhouse. First storey in stone likely dates to mid 1800s. Second storey addition has raised roof, but not altered gable form. Turbines 34, 45 and 41 may be visible from Highway 3, however, all three turbines are located at least 750 m from the house and at that distance the scale of the turbines should not be invasive. Access roads are not considered to be in close proximity to value defining features of the property. **Criteria met:** 1(i) Early example of stone cottage construction. 2(i), 3(i) Associated with mid-19th Euro-Canadian settlement and growth of the area. The building is located along Highway and is visually linked with other older buildings in the vicinity such as the Campbell-Pine House.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-1 Summary of Area 1 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 4608 Highway 3	Two and a half storey redbrick vernacular farmhouse. Chimney at peak of pyramidal roof. Attic dormer. Closed in porch along side fronting Hwy 3. Pediment above door. Late 19th early 20th century. Edwardian Classicism in heavy brick pillars along porch. Turbines 34, 45 and 41 may be visible behind the building from Highway 3, however, all three turbines are located at least 750 m from the house and at that distance the scale of the turbines should not be invasive. Access roads are not considered to be in close proximity to value defining features of the property. **Criteria met:** 1 (i) Representative of Vernacular farmhouse style with Edwardian Classicism influence. 3(i) Visually linked to the development of Haldimand County along the Highway 3 landscape.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-1 Summary of Area 1 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 165 Reeds Road	One and a half storey Ontario Gothic Revical Cottage. Stone foundations. Six-over-six pane windows flanking door. Wide door case with transome and sidelights. Lancet arch window below front gable, with Regency Gothic-style decorative motif, suggests early to mid 19th century construction. Sheltered by thick tree cover. **Criteria met:** 1(i) Good example of Ontario Gothic Revival Cottage style with Regency Gothic style lancet arch window.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

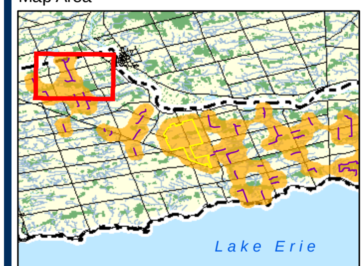
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area1
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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Figure No.

4-1

Title

AREA 1: HERITAGE RESOURCES & PROJECT COMPONENTS

4.2 Area 2

Area 2 is roughly bounded by Highway 3 to the north and Haldimand Road 20 along the south and west. The area extends approximately 1500 m east of Decewsville Road (Figure 4-2). Area 2 includes evaluations of the following properties:

- 81 Irish Line
- 165 Irish Line
- 120 Irish Line
- 4240 Highway 3
- 4257 Highway 3
- 4294 Highway 3

Table 4-2 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 2 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

No negative impacts are expected for 120 Irish Line and 4257 Highway 3. Both properties are located opposite the road from Project infrastructure and views will not be obstructed by the proposed Project (Figure 4-1).

Views of both 81 and 165 Irish Line are currently obscured by tree cover (see photos in Table 4-2). Based on the distance of both properties to Turbine 43 and the thickness of tree cover on each property, views are not expected to be negatively impacted.

Turbine 18 is planned to be sited approximately 750 m south of 4240 and 4294 Highway 3 (Figure 4-2). Both buildings are flanked by mature trees (see photos in Table 4-2) and at a distance of over 750 m, the scale of Turbine 18 is not expected to be invasive if it is visible through the tree cover.

No further mitigation has been recommended.

Table 4-2 Summary of Area 2 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 81 Irish Line	One and a half storey Ontario Gothic Revival Cottage. Tree cover obscures view from road. **Criteria met:** this property has been included as it cannot be excluded as meeting criterion 1(i) for being of an early age of construction as a result of thick tree cover.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 120 Irish Line	One and a half storey ell-shaped Ontario Gothic Revival Cottage with rounded arch window below front gable. Covered porch along front with entrance to the side. Chimney near centre of house. Located on south side of Irish Line. Turbine 43 located on north. **Criteria met:** 1(i) Early example of local Ontario Gothic Revival Cottage style built on an ell-shaped plan.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

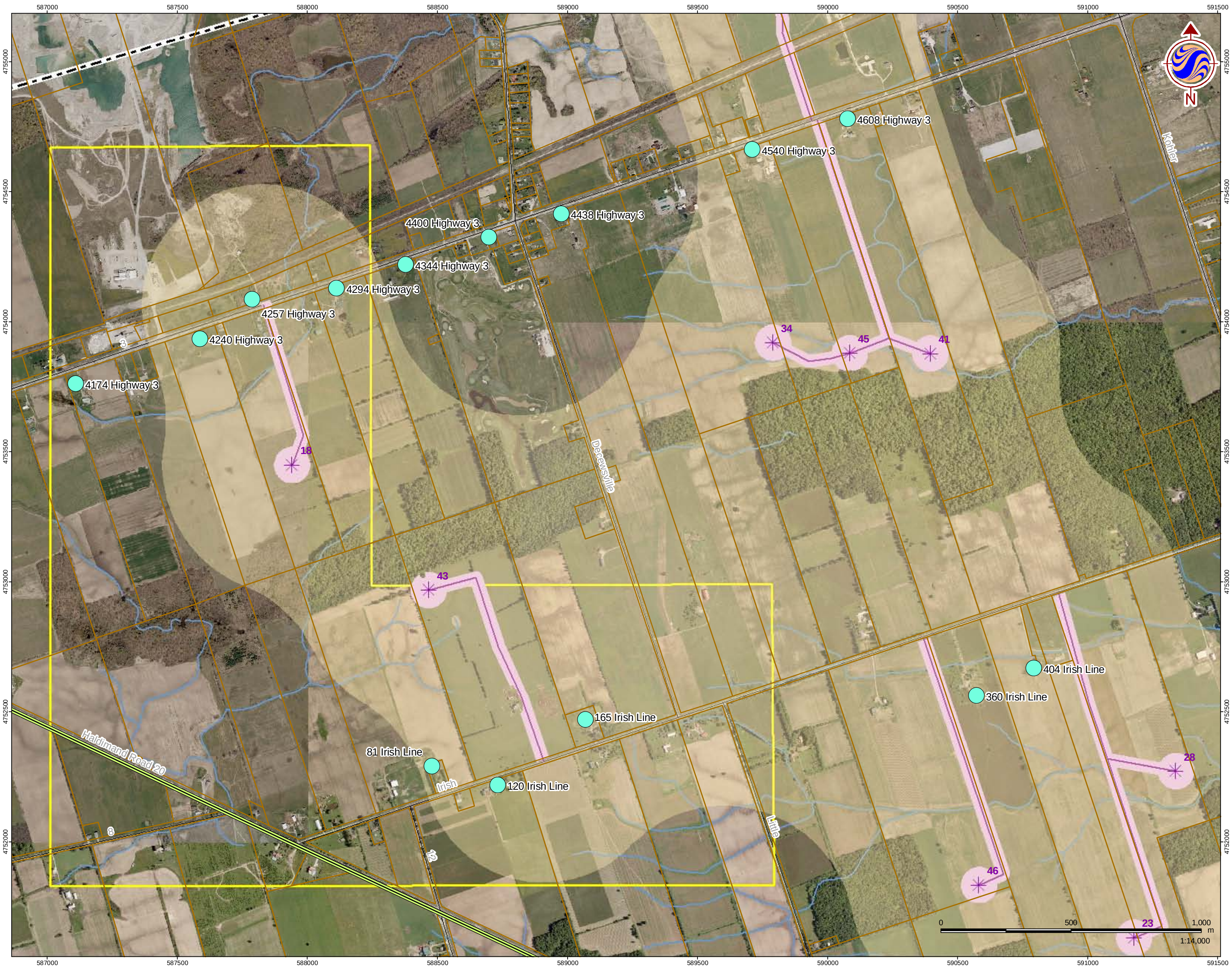
Table 4-2 Summary of Area 2 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 165 Irish Line	One and a half storey Ontario Gothic Revival Cottage. Arched window below front gable and ornate porch spanning front elevation are value-defining features. Trees flanking property shelter viewscapes. **Criteria met:** 1(i) Early example of local Gothic Revival Cottage style with rounded arch window below the gable and full front porch. Wide door frame suggests an early date of construction	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 4240 Highway 3	Two and a half storey redbrick farmhouse with attic dormer and covered porch. Mature trees block views of Turbine 18, located approximately 500m southeast of the house. **Criteria met:** 3(i) Visually linked to the streetscape along Highway 3 which is representative of late 19th and early 20th century rural development in Haldimand County. Highway 3 is a traditional transportation route which links small villages in the County and this property is representative the rural experience between these villages.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-2 Summary of Area 2 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 4257 Highway 3	Two storey aluminum clad light industrial/agricultural building. Irregular design. Sheltered by trees, located north of Highway 3. Nearest turbine (18) south of road. **Criteria met:** 1(i) This outbuilding is a unique example of vernacular agricultural construction. 2(i) It is located along Highway 3 and is linked to the theme of area agriculture and the increase in the industrialisation of agricultural processes and the transporation of those goods from rural areas to village/town centres.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 4294 Highway 3	Two storey Italianate farmhouse wiht metal hip roof. Dichromatic brickwork - red with yellow decorative brickwork along corners. Ornate porch trim and second floor balcony. Sheltered by tall trees. **Criteria met:** 1(i) Representative of dichromatic brickwork in a late 19th century vernacular architecture in an Italianate rather than Gothic Revival Cotage style example.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected



Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area2
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Transmission Line
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area

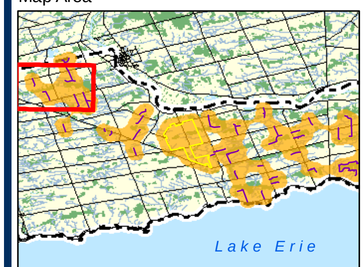


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Figure No.

4-2

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AREA 2: HERITAGE RESOURCES & PROJECT COMPONENTS

4.3 Area 3

Area 3 is roughly bounded by Irish Line to the north, Link Road along the south, Kohler road along the east and Haldimand Road 12 along the west (Figure 4-3). Area 3 includes evaluations of the following properties:

- 360 Irish Line
- 404 Irish Line
- 60 Little Road
- 120 Link Road

Table 4-3 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 3 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

Based on the current Site Plan, Turbines 23, 28 and 46 will likely be visible in the background when viewing 360 and 404 Irish Line (Figure 4-3). Although both properties have some scattered tree cover, it is reasonable to expect that turbines will become part of the viewscape of both of these farmsteads. In every case, however, the turbines are located at least 1 km from the road and no less than 750 m from the two farmhouses (Figure 4-3). The visual impact of the turbines is not, therefore, expected to be invasive in terms of obstructing views of the properties (see Visual Aids 1 and 2). All value-defining features will remain visible and the silhouettes of the houses and associated outbuildings are not expected to suffer impact of significant magnitude.

Views of 120 Link Road will not experience negative impact as a result of the Project. The property is located on the south side of Link Road while the closest turbines are located on the north side of the road (Figure 4-3).

Negative impacts at 60 Little Road are not anticipated as a result of the proposed Project. Although Turbine 46 is located approximately 500 m from the farmstead, it is not expected to obscure views of the property as a result of currently limited views of the farm. At present, the property is only visible through trees along Little Road, for approximately 250 m immediately north of Haldimand Road 20 (see photo Table 4-3, Figure 4-3).

No further mitigation has been recommended.

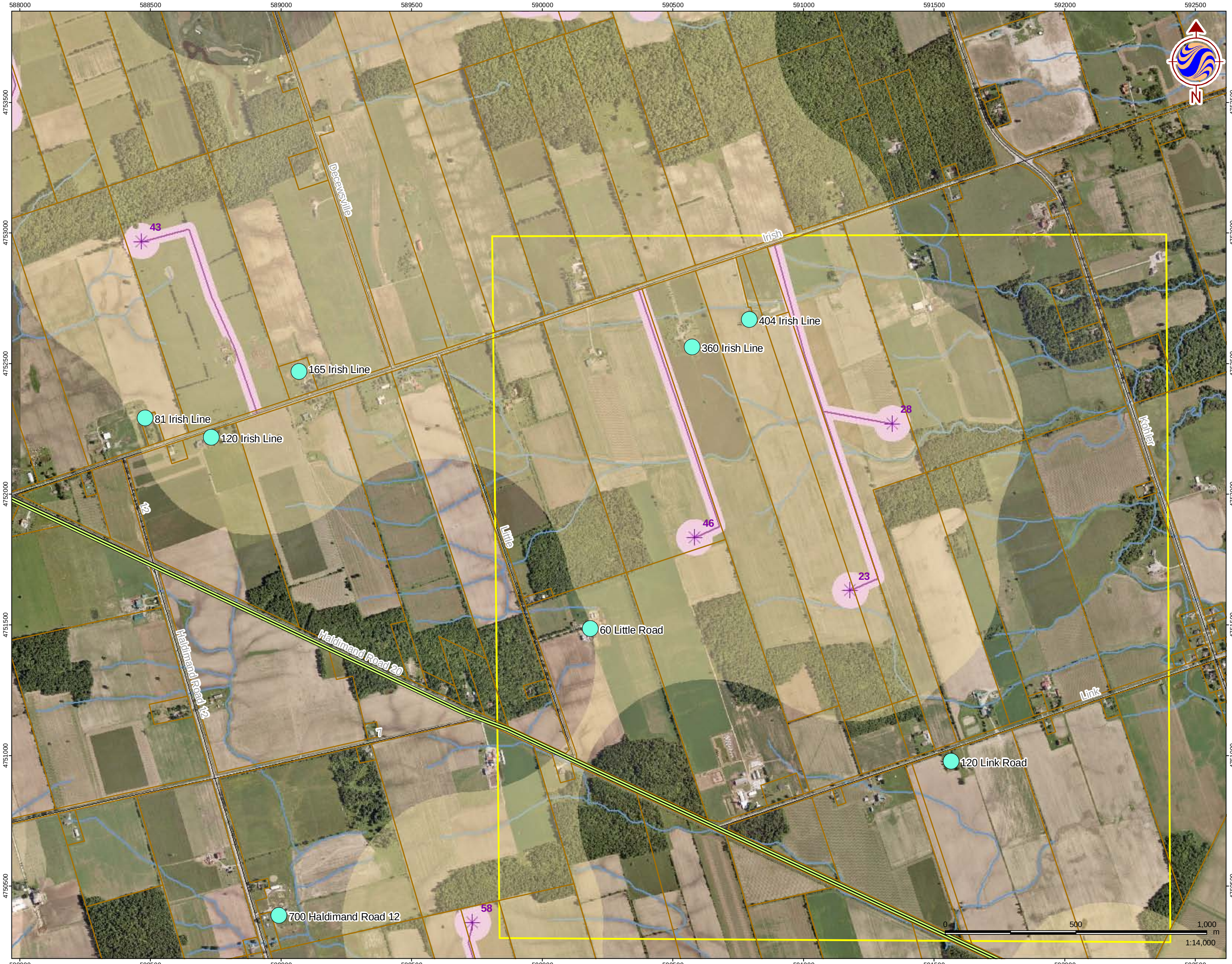
Table 4-3 Summary of Area 3 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 360 Irish Line	One and a half storey Ontario Gothic Revival Cottaga, ell-shaped. Porch across front. Original decorative window below gable. **Criteria met:** Although the property does not meet criteria as outlined in O.Reg9/06 it is of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	R	NE	No further mitigation recommended.
 404 Irish Line	One and a half storey Ontario Gothic Revival Cottaga, red brick, door to balcony below gable, rounded wooden transom. Two-over-one paned windows on first storey. Ornate detailing on porch and small balcony. **Criteria met:** Although the property does not meet criteria as outlined in O.Reg9/06 it is of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	R	NE	No further mitigation recommended.

Table 4-3 Summary of Area 3 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 60 Little Road	One and a half storey Ontario Gothic Revival Cottaga. Associated barns and outbuildings. **Criteria met:** Although the property does not meet criteria as outlined in O.Reg9/06 it is of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 120 Link Road	One and a half storey ell-shaped building. Red brick. Wide gable. Possibly an old schoolhouse. Identified as a property of potential heritage significance by Heritage Haldimand LACAC. **Criteria met:** 1(i) Rare example of 19th century rural public building construction.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

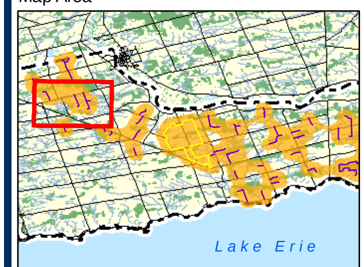


Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area3
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Transmission Line
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 3: HERITAGE RESOURCES & PROJECT COMPONENTS

4.4 Area 4

Area 4 is roughly bounded by Gibson Road and River Road to the north, Concession 5 Road and Haldimand Road 20 to the south, Wilson Road to the east and Kohler Road to the west (Figure 4-4). Area 4 includes evaluations of the following properties:

- 851 Concession 5 Road
- 929 Concession 5 Road
- Bethel Cemetery
- 834 Kohler Road
- 489 Link Road
- 1582 River Road
- 1600 River Road

Table 4-4 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 4 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value. The Bethel Cemetery has been identified as a significant CHL.

The two River Road properties are located on the north side of the road and views of the value-defining features of the properties will not be obscured by Turbine 13 to the south (Figure 4-4).

The Concession 5 Road properties are both separated from the street by thick tree cover (see photos Table 4-4). It is possible that Turbine 20 will be visible within the viewscape of both properties; however, it is unlikely that this would be intrusive given the trees fronting the property and the distance of the turbine from the road (Figure 4-4).

Both 834 Kohler Road and the Bethel Cemetery CHL are located on opposite sides of the road from the Project components and views are not expected to be affected by the Project (Figure 4-4). Views from Bethel Cemetery have also been considered. Visual Aid 3 illustrates views from Bethel Cemetery facing northwest towards Turbines #20 and #24. The simulation indicates that both turbines will be visible, but at a scale that is not intrusive to the landscape. Furthermore, wind energy generation is thematically compatible with agricultural land-use and with the existence of hydro lines across the landscape. In terms of scale and compatibility with the landscape the turbines viewed from the Bethel Cemetery are not expected to have a significant negative impact.

No further mitigation has been recommended.

Visual Aid 3 Simulated view from Bethel Cemetery facing northwest towards Turbines #20 and #24

Table 4-4 Summary of Area 4 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 851 Concession 5 Road	Two storey redbrick residential building. Symmetrical, rectangular form. Local variant of Pensylvania Georgian architectural style. Twin entrances near the centre with first storey windows to the sides. Second storey windows are stacked directly above first storey windows. Hip roof with chimney to one side. Decorative elements include cornice brackets, porch trim, rounded tops of windows and lug sills. **Criteria met:** 1(i) Representative of the use of the dual front entrance in vernacular architecture influenced by Italiante and Pennsylvannia Georgian design.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-4 Summary of Area 4 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 929 Concession 5 Road	Two and a half storey ell-shaped vernacular residece. Wood-clad. Pediment below road facing gable. Second floor balcony indicates that a porch and balcony once existed in the corner of the L. Stone rubble foundations. **Criteria met:** Although this property does not meet criteria as outlined in O.Reg 9/06 but is considered to be of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 988 Concession 5 Road	Active cemetery at the corner of Kohler Road and Concession 5 Road. Earliest legible gravestone dates to 1878. **Criteria met:** 2(i) Associated with the late 19th century development in the community. 2(ii) Potential to yield information as a result of extant grave markers.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-4 Summary of Area 4 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 834 Kohler Road	One and a half storey cottage style residential building. Pediment overhangs above doors. Symmetrical form. Dormer in attic. Original two-over-two paned windows. **Criteria met:** Although this property does not meet criteria as outlined in O.Reg 9/06 but is considered to be of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 489 Link Road	One and a half storey Ontario Gothic Revival Cottage. View from the street is obscured by thick tree cover. **Criteria met:** Although this property does not meet criteria as outlined in O.Reg 9/06 but is considered to be of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-4 Summary of Area 4 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 1582 River Road	Two storey redbrick residential building. Symmetrical, rectangular form with hip roof, recessed porch and balcony. Decorative details include porch trim and moulded soffit. **Criteria met:** 1(i) Representative of late 19th century vernacular design.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 1600 River Road	One and a half storey Ontario Gothic Revival Cottage with metal roof. Redbrick. Kitchen tail to the rear. Closed in porch/sunroom on side facing road. **Criteria met:** Although this property does not meet criteria as outlined in O.Reg 9/06 but is considered to be of heritage value and has been included in this assessment as a result of proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

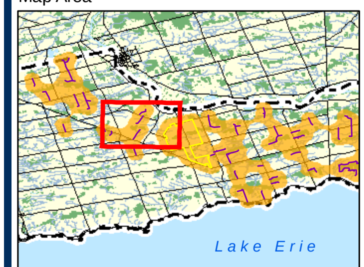
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area4
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Transmission Line
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 4: HERITAGE RESOURCES & PROJECT COMPONENTS

4.5 Area 5

Area 5 is roughly bounded by Haldimand Road 12 to the west, Link Road to the North, Kohler Road to the east and Concession 5 Road to the South (Figure 4-5). Area 5 includes evaluations of the following properties:

- 814 Concession 5 Road
- 700 Haldimand Road 12
- 584 Concession 6 Road
- 702 Concession 6 Road

Table 4-5 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 5 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

The farmstead at 814 Concession 5 Road is not expected to experience any negative impact as a result of the proposed Project. The property is shielded by thick tree cover and is situated on the south side of the road (Figure 4-5). Views of the property will not include Project components.

All three of the significant Concession 6 Road properties are located on the south side of the road and will not experience negative impacts in terms of views as a result of the construction of Turbine 58 (Figure 4-5).

The property at 700 Haldimand Road 12 is located approximately 750 m from Turbine 58 (Figure 4-5). Based on the distance of the property to the turbine and the presence of woodlots between the two, it is unlikely that views of 700 Haldimand Road 12 will be obstructed.

No further mitigation has been recommended.

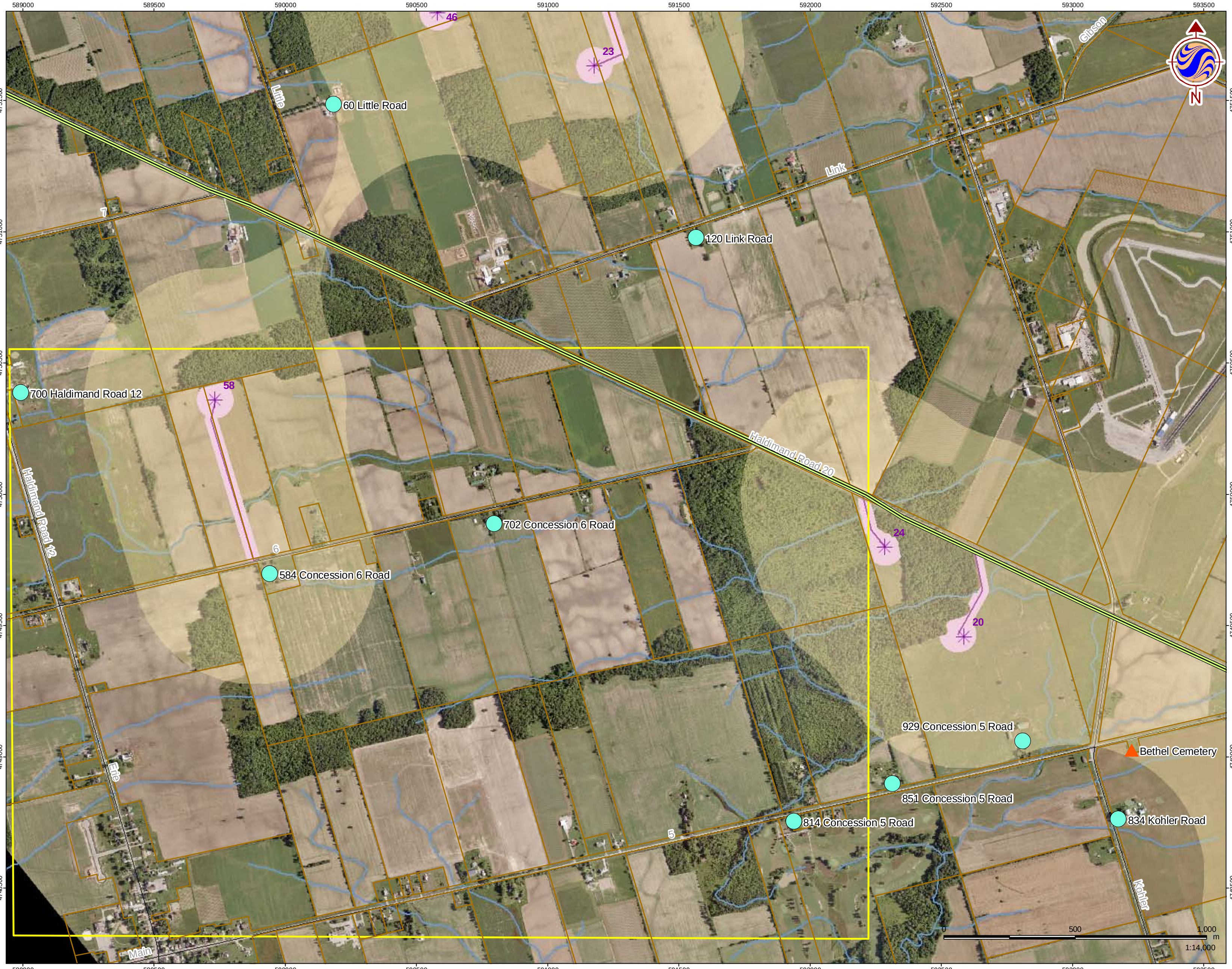
Table 4-5 Summary of Area 5 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 814 Concession 5 Road	One and a half storey Ontario Gothic Revival Cottage style farmhouse. Wide door case with sidelights and decorative woodwork above. Shutters. Metal roof. Coarse rubble foundation. **Criteria met:** Although this property does not meet criteria outlined under O.Reg 9/06 is it considered to be of some heritag value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No Further mitigation recommended.
 700 Haldimand Road 12	One and a half storey cottage-style farmhouse with gable roof. Porch with overhang along front. **Criteria met:** Although this property does not meet criteria outlined under O.Reg 9/06 is it considered to be of some heritag value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No Further mitigation recommended.

Table 4-5 Summary of Area 5 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 584 Concession 6 Road	One and a half storey farmhouse with four-over-four pane windows on top storey and six-over-six panes on first storey. One storey board and batten addition on one side. **Criteria met:** Although this property does not meet criteria outlined under O.Reg 9/06 is it considered to be of some heritag value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No Further mitigation recommended.
 702 Concession 6 Road	One and a half storey vernacular residence. Moulded frieze below eaves, chimney at side of building fronting road. Simple rectangular windows. **Criteria met:** 1(i) Rare example of simple one and a half storey brick construction in the simple cottage style. Windows have been replaced but soffit and chimney suggest a relatively early date of construction (mid to late 19th century).	NE	NE	NE	NE	NE	NE	No Further mitigation recommended.

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

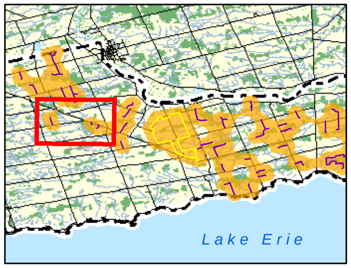


Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area5
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Transmission Line
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 5: HERITAGE RESOURCES & PROJECT COMPONENTS

4.6 Area 6

Area 6 is roughly bounded by the Grand River to the north, Sutor Road to the east, Haldimand Road 20 to the South and Richert Road to the west (Figure 4-6). Area 6 includes evaluations of the following properties:

- 605 Link Road
- 77 Mount Olivet Road
- 39 Meadows Road
- 302 Meadows Road
- 1186 River Road
- 206 Wilson Road
- 2753 Haldimand Road 20
- 2805 Haldimand Road 20
- 2930 Haldimand Road 20
- 2949 Haldimand Road 20

Table 4-6 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 6 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

Area 6 includes solar land components of the Project. The proposed solar panels will be of a much lower height than the wind components are not expected to impact views of any of the surrounding properties in a manner which might obstruct views of any value-defining features (Figure 4-6).

The visual impact of solar panels will be lessened by the use of berms (Appendix B, Solar Panel Simulations). As illustrated in Appendix B, the construction of berms will be extremely effective except in the case of views from elevated topography. It is likely that solar panels will be visible when viewing 39 Meadows Road from an elevated vantage point; however, the panels will not obstruct views of the building. Furthermore, elevated areas from which 39 Meadows Road might be viewed are limited to the small portion of Mount Olivet Road used for visual simulations (Appendix B, Vantage Point 2).

No further mitigation has been recommended.

Table 4-6 Summary of Area 6 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 605 Link Road	One and a half storey Ontario Gothic Revival Cottage farmhouse. Covered porch along the front. **Criteria Met:** Although the property does not meet criteria as outlined in O.Reg 9/06 it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 77 Mount Olivet Road	One and a half storey Ontario Gothic Revival Cottage farmhouse. Identified as a property of potential heritage significance by Heritage Haldimand LACAC. **Criteria Met:** 1(i) Early example of Gothic Revival Cottage style construction in the area.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-6 Summary of Area 6 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 39 Meadows Road	Two and a half storey farmhouse with twin gabled frontispieces at either side of the front entrance. Balcony at the centre of the building front. Chimney to the side of one of the towers. Stuccoed. **Criteria met:** 1(i) Rare example of late 19th to early 20th century vernacular construction with twin protruding towers.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 302 Meadows Road	Two and a half storey residential building. Hip roof, ell-shaped. Road facing pediment with rounded arch window. **Criteria met:** Although this property does not meet any of the criteria as outlined in O.Reg 9/06, it is considered to be of some heritage value as a result and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-6 Summary of Area 6 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 1186 River Road	Two and a half storey farmhouse. Full front porch. Attic dormer. **Criteria met:** Although this property does not meet any of the criteria as outlined in O.Reg 9/06, it is considered to be of some heritage value as a result and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
PHOTO NOT AVAILABLE 206 Wilson Road	Redbrick, one and a half storey Ontario Gothic Revival Cottage. **Criteria met:** Although this property does not meet any of the criteria as outlined in O.Reg 9/06, it is considered to be of some heritage value as a result and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-6 Summary of Area 6 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 2753 Haldimand Road 20	One and a half storey Ontario Gothic Revival Cottage. Closed in front porch. **Criteria met:** Although this property does not meet any of the criteria as outlined in O.Reg 9/06, it is considered to be of some heritage value as a result and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 2805 Haldimand Road 20	One and a half storey Ontario Gothic Revival Cottage style farmhouse. **Criteria met:** Although this property does not meet any of the criteria as outlined in O.Reg 9/06, it is considered to be of some heritage value as a result and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-6 Summary of Area 6 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 2930 Haldimand Road 20	One and a half storey Ontario Gothic Revival Cottage in redbrick. Metal roof. Associated barn. **Criteria met:** Although this property does not meet any of the criteria as outlined in O.Reg 9/06, it is considered to be of some heritage value as a result and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 2949 Haldimand Road 20	Two storey farmhouse. Dichromatic brickwork. Red brick with yellow diamond motif along corners. Italianate decoration includes cornice brackets, elongated windows and protruding bay window. **Criteria met:** 1(i) Representative of the use of dichromatic brickwork and Italiante design in vernacular architecture near the end of the 19th century.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

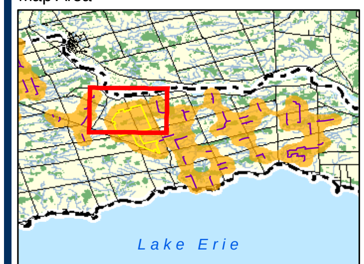
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area6
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Transmission Line
- Electrical Transmission Component
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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Figure No.

4-6

Title

AREA 6: HERITAGE RESOURCES & PROJECT COMPONENTS

4.7 Area 7

Area 7 is roughly bounded by Concession 5 Road and Haldimand Road 20 to the north, mount Olivet Road to the east, Kohler to the west and Concession 4 Road to the south (Figure 4-7). Area 7 includes evaluations of the following properties:

- 1081 Concession 4 Road
- 25 Bains Road

Table 4-7 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 7 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

25 Bains Road is located in the vicinity of the solar lands (Figure 4-7). The Project will not obscure views of the value-defining features of the property.

The farmhouse at 1081 Concession 4 Road is currently separated from the road by relatively thick tree cover (see photo, Table 4-7). Turbine 10, located approximately 500m north of the building is unlikely to obscure views of the property (Figure 4-7).

No further mitigation has been recommended.

Table 4-7 Summary of Area 7 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 1081 Concession 4 Road	One and a half storey redbrick Ontario Gothic Revival Cottage style farmhouse. Rubble foundation. Windows have lug sills and brick voussoirs. Rounded arch window below front gable. Views protected by thick tree cover. **Criteria met:** Although this property does not meet criteria as outlined under O.Reg 9/06, it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 25 Bains Road	One and a half storey Ontario Gothic Revival Cottage style residential building. Small square second storey windows. **Criteria met:** Although this property does not meet criteria as outlined under O.Reg 9/06, it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Notes

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Figure No.

4-7

Title

AREA 7: HERITAGE RESOURCES & PROJECT COMPONENTS

4.8 Area 8

Area 8 is roughly bounded by Haldimand Road 20 to the north, Haldimand Road 50 to the east, Rainham Road to the south, and Sweets Corners to the west (Figure 4-8). Area 8 includes evaluations of the following properties:

- 355 Bains Road
- 447 Bains Road

Table 4-8 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 8 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

Area 8 includes the south east corner of solar land components for the Project. The proposed solar panels will be of a much lower height than the wind components are not expected to impact views of any of the surrounding properties in a manner which might obstruct views of any value-defining features (Figure 4-8).

No further mitigation has been recommended.

Table 4-8 Summary of Area 8 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 355 Bains Road	One and a half storey ell-shapped Ontario Gothic Revival Cottage style residence. Slate roof. Stovepipes on either side of the building. Closed in porch. Identified as a property of potential heritage significance by Heritage Haldimand LACAC. **Criteria met:** 1(i) Relatively early example of local ell-shaped Gothic Revival Cottage style. Slate roof is rare in rural areas in the general vicinity.	NE	NE	NE	NE	NE	NE	No Further Mitigation Recommended
 447 Bains Road	One and a half storey Ontario Gothic Revival Cottage farmhouse. Sheltered by surrounding trees. **Criteria met:** Although this property does not meet criteria as outlined under O.Reg 9/06 it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No Further Mitigation Recommended

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area8
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area

Lake Erie

Notes

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Figure No.

4-8

Title

AREA 8: HERITAGE RESOURCES & PROJECT COMPONENTS

4.9 Area 9

Area 9 is roughly bounded by River Road to the north, Haldimand Road 20 to the south, Sutor Road to the west and Yaremy Road to the east (Figure 4-9). Area 9 includes evaluations of the following properties:

- 3050 Haldimand Road 20
- 3264 Haldimand Road 20
- Steen Cemetery
- 3343 Haldimand Road 20

Table 4-9 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 9 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value.

The Steen Cemetery has been identified as a significant CHL. The CHL is located at the southeast corner of Haldimand Roads 20 and 50. No Project components will obscure views of the Steen Cemetery (Figure 4-9). Views from the Steen Cemetery will include Turbines #42 and #29 when facing northwest. Turbine #42 is located approximately 750 m from the Steen Cemetery, a distance similar to that of Turbine #20 from the Bethel Cemetery and the visual impact is not expected to be of a significant magnitude (Visual Aid 3).

3264 Haldimand Road 20 and 3445 Regional Road 20 are both located on the south side of the road, away from Project components and views of the properties will not be obscured by the Project (Figure 4-9).

Turbine 44 will be visible within the viewshed of 3050 Haldimand Road 20. The turbine is located approximately 700 m south of the property and will be partially shielded from the road by trees (see photo, Table 4-9). Although the turbine may be visible from some angles, it is not considered to be intrusive and the property will remain the primary focus of views.

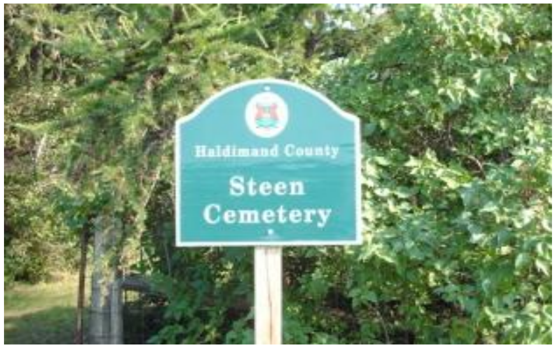
3343 Haldimand Road 20 is currently sheltered from the road by trees (see photo, Table 4-9). Turbine 42 is not expected to obscure views of value-defining features of the building as one must be close to the building to view it and from directly in front of the building the turbine will not be visible (Figure 4-9).

No further mitigation has been recommended.

Table 4-9 Summary of Area 9 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 3050 Haldimand Road 20	Two storey vernacular farmhouse. **Criteria met:** Although this property does not meet criteria as outlined under O.Reg 9/06, it is considered to be of some heritage value and has been included in the current assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 3264 Haldimand Road 20	Two storey redbrick farmhouse. On rise above road. Design details include ornamental woodwork on porch. Surrounded by trees. **Criteria met:** Although this property does not meet criteria as outlined under O.Reg 9/06, it is considered to be of some heritage value and has been included in the current assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-9 Summary of Area 9 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 3332 Haldimand Road 20	Steen Cemetery. Earliest gravemarker noted - 1852. **Criteria met:** 2(ii) Extant grave markers have the potential to yield information regarding the history of the community.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 3343 Haldimand Road 20	One and a half storey stone farmhouse. Metal roof. Sheltered by trees. **Criteria met:** 1(i) Stone construction is uncommon in the rural areas in and around the Project area. This structure is considered to be a rare example of Cottage-style architecture in stone.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

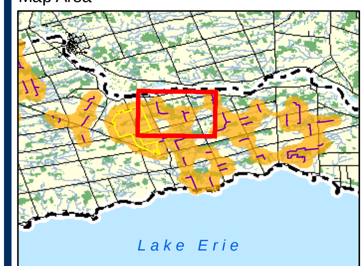
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area9
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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Figure No.

4-9

Title

AREA 9: HERITAGE RESOURCES & PROJECT COMPONENTS

4.10 Area 10

Area 10 is roughly bounded by Lake Erie to the south, Rainham Road to the north, Haldimand Road 50 to the east and Brookers Road to the west (Figure 4-10). Area 10 includes evaluations of the following properties:

- 25 Brookers Road
- 2191 Lakeshore Road
- 2236 Lakeshore Road
- The Lakeshore Road CHL
- 5600 Rainham Road
- 5667 Rainham Road
- 5707 Rainham Road
- 5809 Rainham Road
- 5820 Rainham Road
- 5861 Rainham Road
- 5981 Rainham Road

Table 4-10 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts. All of the identified resources in Area 10 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value. A significant CHL has been identified along Lakeshore Road.

The Lakeshore Road CHL is characterized by a narrow paved road that runs along the shore of Lake Erie. The shoreline itself is composed of a grassy or rocky slope from the road to the water although trees are also common (Photograph 1). A number of stairways and docks are found along the shore as well (Photographs 1 and 2). The road itself is a two-lane asphalt road without curbs (Photograph 1). Much of the road is covered by a mature tree canopy (Photograph 3). Historic homes, agricultural outbuildings and cottages are located along the road which runs along the shore and continues both east and west of the Project area (Photographs 4, 5 and 6). Value-defining characteristics of the Lakeshore Road CHL include: a narrow paved road winding along the shore of Lake Erie; rows of trees along both sides of the road; grassy slope along the south side of the road; the rocky shoreline; and stairways and docks.

Important views to be conserved include: views from the road to the houses and cottages along either side, beneath the canopy; and views from the road to the lake (Photographs 1, 2, 4 and 5). Visual Aid 4 shows the location from which Photograph 6 was taken. The location indicated on the map is a rare vantage point from which the shoreline can be viewed from within the CHL without being blocked by trees. Although Turbines 1, 3, 6, 8, 54 and 69 are located approximately 2000 m from the vantage point, it is unlikely that they will be visible as a result of trees north of the vantage point. Turbines that may be within the viewshed include Turbines 65, 66 and 67, which are located approximately 7000 m east-northeast of the vantage point (Visual Aid 4). At a distance of 7000 m the scale of the turbines is unlikely to have a negative impact of significant magnitude. Other turbines that might potentially be visible from the vantage point include 59, 60, 61, 62, 63 and 64. This group of turbines is located approximately 10,000 m east-northeast of the vantage point (Visual Aid 4).

Views of 25 Brookers Road and the Lakeshore Road properties and CHL are protected from the impact of Project components by existing treed areas (Figure 4-10).

As a result of woodlots and distance, Project components are not likely to be readily visible from 5600 Rainham Road (Figure 4-10). Views of 5820 Rainham Road will not be affected by Project components as it is located on the south side of the road away from Turbine 12, the closest Project component on the north side of Rainham Road and Turbine 21 on the east side of Haldimand Road 15 (Figure 4-10).

Project components will be visible in the viewscapes of 5707, 5763, 5809, 5861 and 5981 Rainham Road (Figure 4-10). Direct views of 5707, 5809, 5820, 5861 and 5981 Rainham Road are shielded by trees, however, and value-defining features of the buildings will not be obscured by the Project (see photos, Table 4-10). Project components will likely be visible within views of 5707 Rainham Road; however, the design value of 5707 Rainham Road lies in the age of the property and modest architectural style of the building (Table 4-10). Vistas and aesthetic characteristics of the building's setting are not considered to be value-defining features of this resource.

No further mitigation has been recommended.

Photograph 1 Lakeshore Road, historic stone barn on left, Lake Erie shoreline on right (note staircase, grassy shoulder and treed/rocky slope to the water)

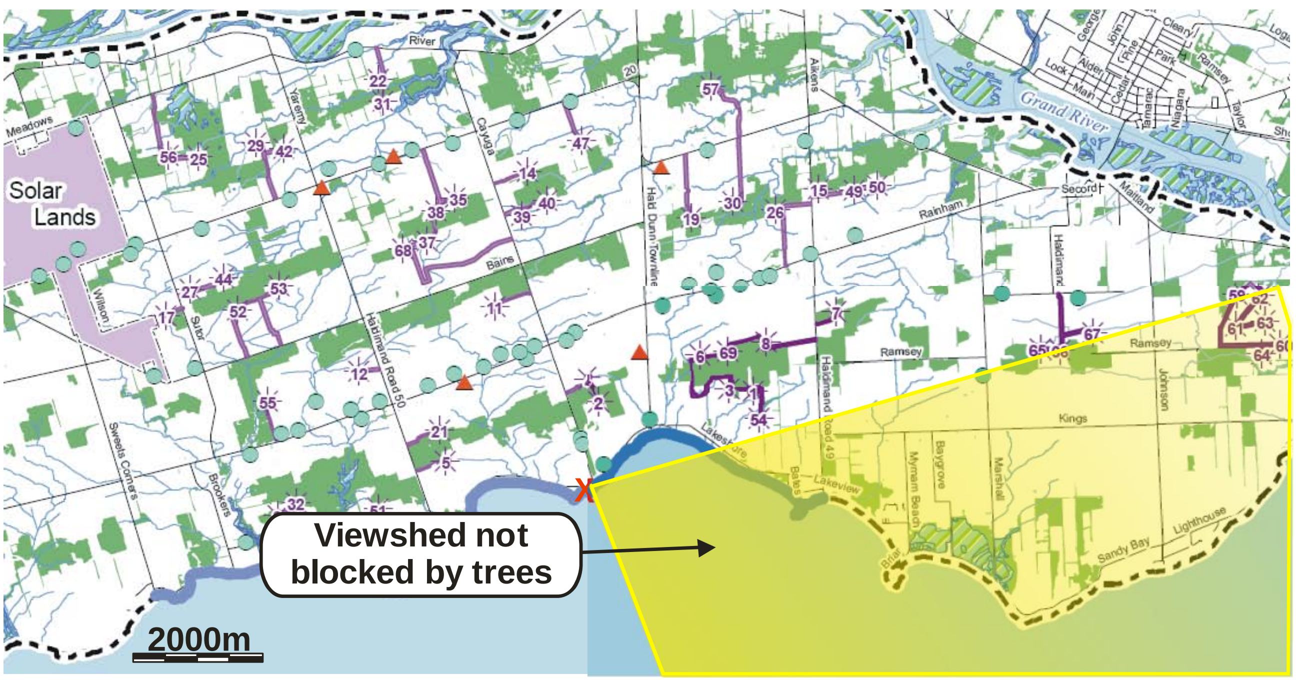
Photograph 2 Example of dock along Lakeshore Road CHL

Photograph 3 View of Lakeshore Road showing tree canopy and rocky shore.

Photograph 4 Example of modern trailers/cottages along Lakeshore CHL

Photograph 5 Cabin at Camp Kienuka, a Girl Guide camp located at 2595 Lakeshore Road (note tree cover).

Photograph 6 View of east end of Lakeshore Road CHL as seen from near Haldimand Road 50, facing southeast.



Visual Aid 4 Location of Photograph 6 (shown as X on map)

Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 26 Brookers Road	Two storey vernacular farmhouse with hipped roof. Backed by a woodlot. **Criteria met:** Although the property doesn not meet criteria as outlined under O.Reg 9/06, it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project Components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 2191 Lakeshore Road	One and half storey red brick Gothic Revival residence. Local three-gable variant. Wider gable at centre, steeper gables on either side with separate men's and women's entrances. Covered porches on either wing. Design features include ornate porch trim and bargeboard along gables. Rounded arch windows below steep gables with wide sills. **Criteria met:** 1(i) Excellent example of Local Gothic Revival variant with dual front entrances on either side of protruding frontispiece.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 2236 Lakeshore Road	Two storey vernacular farmhouse with hip roof. Similar to other examples of local Georgian architecture. First and second storey windows at either side of building. Front entrance is off-centre, suggesting that there were originally two doors. Sheltered by tree cover. **Criteria met:** Although this building no longer meets any of the criteria set out under O.Reg 9/06 it has been included in this assessment as it is of some heritage value and is within close Proximity to Project Components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
  Lakeshore Road CHL	Cultural Heritage Landscape consisting of a narrow, winding road with thick canopy cover. The majority of properties along the road are cottages, trailers and summer homes. Docks and stairs to the water are located along the waterfront. Project components will not be visible from the majority of locations along the road as a result of thick tree cover. **Justification:** The Lakeshore Road CHL is characterised by tree canopies above a narrow roadway. Lake Erie is located along the southern boundary of the CHL. The shoreline is composed of rocky slopes, stairways, docks and anchorages. 19th century homes and farmsteads and 20th century cottages line the road.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 5600 Rainham Road	One and a half storey Ontario Gothic Revival Cottage farmhouse in redbrick. Finials at peaks of gables. **Criteria met:** Although the property doesn not meet criteria as outlined under O.Reg 9/06, it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project Components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 5667 Rainham Road	One and a half storey dichromatic brick building. Red brick with yellow decorative work including diamonds along corners, voussoirs on top of rounded arch window below gable. Date plaque '1885'. Decorated trim along long front porch. Metal roof. Sheltered by thick tree cover. **Criteria met:** 1(i) Representative of late 19th century dichromatic Gothic Revival Cottage style in Haldimand County.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 5707 Rainham Road	One and a half storey cottage-style farmhouse with chimneys on either side. Off-centre front entrance may indicate a hidden former second entrance. The massing and simple form of this building suggest an early age of construction and the possibility of a log sub-structure. **Criteria met:** Although it is not readily apparent from the road, internal chimneys at either side of the building and the simple, rectangular form of the building suggest the possibility of a much older sub-structure, possibly of log construction. This property has been included in this assessment as a result of the proximity of Project components and the potential for significant heritage value under criteria 1(i).	NE	NE	NE	NE	R	NE	No further mitigation recommended.

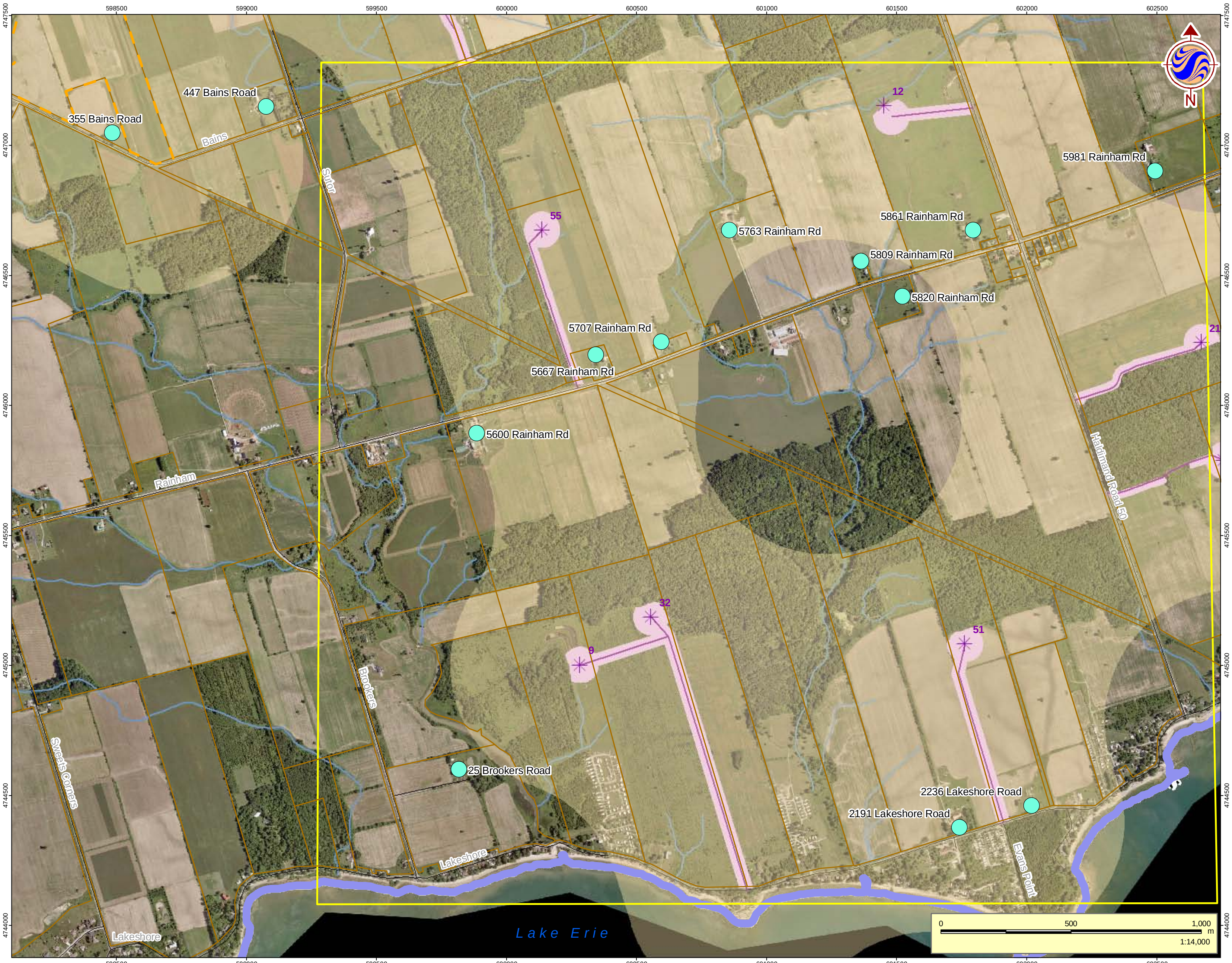
Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 5809 Rainham Road	One and a half storey Ontario Gothic Revival Cottage farmhouse in redbrick. Closed in porch (later addition). Date plaque below gable was obscurred by trees and could not be read on the day of the visual survey. Although this property does not meet criteria outlined in O.Reg 9/06, it is of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 5820 Rainham Road	One and a half storey redbrick Ontario Gothic Revival Cottage farmhouse with full front porch. Date plaque '1880' below gable. Although this property does not meet criteria outlined in O.Reg 9/06, it is of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-10 Summary of Area 10 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 5861 Rainham Road	One and a half storey redbrick Ontario Gothic Revival Cottage farmhouse. Notable design features include bay window at front. **Criteria met:** Although this property does not meet criteria outlined in O.Reg 9/06, it is of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 5981 Rainham Road	One and a half storey redbrick farmhouse. Lancet arch window with gothic motif below front gable. Decorative trim along full-front porch. **Criteria met:** Although this property does not meet criteria outlined in O.Reg 9/06, it is of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

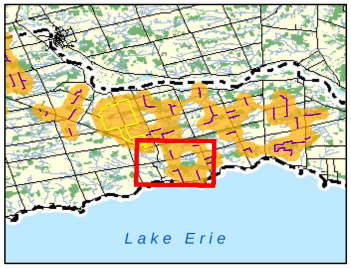


Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area10
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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4-10

Title

AREA 10: HERITAGE RESOURCES & PROJECT COMPONENTS

4.11 Area 11

Area 11 is roughly bounded by River Road to the north, Bains Road to the south, Hald-Dunn Townline to the east. The Area extends approximately 1500 m west of Cayuga Side Road South (Figure 4-11). Area 11 includes evaluations of the following properties:

- 600 River Road
- 3445 Regional Road 20
- South Cayuga Baptist Church
- 3523 Regional Road 20
- 3596 Regional Road 20
- 3724 Regional Road 20
- 3834 Regional Road 20

Table 4-11 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts. All of the identified resources in Area 11 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value. The South Cayuga Baptist Church and cemetery at 3475 Regional Road 20 has been identified as a significant CHL.

600 River Road is located on the north side of the road. Views of the property will not be obscured by Project components (Figure 4-11).

Turbine 31, located approximately 900 m north of Regional Road 20, may be visible within the viewscapes of 3445, 3475 (South Cayuga Baptist Church) and 3523 Regional Road 20; however given the distance of the turbine and the tree cover fronting all of the properties, the heritage resources are all likely to remain dominant in the landscape over Project components (Figure 4-11).

Views from the South Cayuga Baptist Church have also been considered in this assessment. Visual Aid 5 shows the view from the parking lot at South Cayuga Baptist Church facing south. The simulation illustrates that although Turbines 35, 37, 38 and 68 will be visible from certain points within the cemetery the elevated topography south of Regional Road 20 and sparse tree cover significantly lessens the visual impacts of all four turbines. Agricultural outbuildings southeast of South Cayuga Baptist Church block Turbine 35 almost entirely.

Turbines 35 and 38 were identified as being within the zone of influence of 3596 Regional Road 20 (Figure 4-11). However, 3596 Regional Road 20 is not expected to experience negative impact in terms of views as a result of thick tree cover around the building (see photo, Table 4-11). Likewise, 3724 and 3834 Regional Road 20 are surrounded by trees which should soften views of Turbines 14 and 47, respectively (Figure 4-11).

No further mitigation has been recommended.

Visual Aid 5 Views from South Cayuga Baptist Church, facing south

Table 4-11 Summary of Area 11 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 600 River Road	One and a half storey ell-shaped Ontario Gothic Revival Cottage with wrap-around porch. Slender one-over-one, rectangular windows. Metal roof. **Criteria met:** Although this property does not meet any criteria as outlined in O.Reg 9/06, it has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 3445 Regional Road 20	Two storey redbrick farmhouse. Rectangular form, hip roof with attic dormer. **Criteria met:** Although this property does not meet any criteria as outlined in O.Reg 9/06, it has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-11 Summary of Area 11 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 3475 Regional Road 20	Rural Gothic style church with lancet arch doorway and steeple. Associated cemetery. Established in 1853. **Criteria met:** 1(i) Excellent and early example of rural Gothic style church architecture. 2(i) Associated with early growth of the community. (ii) Potential to yield information about the community through extant gravemarkers. 3(ii) Visually linked to the surrounding landscape. (iii) Could be considered a landmark.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-11 Summary of Area 11 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 3523 Regional Road 20	Two storey stone farmhouse. Local variant of Georgian architecture . Hip roof. Front face has two windows on either side of second storey, door at centre to balcony. Twin front doors at centre of building (men's and women's entrance) Porch with decorative trim above doors. **Criteria met:** 1(i) Representative of evolution of Vernacular construction heavily influenced by Pennsylvania Mennonite design conventions.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 3596 Regional Road 20	One and a half storey Ontario Gothic Revival Cottage farmhouse. Wood clad. Lancet arch window below front gable. Stone foundation. Sheltered by trees. **Criteria met:** Although this property does not meet any criteria as outlined in O.Reg 9/06, it has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-11 Summary of Area 11 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 3724 Haldimand Road 20	One and a half storey rebrick Ontario Gothic Revival Cottage farmhouse. Chimney at one side of building. Closed in front porch. **Criteria met:** Although this property does not meet any criteria as outlined in O.Reg 9/06, it has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-11 Summary of Area 11 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 3834 Regional Road 20	One and a half storey redbrick Ontario Gothic Revival Cottage farmhouse. Date plaque below gable, "1888". Lancet arch window below front gable. Notable design features include chimneys at both sides and centre-rear of building, decorative bargeboard along gable and ornate trim along covered porch. Trees surrounding property soften views. **Criteria met:** 1(i) Representative of local Ontario Gothic Revival Cottage style architecture with dichromatic brickwork and decorative bargeboard.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

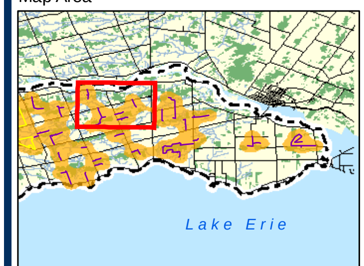
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area11
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 11: HERITAGE RESOURCES & PROJECT COMPONENTS

4.12 Area 12

Area 12 includes properties along Rainham Road and South Cayuga Side Road South. The Area is bounded by Haldimand Road 50 to the west, Cayuga Side Road to the east, Bains Road to the north and Lake Erie to the south (Figure 4-12). Area 12 includes evaluations of the following properties:

- 70 South Cayuga Side Road
- 83 South Cayuga Side Road
- 2807 Lakeshore Road
- 6027 Rainham Road
- South Cayuga Cemetery CHL
- 6075 Rainham Road
- 6113 Rainham Road
- 6147 Rainham Road
- 6156 Rainham Road
- 6185 Rainham Road
- 6260 Rainham Road
- 6267 Rainham Road

Table 4-12 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 12 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value. South Cayuga Cemetery has been identified as a significant CHL.

Views of 2807 Lakeshore Road and 70 and 83 Cayuga Side Road South are protected by thick tree cover (Figure 4-12; photos, Table 4-12).

South Cayuga Cemetery is located more than 750 m from any Project components. The closest turbine is Turbine 21, located to the south west of the cemetery. The cemetery is surrounded by trees on the south and west, which are expected to protect views to and from the CHL (Figure 4-12). Views from the cemetery are expected to be similar to those from Bethel Cemetery (Visual Aid 3), as the distance from turbines to the respective cemeteries are similar.

None of the significant properties along Rainham Road are located within 500 m of any turbine locations (Figure 4-12). Both 6185 and 6260 Rainham Road are located within the 500 m zone of influence surrounding Cayuga Side Road South, which will act as the access road to Turbines 4 and 5 and to Turbine 11; however, this is not expected to have an impact greater than the existing road.

No further mitigation has been recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 70 South Cayuga Road	One and a half storey redbrick Ontario Gothic Revival Cottage farmhouse. Lancet window below gable, porch across front with relatively plain posts. Stovepipes in front and rear corners. **Criteria met:** Although this building does not meet criteria as outlined in O.Reg 9/06 it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 83 South Cayuga Road	One and a half storey redbrick residence. Likely earlier schoolhouse or possible meetinghouse. **Criteria met:** 2(ii) Potential to yield information about rural schoolhouse construction in the area.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 2807 Lakeshore Road	One storey outbuilding. Stone walls with metal gabled roof. Date plaque indicates a date of construction of 1871. Surrounded by tree cover. **Criteria met:** Rare example of stone construction in an agricultural outbuilding.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 6027 Rainham Road	Two and a half storey Second Empire residential building with central protruding vestibule, mansard roof with gabled attic dormers. Second storey windows have arched dripmoulds. Porch extends across the front of the building and includes decorative trim along the roof and posts. Surrounded by tall trees. **Criteria met:** 1(i) Rare rural example of the Second Empire style in the area.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 Concession 7, Lot 16	South Cayuga Cemetery dates to circa 1935. **Criteria met:** 2(ii) Potential to yield information about the history of the community through information on the extant gravemarkers. 3(ii) Historically linked to the history of the community.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 6075 Rainham Road	One and a half storey Ontario Gothic Revival Cottage style farmhouse with rectangular openings. Brick-clad, one and a half storey Gothic revival style cottage with asphalt roof. Noatable features include transom above door, decorative brick work below front gable and the stove pipe. **Criteria met:** Although this building does not meet criteria as outlined in O.Reg 9/06 it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6113 Rainham Road	Two storey red brick Pennsylania Georgian farmhouse with three windows on the second storey and a central door with flanking windows on the first storey. The building has a metal gable rood. A Chimney is located to one side of the house. Other notable features include shutters around all of the windows. **Criteria met:** 1(i) Representative of the evolution of the Pennsylvania Georgian influence in the general vicinity.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 6147 Rainham Road	Commemorative plaque for the former South Cayuga Mennonite Church and cemetery, built in 1850. **Criteria met:** 2(ii) Potential to yield information about the history of the community through information on the extant gravemarkers. 3(ii) Historically linked to the growth of the Mennonite community in Haldimand County.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 6156 Rainham Road	One and a half storey Gothic Revival farmhouse. Local 'Triple-Gable' variant of the Ontario Gothic Revival Cottage style. Central gable with bay window on first storey, two rectangular one-over-one pane windows on second storey and date plaque below gable "1880". Twin front entrances are located on either side of this protruding vestibule. Porches extend along either wing. Lancet windows are located below each of the side gables. **Criteria met:** 1(i) Representative of 1880's evolution of Ontario Gothic Revival Cottage with dual front entrances on either side of a projecting frontispiece.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 6185 Rainham Road	One and a half storey red brick Ontario Gothic Revival Cottage. Decorative bargeboard along gable and porch. **Criteria met:** Although this building does not meet criteria as outlined in O.Reg 9/06 it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 6260 Rainham Road	Two storey fram farmhouse with attic dormers on two sides. Owner indicates that the home once had separate men's and women's entrances. The buildint is stuccoed. Porch has been removed. **Criteria met:** This building does not meet criteria as outlined under O.Reg 9/06. It has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-12 Summary of Area 12 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 6267 Rainham Road	Two storey brick farmhouse. Gabled attic dormers and covered front porch with plain frieze. **Criteria met:** Although this building does not meet criteria as outlined in O.Reg 9/06 it is considered to be of some heritage value and has been included in this assessment as a result of its proximity to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

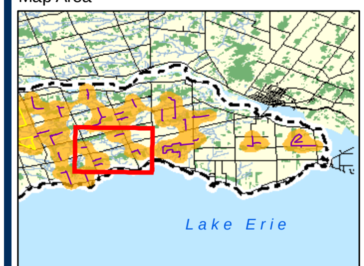
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area12
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 12: HERITAGE RESOURCES & PROJECT COMPONENTS

4.13 Area 13

Area 13 is roughly bounded by Hald-Dunn Townline to the west, Rainham Road to the north, Haldimand Road 49 to the east and Lake Erie to the south (Figure 4-13). Area 13 includes evaluations of the following properties:

- 1 Hald-Dunn Townline
- St. John's Anglican Church CHL
- 6440 Rainham Road
- 6495 Rainham Road
- 6525 Rainham Road
- 6554 Rainham Road
- 6606 Rainham Road

Table 4-13 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

All of the identified resources in Area 13 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value. St. John's Anglican Church and Cemetery has been identified as a significant CHL.

Negative impacts at1 Hald-Dunn Townline are not expected as a result of the proposed Project. Although Turbine 3 will be visible in the background when viewing the property, the turbine is nearly a kilometre northeast of the property and backs onto a large woodlot (Figure 4-13). The impact of the turbine in terms of views of 1 Hald-Dunn Townline is expected to be minimal.

The CHL of St. John's Anglican Church and Cemetery is located within a 1 km radius of Project components, but not within the 500 m zone of influence. The church property is lined with trees which link the CHL to the surrounding area and will act to soften views of Turbine 4, which will be visible to the west of St. John's from some, but not all, angles (Figure 4-13).

Views from the cemetery at St. John's Anglican Church were considered in this assessment. Visual Aid 6 illustrates views from Hald-Dunn Townline facing east. Turbines will be visible from a number of vantage points within the cemetery. The closest turbine, #8, is approximately 750m east of St. John's and at that distance it has little more visual impact than a nearby tree; however, the relatively large number of turbines in the vicinity of St. John's requires an assessment of the cumulative effects of Project components. A landscape approach was, therefore, taken to the assessment of the magnitude of visual impacts whereby the turbines were assessed for their compatibility with their context (Scotrenewables, 2005). The form and function of the turbines along with their linear arrangement are considered to be compatible with the rural landscape surrounding St. John's in much the same way as rows of hydro poles which have become an inconspicuous component of the rural landscape.

Five properties on Rainham Road have been included in Area 13. Although Turbines 6, 69 and 8 will be visible south of Rainham Road, the turbines are located in front of a wood lot. Given the distance of the properties to the Project components, the impacts expected to be minimal (Figure 4-13).

No further mitigation has been recommended.

Visual Aid 6 View from Hald-Dunn Townline at St. John's Anglican Church, facing east

Table 4-13 Summary of Area 13 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
  1 Hald-Dunn Townline Rd	One and a half storey Ontario Gothic Revival Cottage farmhouse. Wood clad in the board and batten method. Keystone trim above upper storey window below gable, cut stone chimney on façade. Covered porch along front. Agricultural complex associated including board and batten style wood-clad barn with rubble foundations and metal saltbox roof. Treed property. **Criteria met:** 1(i) Representative of Ontario Gothic Revival Cottage style with keystone trim above upper storey window.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 143 Hald-Dunn Townline	St. John's Anglican Church and cemetery. Established in 1844. **Criteria met:** 1(i) Representative of rural church architecture. 2(i) Associated with the Anglican community and early settlement of the area. (ii) Potential to yeild information about the community.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-13 Summary of Area 13 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6440 Rainham Road	One and a half storey Ontario Gothic Revival Cottage farmhouse with rubble foundation. Brick chimney at west side of house. Covered porch along front elevation with twin front entrances. Arched window below gable. **Criteria met:** Although this building is a good example of the Ontario Gothic Revival Cottage style, it is not considered to meet criterion 1(i) under O.Reg 9/06. Based on its location in relation to Project components it has, however, been included in this assessment as it has some heritage value.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-13 Summary of Area 13 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6495 Rainham Road	One and a half storey ell-shaped Ontario Gothic Revival Cottage style farmhouse with garage addition. Brick chimney on one side. **Criteria met:** Although this building is a good example of the Ontario Gothic Revival Cottage style, it is not considered to meet criterion 1(i) under O.Reg 9/06. Based on its location in relation to Project components it has, however, been included in this assessment as it has some heritage value.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-13 Summary of Area 13 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6525 Rainham Road	One and a half storey brick Ontario Gothic Revival Cottage. Window box on front elevation. **Criteria met:** Although this building is a good example of the Ontario Gothic Revival Cottage style, it is not considered to meet criterion 1(i) under O.Reg 9/06. Based on its location in relation to Project components it has, however, been included in this assessment as it has some heritage value.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-13 Summary of Area 13 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6554 Rainham Road	One and a half storey simple cottage-style farmhouse with porch along the front and a brick chimny to one side. Twin front entrances. Date painted below eaves at centre "1866". **Criteria met:** 1(i) Example of an early, simple cottage style farmhouse with dual front entrance. Rare in vicinity.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-13 Summary of Area 13 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6606 Rainham Road	Two storey redbrick residence built on a simple rectangular plan with metal pyramidal roof. Open verandah along front and south side. Openings are slightly rounded at the tops and windows have lug sills. Although this residence does not meet criteria set out in O.Reg 9/06 it is still considered to be of some heritage value and has been included in this assessment as a result of its location in relation to Project components.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

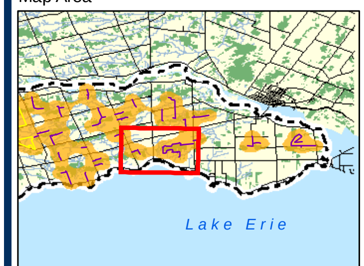
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area13
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 13: HERITAGE RESOURCES & PROJECT COMPONENTS

4.14 Area 14

Area 14 is roughly bounded by Hald-Dunn Townline to the west, Haldimand Road 20 to the north, Aikens Road to the east and Rainham Road to the south (Figure 4-14). Area 14 includes evaluations of the following properties:

- 436 Hald-Dunn Townline
- 6553 Rainham Road
- 6666 Rainham Road
- 6672 Rainham Road
- 6753 Rainham Road
- 6901 Rainham Road
- 701 Aikens Road
- Dunn United Church CHL
- 4300 Regional Road 20

Table 4-14 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts. All of the identified resources in Area 14 meet the criterion of Design Value and are considered to be of significance in terms of their heritage value. Dunn United Church and cemetery at 4200 Regional Road 20 has been identified as a significant CHL.

Direct lines of sight between 701 Aikens Road and all Project components are blocked by wood lots (Figure 4-14).

When viewing Dunn United Church from Regional Road 20, it may be possible to see Turbines 19 and 30 in the background to the south and south east respectively. Both turbines are located directly alongside wooded lots and are more than 1 km away from Dunn United (Figure 4-14). As a result of the distance, the scale should be such that the turbines have little impact on the visual integrity of the Dunn United CHL.

Views from Dunn United Church and the associated cemetery were also assessed. Visual Aid 7 simulates the view of Turbine 19 from the parking lot of Dunn United. Turbines 26 and 30 are also illustrated in the simulation, but are barely visible through the tree cover. The simulation illustrates that while Turbine 19 will be visible from the cemetery, it does not dominate the landscape and will be viewed at a scale that will have minimal impact on the enjoyment of cemetery views.

4300 Regional Road 20 is also within 1 km of Turbines 19 and 30 (Figure 4-14). From certain angles, it will be possible to view both turbines in the distance; however, the farmhouse has a narrow set back from the road and views of the front elevation are unlikely to include any Project components (Figure 4-14). Views of the value-defining features of the property are expected to remain entirely unobscured.

Turbines 26, 15, 49 and 50 may all be partially visible in the background of viewscapes along Rainham Road (Figure 4-14). 6901 and 6753 Rainham Road are the most likely to be affected by the locations of these four turbines. Both properties are located more than 500m from the turbines, which back onto woodlots (Figure 4-14). Value-defining features of the properties along Rainham Road will not be obstructed by turbine and access road locations (Figure 4-14).

No further mitigation has been recommended.

Visual Aid 7 View from Dunn United Church, facing south.

Table 4-14 Summary of Area 14 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6553 Rainham Road	Two storey Pennsylvania Georgian residence. Small rectangular attic windows suggest a date of construction in the early to mid 19th century. The building is constructed on a simple rectangular plan with a gable roof and covered porch across the front elevation. There is a single stove pipe in the front, two storey wing and a brick chimney at the rear of the one storey (possibly summer kitchen) wing. **Criteria met:** 1(i) Early example of Georgian architecture heavily influenced by Pennsylvanian conventions of the style.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-14 Summary of Area 14 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 6666 Rainham Road	One and a half story Ontario Gothic Revival Cottage farmhouse constructed in English bond. Metal roof. Regency Gothic lancet arch window below the gable with coat of arms and date plaque, "1862". Cut stone foundation. Closed in porch with moulded soffit. **Criteria met:** 1(i) Unique example (in the general area) of English bond brick work for Ontario Gothic Revival Cottage construction. The early date of construction adds to its physical value.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 6672 Rainham Road	One and a half storey Ontario Gothic Revival Cottage farmhouse with six-pane, rectangular window below the gable. Brick chimney at the west side of the house. **Criteria met:** This example does not meet the criteria as set out in O.Reg 9/06, but is considered to have value as a heritage resource. Given its location in relation to Project components, it has been included in this assessment.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-14 Summary of Area 14 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
 6753 Rainham Road	One and a half storey red brick building on simple, rectangular plan with gabled roof and full front porch. Three long windows along each of the side elevations suggest that this building is a former schoolhouse as does its location at the crossroads of Rainham and Aikens Roads. Date plaque below gable, "1883". Brick chimeny at rear of building. **Criteria met:** 1(i) Given the paucity of 19th century rural public buildings in and around the study area this structure is considered to meet the criterion of being a unique example of the simple rural schoolhouse style. 2(ii) The location and architecture of the building yield information about the likely composition of other rural schoolhouses in the region.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-14 Summary of Area 14 Properties

Property	Description	Potential Negative Impact: Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	Recommended Mitigation
  6901 Rainham Road	One and a half storey Ontario Gothic Revival Cottage farmhouse. Dichromatic brickwork - redbrick with yellow brick triangular patter along eaves and protruding voussoirs above windows. Windows in upper floor are one-over-one pane with lug sills. **Criteria met:** Excellent example of dichromatic brick work on a Ontario Gothic Revival Cottage style residence.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-14 Summary of Area 14 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 701 Aikens Road	One and a half storey Ontario Gothic Revival Cottage farmhouse in ell-shape. Cut stone foundations. Decorative woodworking above first storey windows and front door. **Criteria met:** 1(i) Representative of local Ontario Gothic Revival Cottage style, ell-shaped variant with central and corner front entrances.	NE	NE	NE	NE	NE	NE	No further mitigation recommended
 Dunn United Church	Vernacular georgian church and associated cemetery. Date plaque "1863". **Criteria met:** 1(i) Early example of vernacular church architecture for the area in which Mennonite Meetinghouse style has been reflected/adopted for a United Church (may originally have been a Meetinghouse). 2 (i) Associated with the United Church and the local community. (ii) Grave markers yeild information about the history of the community. 3(ii) Visually linked to its surrounding landscape. (iii) Could be considered a landmark.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

Table 4-14 Summary of Area 14 Properties

Property	Description	Potential Negative Impact						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
  4300 County Road 20	One and a half storey Ontario Gothic Revival Cottage farmhouse in red brick. Lancet arch window below front gable and date plaque "JM 1853". Full front covered porch. Twin entrances at centre of front elevation with six-over-six pane windows to the sides. Exterior brick chimney on the east side of the house. Slate roof. English bond brickwork. **Criteria met:** 1(i) Early example of Ontario Gothic Revival Cottage architecture with local dual front entrance variation.	NE	NE	NE	NE	NE	NE	No further mitigation recommended

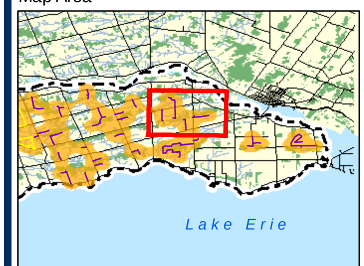
Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area14
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

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AREA 14: HERITAGE RESOURCES & PROJECT COMPONENTS

4.15 Area 15

Area 15 is roughly bounded by Marshall Road to the west, Kings Road to the south, Johnson Road to the east and Rainham Road to the north (Figure 4-15). Area 15 includes evaluations of the following properties:

- 377 Haldimand Trail
- 49 Haldimand Tract Road
- 397 Marshall Road

Table 4-15 provides a summary of evaluation of the properties and assessment of potential Project-related negative impacts.

There are no direct lines of sight from 397 Marshall Road and Project components. All views from the property are protected by trees and views of the property face away from nearby Project infrastructure (Figure 4-15). Likewise, 377 Haldimand Trail is viewed towards the north, away from Project components (Figure 4-15).

Turbines 65, 66 and 67 will be visible in the background of the viewscape of 49 Haldimand Tract Road from some angles (Figure 4-15). Although there are several large trees on the property, it will still be possible to see all three turbines when viewing the property in general. Older, value-defining features of the property, however – such as architectural features of the farmhouse and adjacent silo – remain framed by tall trees (see photo, Table 4-15) and will not be obscured by Project components.

No further mitigation has been recommended.

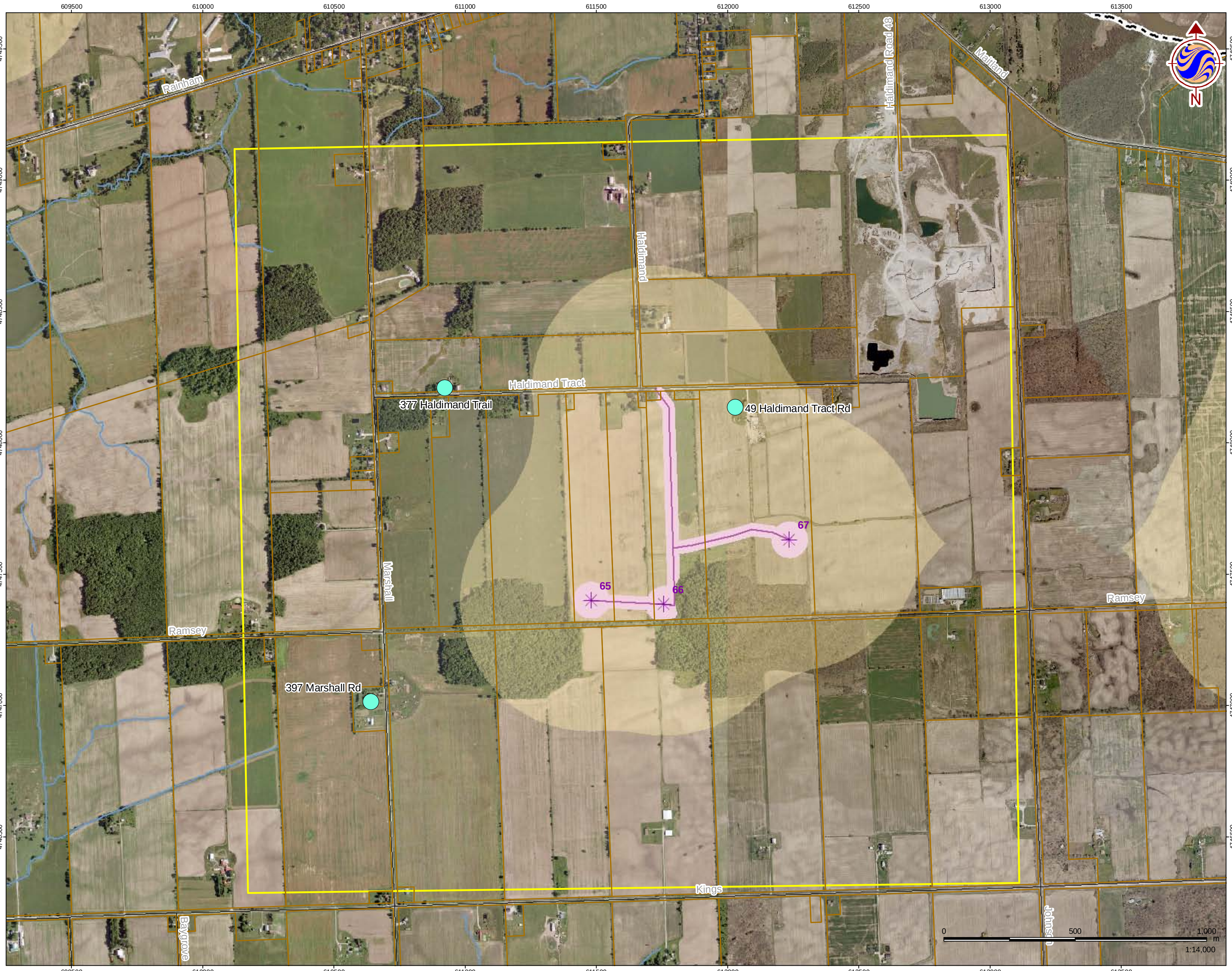
Table 4-15 Summary of Area 15 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 377 Haldimand Trail	One and a half storey Ontario Gothic Revival Cottage. Decorative trim along full-front porch. Protruding frontispiece. Metal roof. **Criteria met:** 1(i) Good example of local Ontario Gothic Revival Cottage style including full front porch with decorative trim. Protruding frontispiece is evocative of the local Mennonite architectural convention which is characterised by dual front entrance doors on either side of a protruding frontispiece or vestibule.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Table 4-15 Summary of Area 15 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 49 Haldimand Tract Road	Two and a half storey redbrick farmhouse. Wrap around porch with decorative trim. Rectangular one-over-one pane window with shutters. Attic dormers on two sides. Chimney near centre of building. **Criteria met:** 1(i) Representative of turn of the century vernacular construction in the area particularly the porch which spans the front of the building and wraps around to the side. 3(ii) Visually link to the agricultural history and setting of its location.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.
 397 Marshall Road	Two storey Georgian home in red brick. Six-over-six pane windows. Symmetrical form, gable roof. Chimney on either side. Hand well with rubble foundation, bank barn with steel roof and log foundation. **Criteria met:** 1(i) Excellent example of red brick Georgian construction.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

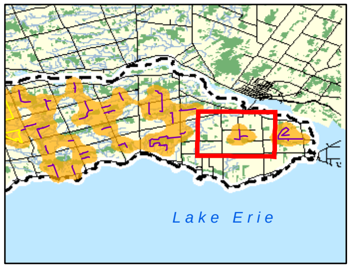


Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area15
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

1. Coordinate System: UTM Zone 17 NAD 83.
2. Data Sources: Ontario Ministry of Natural Resources © Queens Printer Ontario, 2009; © GREP, 2010; © Samsung, 2010.
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Figure No.

4-15

Title

AREA 15: HERITAGE RESOURCES & PROJECT COMPONENTS

4.16 Area 16

Area 16 is roughly bounded by Marshall Road to the west, Kings Road to the south, Johnson Road to the east and Rainham Road to the north (Figure 4-16). Area 16 includes the evaluation of the following property:

- 665 Port Maitland Road

Table 4-16 provides a summary of the evaluation of the property and assessment of potential Project-related negative impacts.

665 Port Maitland Road meets criteria 1(i) as a stuccoed example of the Ontario Gothic Revival Cottage style and 3(ii) as it is visually linked to the Grand River.

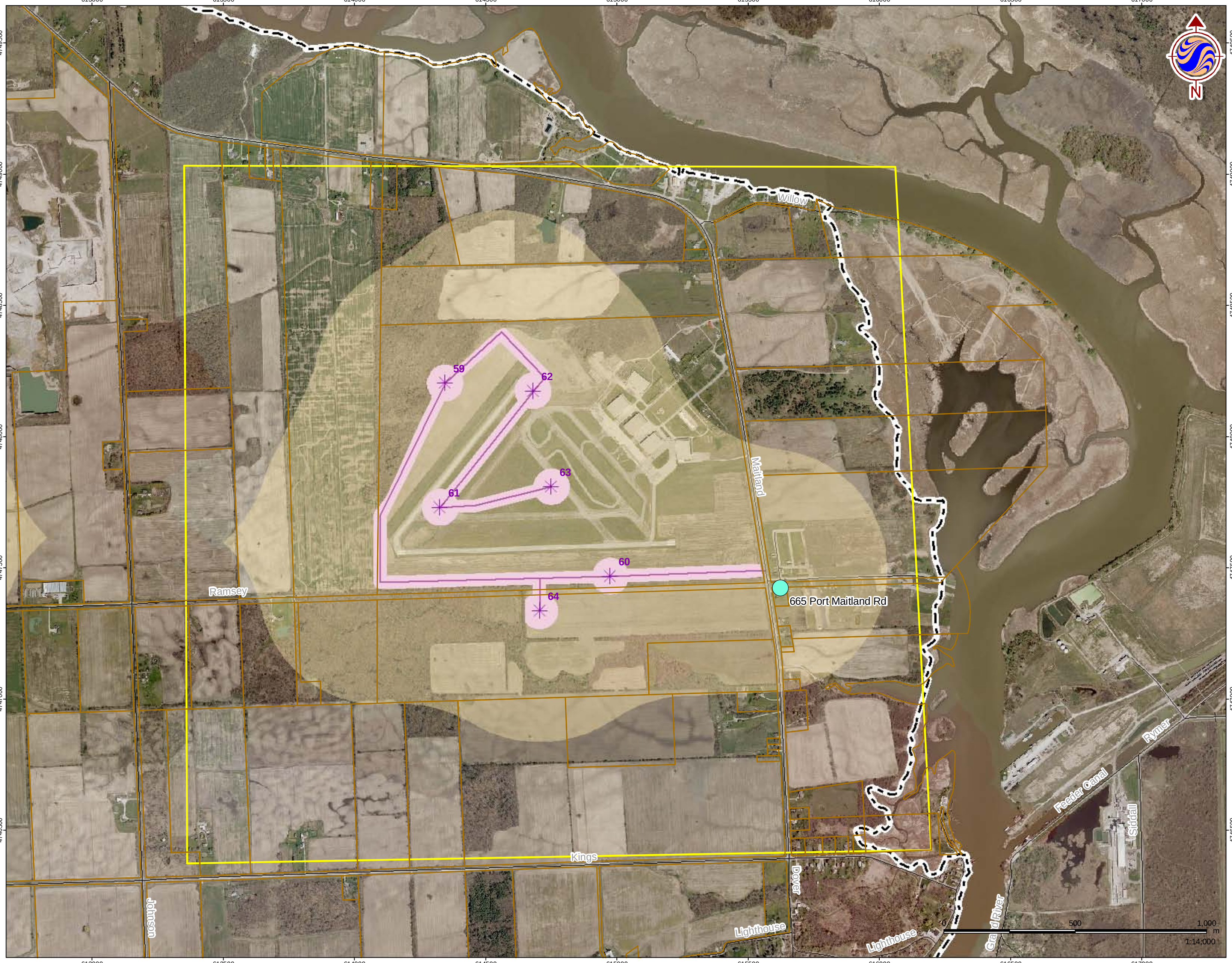
The farmhouse at 665 Port Maitland Road is located on the east side of the road, opposite Project components (Figure 4-16). In terms of contextual relationships, the property's relationship with the Grand River is considered to be of heritage value rather than the airport on the west side of Port Maitland Road (Figure 4-16). No part of the Project will obscure value-defining features of the resource.

No further mitigation has been recommended.

Table 4-16 Summary of Area 16 Properties

Property	Description	Potential Negative Impact (R/I)						Recommended Mitigation
		Destruction	Alteration	Shadows	Isolation	Obstruction of Views	Change in Land Use	
 665 Port Maitland Road	One and a half storey Ontario Gothic Revival Cottage. Stuccoed. Overlooks the Grand River. **Criteria met:** 1(i) stuccoed example of Ontario Gothic Revival Cottage style. Stucco is a relatively uncommon cladding in the general vicinity. 3(ii) Visually linked to the Grand River which it overlooks.	NE	NE	NE	NE	NE	NE	No further mitigation recommended.

Potential Negative Impact R - Reversible, I - Irreversible, NE - Not Expected

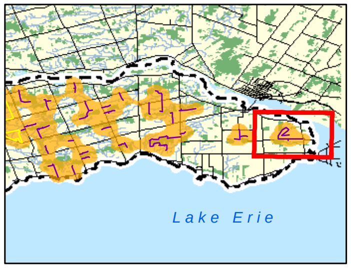


Legend

Heritage Property Type

- Significant Heritage Resource
- Cemetery/Place of Worship
- Wind Turbine Location
- Area16
- 500m Assessment Area
- Property Parcel
- Planned Constructable Areas
- Cultural Heritage Landscape
- Road
- Access Road
- Watercourse
- Solar Lands
- Project Location

Map Area



Notes

1. Coordinate System: UTM Zone 17 NAD 83.
2. Data Sources: Ontario Ministry of Natural Resources © Queens Printer Ontario, 2009; © GREP, 2010; © Samsung, 2010.
3. Image Sources: © Google Earth Pro, 2010 (© First Base Solutions, 2010; © TeleAtlas, 2010 -Imagery Date: April 7, 2006)

Stantec

March 2011
Project No. 161010624

Client/Project

SAMSUNG C & T
GRAND RENEWABLE ENERGY PARK

Figure No.

4-16

Title

AREA 16: HERITAGE RESOURCES & PROJECT COMPONENTS

5 STUDY RESULTS AND RECOMMENDATIONS

A total of 85 properties and seven cultural landscapes within the Project's zone of influence were evaluated as being significant in terms of their heritage value. All of the significant properties and cultural landscapes were assessed for potential Project-related negative impacts.

No significant resources will be destroyed by the proposed Project.

No significant resources will be altered by the proposed Project.

No significant resources will have shadows cast on them by the proposed Project.

No significant resources will be isolated by the proposed Project.

No views of significant resources and/or their value-defining features will be obscured in an invasive manner.

Based on the current Site Plan, no further mitigation is recommended.

6 CLOSURE

This report has been prepared for the sole benefit of SPK, and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and SPK. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this Project.

Yours truly,

Stantec Consulting Ltd.

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7.3 Personal Communications

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APPENDIX A

Turbine and Solar Panel Specifications

SWT-2.3-101 Technical Description

General
The following is a brief technical description of the main components of the SWT-2.3-101 wind turbine.

Rotor
The SWT-2.3-101 rotor is a three-bladed cantilevered construction, mounted upwind of the tower. The power output is controlled by pitch regulation. The rotor speed is variable and is designed to maximize the aerodynamic efficiency.

Blades
The B49 blades are made of fibreglass-reinforced epoxy in Siemens' proprietary IntegralBlade® manufacturing process. In this process the blades are cast in one piece to eliminate weaker areas at glue joints. The blades are mounted on pitch bearings and can be feathered 80 degrees for shutdown purposes. Each blade has its own independent pitching mechanism capable of feathering the blade under any operating condition. The blade pitch arrangement allows for optimization of the power output throughout the operating range, and the blades are feathered during standstill to minimize wind loads.

Rotor Hub
The rotor hub is cast in nodular cast iron and is fitted to the main shaft with a flange connection. The hub is sufficiently large to provide a comfortable working environment for two service technicians during maintenance of blade roots and pitch bearings from inside the structure.

Main Shaft and Bearing
The main shaft is forged in alloy steel and is hollow to facilitate the transfer of power and signals to the blade pitching system. The main shaft is supported by a self-aligning double spherical roller bearing which is shrunk onto the main shaft.

Gearbox
The gearbox is a custom-built three-stage planetary-helical design. The first high torque stage is of a helical planetary design. The two high-speed stages are of a normal helical design and provide the offset of the high speed shaft that is needed to allow passage of power and control signals to the pitch systems.

The gearbox is shaft-mounted and the main shaft torque is transferred to the gearbox by a shrink disk connection. The gearbox is supported on the nacelle with flexible rubber bushings.

The gearbox is fitted with an oil conditioning system. All bearings are lubricated with oil fed directly from a large in-line filter and is cleaned by an off-line filter unit.

The gearbox is fitted with sensors for monitoring temperature, oil pressure and vibration levels.

Generator
The generator is a fully enclosed asynchronous generator. The generator has a squirrel-cage rotor without slip-rings. The generator rotor construction and stator winding are designed for high efficiency at partial loads.

The generator is protected with thermal switches and analogue temperature measurement sensors. The generator is fitted with a separate thermostat-controlled ventilation arrangement. Air is re-circulated internally in the generator and heat is transferred through an air-to-air heat exchanger that separates the internal environment in the generator from the ambient air.

Mechanical Brake
The mechanical brake is fitted to the gearbox high-speed shaft and has two hydraulic calipers.

Yaw System
The yaw bearing is an externally geared ring with a friction bearing. Eight electric planetary gear motors drive the yawing.

Tower
The SWT-2.3-101 wind turbine is mounted on a tapered tubular steel tower. The tower has internal ascent and direct access to the yaw system and nacelle. It is equipped with platforms and internal electric lighting.

Controller
The wind turbine controller is a microprocessor-based industrial controller. The controller is complete with switchgear and protection devices. It is self-diagnosing and has a keyboard and display for easy readout of status and for adjustment of settings.

The NetConverter® power conversion system allows generator operation at variable speed, frequency and voltage while supplying power at constant frequency and voltage to the MV transformer. The power conversion system is a modular arrangement for easy maintenance and is water cooled.

SCADA
The SWT-2.3-101wind turbine is equipped with the Siemens WebWPS SCADA system. This system offers remote control and a variety of status views and useful reports from a standard internet web browser. The status views present information including electrical and mechanical data, operation and fault status, meteorological data and grid station data.

Turbine Condition Monitoring
In addition to the Siemens WebWPS SCADA system, the SWT-2.3-101 wind turbine is equipped with the unique Siemens TCM condition monitoring system. This system monitors the vibration level of the main components and compares the actual vibration spectra with a set of established reference spectra. Result review, detailed analysis and reprogramming can all be carried out using a standard web browser.

Operation Systems
The wind turbine operates automatically. It is self-starting when the wind speed reaches an average about 3 to 5 m/s. The output increases approximately linearly with the wind speed until the wind speed reaches 11 to 12 m/s. At this point, the power is regulated at rated power.

If the average wind speed exceeds the maximum operational limit of 25 m/s, the wind turbine is shut down by feathering of the blades. When the average wind speed drops back below the restart average wind speed, the systems reset automatically.

Siemens Wind Power A/S reserves the right to change the above specifications without previous notice.

SWT-2.3-101 Technical Specifications

Rotor

Type	3-bladed, horizontal axis
Position	Upwind
Diameter	101 m
Swept area	8000 m²
Synchronous rotor speed	6-16 rpm
Power regulation	Pitch regulation with variable speed
Rotor tilt	6 degrees

Blade

Type	Self-supporting
Blade length	49 m
Root chord	3.4 m
Aerodynamic profile	NACA63.xxx, FFAxxx, SWPxxx
Material	GRE
Surface gloss	Semi-mat, < 30 / ISO2813
Surface colour	Light grey, RAL 7035

Aerodynamic Brake

Type	Full span pitching
Activation	Active, hydraulic

Load-Supporting Parts

Hub	Nodular cast iron
Main bearing	Spherical roller bearing
Main shaft	Alloy steel
Nacelle bed plate	Steel

Transmission System

Coupling hub - shaft	Flange
Coupling shaft – gearbox	Shrink disc
Gearbox type	3-stage planetary/helical
Gearbox ratio	1 : 91
Gearbox lubrication	Splash / forced lubrication
Oil volume	Approx. 400 l
Gearbox oil filtering	Inline and offline
Gearbox cooling	Separate oil cooler
Gearbox designation	PEAB 4456 (Winergy) or EH851 (Hansen)
Coupling gear - generator	Double flexible coupling

Mechanical Brake

Type	Hydraulic disc brake
Position	High speed shaft
Number of callipers	2

Canopy

Type	Totally enclosed
Material	Steel
Surface gloss	Semi gloss, 30-50, ISO2813
Colour	Light grey, RAL 7035

Generator

Type	Asynchronous
Nominal power	2300 kW
Protection	IP 54
Cooling	Integrated heat exchanger
Insulation class	F

Grid Terminals (LV)

Nominal power	2300 kW
Voltage	690 V
Frequency	50 Hz or 60 Hz

Yaw System

Type	Active
Yaw bearing	Externally geared slewring
Yaw drive	Eight electric gear motors with frequency converter
Yaw brake	Passive friction brake

Controller

Type	Microprocessor
SCADA system	WPS via modem
Controller designation	KK WTC 3.0
Controller manufacturer	KK Electronic A/S

Tower

Type	Cylindrical and/or tapered tubular
Hub height	80 m or site specific
Corrosion protection	Painted
Surface gloss	Semi gloss, 30-50, ISO2813
Colour	Light grey, RAL 7035

Operational Data

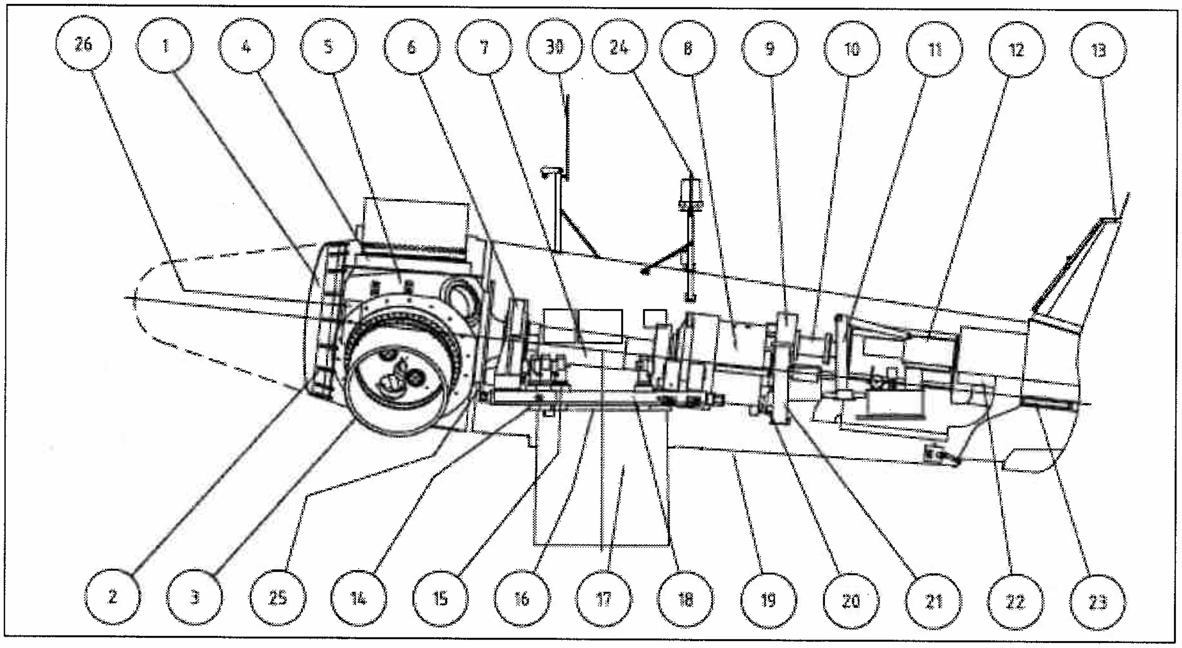
Cut-in wind speed.	4 m/s
Nominal power at	12-13 m/s
Cut-out wind speed	25 m/s
Maximum 3 s gust	59.5 m/s (IEC version)

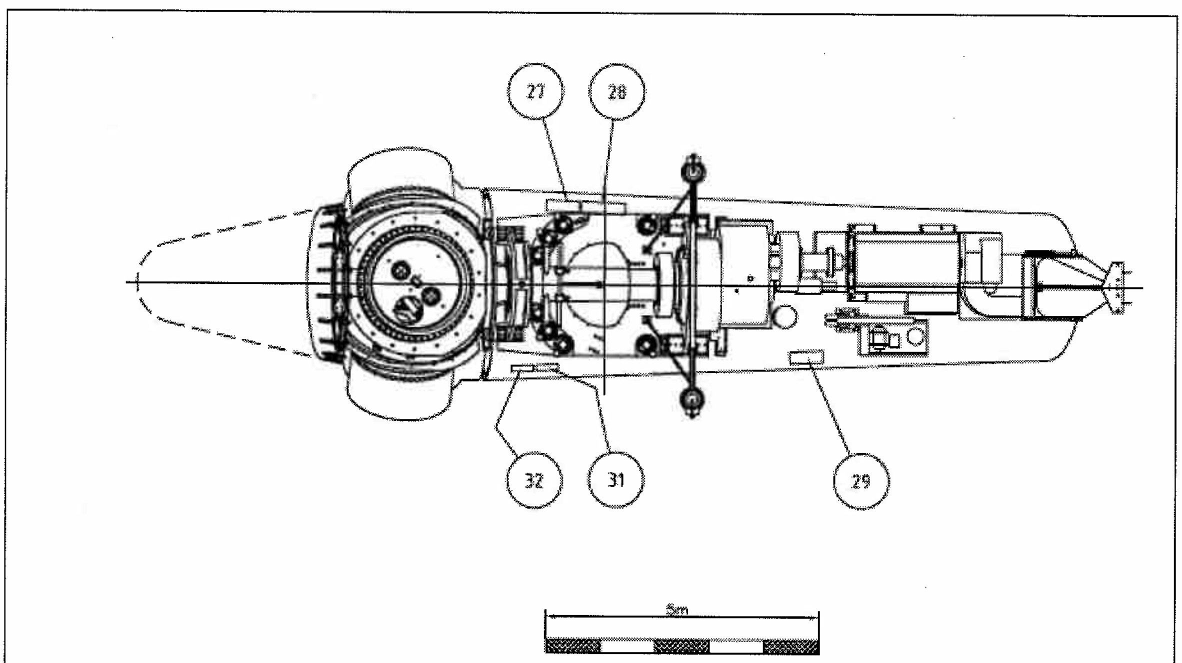
Weights (approximately)

Rotor	62,000 kg
Nacelle	82,000 kg
Tower for 80 m hub height	162,000 kg

Siemens Wind Power A/S reserves the right to change the above specifications without previous notice.

SWT-2.3-101
Nacelle Arrangement





	Dansk	English	Deutsch
1.	Spinner, option: lang spinner	Spinner, optional long spinner	Spinner, Option: langer Spinner
2.	Spinner beslag	Spinner bracket	Spinnerhalterung
3.	Vinge	Blade	Rotorblatt
4.	Pitchleje	Pitch bearing	Blattlager
5.	Rotornav	Rotor hub	Nabe
6.	Hovedleje	Main bearing	Hauptlager
7.	Hovedaksel	Main shaft	Hauptwelle
8.	Hovedgear	Gearbox	Getriebe
9.	Bremseskive	Brake disc	Scheibenbremse
10.	Kobling	Coupling	Kupplung
11.	Service kran	Service crane	Servicekran
12.	Generator	Generator	Generator
13.	Meteorologiske sensorer	Meteorological sensors	Windfahne und Anemometer
14.	Krøjeleje	Yaw bearing	Windnachführungslager
15.	Krøjegear	Yaw gear	Windnachführung
16.	Krøjering	Yaw ring	Zahnkranz
17.	Tårn	Tower	Turm
18.	Maskinramme	Nacelle bedplate	Maschinenrahmen
19.	Maskinskærm	Canopy	Gondel
20.	Oliefilter	Oil filter	Öl Filter
21.	Oliefilter	Oil filter	Öl Filter
22.	Generatorblæser	Generator fan	Generator Kühlung
23.	Oliekøler	Oil cooler	Ölkühler
24.	Flyadvarselslys, option	Aviation warning lights, option	Standardhindernisbefeuerung, Option
25.	Rotorlås	Rotor lock	Rotor Arretierung
26.	Navboks	Hub controller box	Nabencontroller
27.	Topkontrolboks	Top control box	Top Controller
28.	Relæboks	Relay box	Relaiskasten
29.	Forsyningsboks	Supply box	Stromversorgung
30.	Sigtbarhedsmåler, option	Visibility meter, option	Sichtweitenmessgerät, Option
31.	Kontrolboks flyadvarselslys	Control box, aviation warning light	Controller, Hindernisbefeuerung
32.	Kontrolboks sigtbarhedsmåler	Control box, visibility meter	Controller, Sichtweitenmessgerät

Siemens Wind Power reserves the right to change the above specifications without notice.

SWT-2.3-101
Design Climatic Conditions

The design climatic conditions are the boundary conditions at which the turbine can be applied without supplementary design review. Applications of the wind turbine in more severe conditions may be possible, depending upon the overall circumstances. A project site-specific review requires the completion by the Client of the "Project Climatic Conditions" form.

Subject	ID	Issue	Unit	Value
1. Wind, operation	1.1	Wind definitions	-	IEC 61400-1 Ed3
	1.2	IEC class	-	IIB
	1.3	Air density, ρ	kg/m^3	1.225
	1.4	Mean wind speed, v_{ave}	m/s	8.5
	1.5	Weibull scale parameter, A	m/s	9.6
	1.6	Weibull shape parameter, k	-	2
	1.7	Wind shear exponent, α	-	0.20
	1.8	Mean turbulence intensity at 15 m/s, I_{ref}	-	0.14
	1.9	Standard deviation of wind direction	Deg	7.5
	1.10	Maximum flow inclination,	Deg	8
	1.11	Minimum turbine spacing, in rows	D	3
	1.12	Minimum turbine spacing, between rows	D	5
2. Wind, extreme	2.1	Wind definitions		IEC 61400-1 Ed3
	2.2	Air density, ρ	kg/m^3	1.225
	2.3	Maximum hub height 10 min.wind, V_{ref}	m/s	42.5
	2.4	Maximum 3 s gust in hub height, V_{e50}	m/s	59.5
	2.5	Maximum hub height power law index, α	-	0.11
3. Temperature	3.1	Temperature definitions	-	IEC 61400-1 Ed3
	3.2	Minimum temperature at 2 m, stand-still, $T_{min,s}$	Deg.C	-20
	3.3	Minimum temperature at 2 m, operation, $T_{min,o}$	Deg.C	-10
	3.4	Maximum temperature at 2 m, operation, $T_{max,o}$	Deg.C	35
	3.5	Maximum temperature at 2 m, stand-still, $T_{max,s}$	Deg.C	45
4. Corrosion	4.1	Corrosion definitions	-	ISO 12944
	4.2	External corrosion class	-	C3
	4.3	Internal corrosion class	-	C2
	4.4	Internal climate control	-	Yes
5. Lightning	5.1	Lightning definitions	-	IEC 62305-1
	5.2	Lightning protection level (LPL) acc to IEC 62305	-	LPL 1
6. Dust	6.1	Dust definitions	-	-
	6.2	Dust conditions, ground level	-	Normal DK
	6.3	Dust conditions, hub height	-	Normal DK
7. Hail	7.1	Maximum hail diameter	mm	20
	7.2	Maximum hail falling speed	m/s	20
8. Ice	8.1	Ice definitions	-	IEC 61400-1 Ed3
	8.2	Ice conditions		Normal DK
9. Trees	9.1	If the height of trees within 500m of any turbine location height exceeds 1/3 of H – D/2 where H is the hub height and D is the rotor diameter then restrictions may apply. Please contact Siemens for information on the maximum allowable tree height with respect to the site and the turbine type.		

SWT-2.3-101, 60 Hz Application Electrical Specifications Americas

Generator

Type	Asynchronous
Nominal power	2300kW
Speed range	600 - 1800 rpm
Nominal voltage	750V @ 1550 rpm
Nominal current	2070 A
Frequency	16,5 - 60 Hz
Protection	IP 54

Generator Protection

Insulation class	F
Winding temperatures	2 x 3 PT100 sensors
Bearing temperatures	1 PT100 at each bearing
Bearing insulation	Insulation at both bearings
Grounding brush	On drive end

Generator Cooling

Cooling system	Air to air
Ventilation	Shaft mounted fan
Ventilation type	Centrifugal
External flow direction	From D-end to N-end
Control parameter	Winding temperature

Frequency Converter

Operation	4Q Full scale converter
Switching	PWM
Switching frequency	1250/2500 Hz
Cooling	Liquid

Power Factor at 690 V and Nominal Grid Conditions

Power factor correction	Frequency converter control
Power factor range	0.9 cap. to 0.9 ind. at nominal balanced voltage

Main circuit protection

Short circuit protection	Circuit breaker
Surge protection per phase Imax (8/20 μs)	30 kA

Peak Power Levels

10 min average	100 % of nominal
30 sec average	104 % of nominal

Grid Requirements

Nominal grid frequency	60 Hz
Minimum voltage	90 % of nominal
Maximum voltage	110 % of nominal
Minimum frequency	95 % of nominal
Maximum frequency	103 % of nominal
Maximum current asym.	5%
Max 1 s. short circuit level at controller's grid Terminals (690 V)	40 kA
Min. 1 s short circuit level at controller's grid terminals (690 V)	5 x Pn
Grid error numbers	Max. 300 per year

Power Consumption from Grid (approximately)

At stand-by	5.0 kW, 9kVAR
At stand-by, yawing	9.6 kW, 9kVAR
Before cut-out (60 s)	18 kW
After cut-out (600 s)	18 kW

Earthing Requirements

Earth system	Acc. To IEC62305-3 ED 1.0:2006
Depth electrodes	Min. 2 pcs 50 mm2 Cu, 120° separation
Inner ring electrode	50 mm2 Cu 1 m from tower
Outer ring electrode	50 mm2 Cu min. 10 m from tower
Foundation reinforcement	Must be connected to earth electrodes
Foundation terminals	Min. 6 stainless pads in two levels corresponding to ring electrodes, separated at 120°
HV connection	HV cable shield shall be connected to earthing system
Cable tray conductor	Min. 50 mm2 bare Cu parallel to HV cable

Transformer Requirements

Transformer impedance requirement	6 %
Secondary voltage	690 V
Vector group	Dyn 11 (star point earthed)

Siemens Wind Power A/S reserves the right to change the specifications without previous notice
All data are subject to tolerances in accordance with IEC.

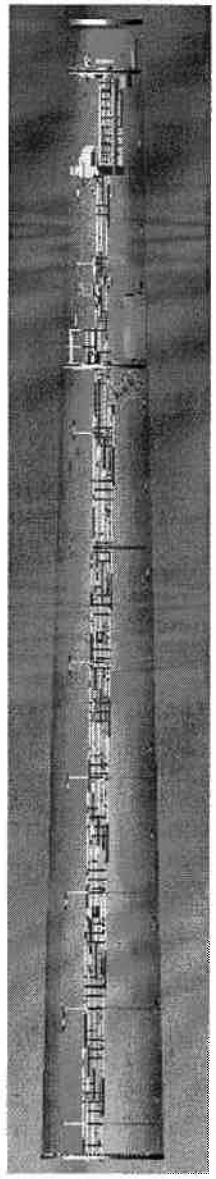
SWT-2.3-101 60 Hz
General 80 m Tower Arrangement

Description
The SWT-2.3-101 wind turbine is mounted on a tapered, tubular, steel tower. The 80 m hub height tower is divided into three sections. The tower has internal ascent and direct access to the yaw system and nacelle. It is equipped with platforms and interior electric lighting.

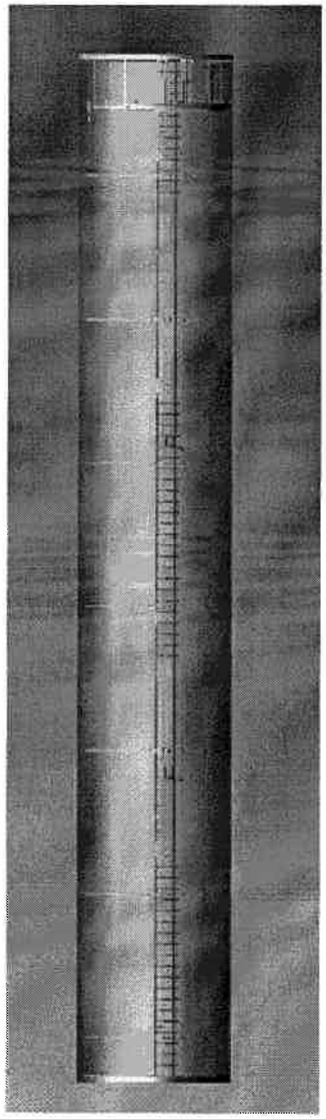
Platforms are located just below the intermediate flange locations for suitable access to connections of cables, for tightening the bolts, and servicing the yaw system.

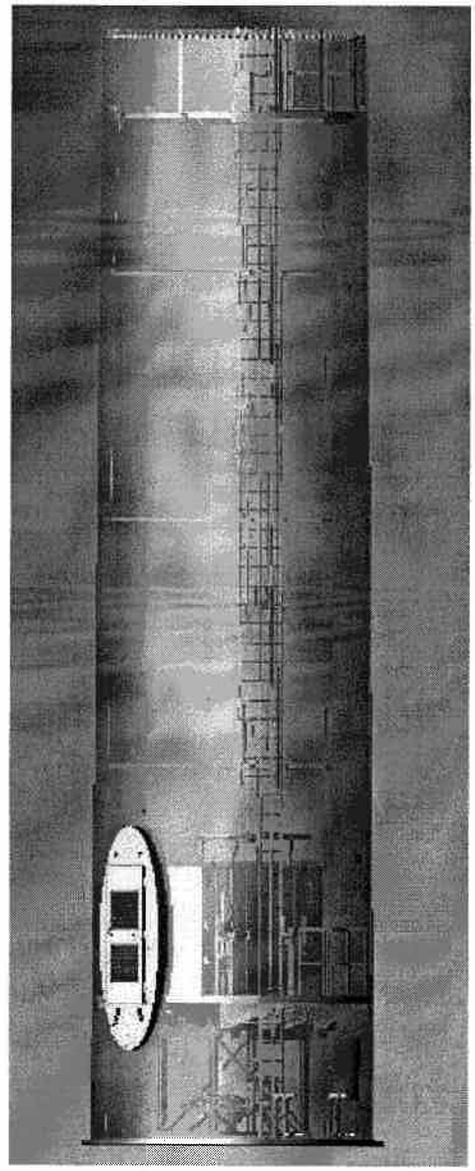
Siemens can substitute a functionally equivalent, rail able, tower equipment design for the standard tower equipment design set forth in this exhibit.

Sketch of Tower Arrangement
The sketch shows the tower top, intermediate and bottoms section.



Top Section





Intermediate Section **Bottom Section**

SWT-2.3-101, 80 m Hub Height Codes and Standards for Design, Manufacturing and Testing-Americas

The SWT-2.3-101 Wind Turbine Generator isdesigned, manufactured, and tested to Siemens' technical drawings, procedures, and processes that are generally in compliance with the applicable sections of the codes and standards listed herein.

General

- IEC WT 01:2001, IEC System for Conformity Testing and Certification of Wind Turbines. Rules and procedures
- EN 61400-1:2006, Wind turbine generator systems, Part 1: Design requirements, (IEC 61400-1:2005 Ed. 3, modified).
- IEC 61400-1:2005 Ed. 3, Wind turbine generator systems, Part 1: Design requirements.
- IEC 61400-11:1998, Wind turbine generator systems. Part 11: Acoustic noise measurement techniques.
- IEC 61400-12:1998, Wind turbine generator systems. Part 12: Wind turbines power performance testing
- DS/IEC/TS 61400-13:2002, Wind turbine generator systems, Part 13: Measurement of mechanical loads.
- DS/IEC/TS 61400-23:2002, Wind turbine generator systems, Part 23: Full-scale structural testing of rotor blades.
- DS 412:1998 Code of Practice for the structural use of steel (Weldings)
- VDI 2230 Blatt 1, February 2003, Systematic calculation of high duty bolted joints - Joints with one cylindrical bolt (Bolt calculations
- DS-EN ISO 898-1:1999, Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs
- EN 10029:1993, Hot rolled steel plates 3 mm thick or above - Tolerances on dimensions, shape and mass
- DS/EN 10083:2000, Quenched and tempered steels - Part 1: Technical delivery conditions for special steels (Main shaft)
- DS/EN 1563 +A1:2004, Founding - Spheroidal graphite cast irons
- DS/EN 10025-1:2004, Hot rolled products of structural steels - Part 1: General technical delivery conditions
- DS/EN 10025-2:2004, Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels
- DS/EN 10025-3:2004, Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels
- 97/23/EF Pressure Equipment Directive

Gearbox

- ISO 81400-4:2005 Wind turbines – Part 4: Design and specification of gearboxes
- ISO 6336 1996, Calculation of load capacity of spur and helical gears-- Part 1 Basic principles, introduction and general influence factors (+ correction 1998 and correction 2 1999)
- ISO 6336 1996, Calculation of load capacity of spur and helical gears-- Part 2 Calculation of surface duability (+ correction 1998 and correction 2 1999)
- ISO 6336 1996, Calculation of load capacity of spur and helical gears-- Part 3 Calculation of tooth bending strength (+correction 2 1999)
- ISO 6336 2003, Calculation of load capacity of spur and helical gears-- Part 5 Strength and quality of Materials.

- ISO 281:1990, Rolling bearings – Dynamic load ratings and rating life.
- ISO 527-04:1997 Plastics - Determination of tensile properties - Part 4: test conditions for isotropic and orthotropic fiber-reinforced plastic composite: (wind turbine blades with fiberglass-reinforced epoxy)
- ASTM D3479-96, Standard Test Method for Tension-Tension Fatigue of Polymer Matrix Composite Materials (fiberglass- reinforced epoxy)*

Electrical
- EN61000-6-2:2005 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN61000-6-4: 2002 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
- EN60204-1 1998 (+correc 1999) Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- EN60034-14: 2004 Rotating electrical machines - Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity (Generator)
- IEC/TR 61400-24: 2002, Wind turbine generator systems - Part 24: Lightning protection
- IEC 61400-21:2001, Wind turbine generator systems - Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines
- 2006/95/EF Low Voltage Directive
- 2004/108/EF EMC Directive
- IEEE 519-Recommended Practice and Requirements for Harmonic Control on Electric Power Systems
- FERC Order 661-A, Interconnection for Wind Energy
- The Manitoba Electrical Code – 10th Edition
- Code Red-CFE Interconnect Requirements for wind turbines to the Mexican Electrical System

Quality
- ISO 9001:2000, Quality management systems – Requirements.

Personal Safety
- DS/EN 50308:2005, Wind turbines – Protective measures – Requirements for design, operation and maintenance
- US Occupational, Health, and Safety (OSHA) Guidelines
- 98/37/EC Machinery Directive
- FAA AC70-7460-1K, Obstruction Marking and Lighting

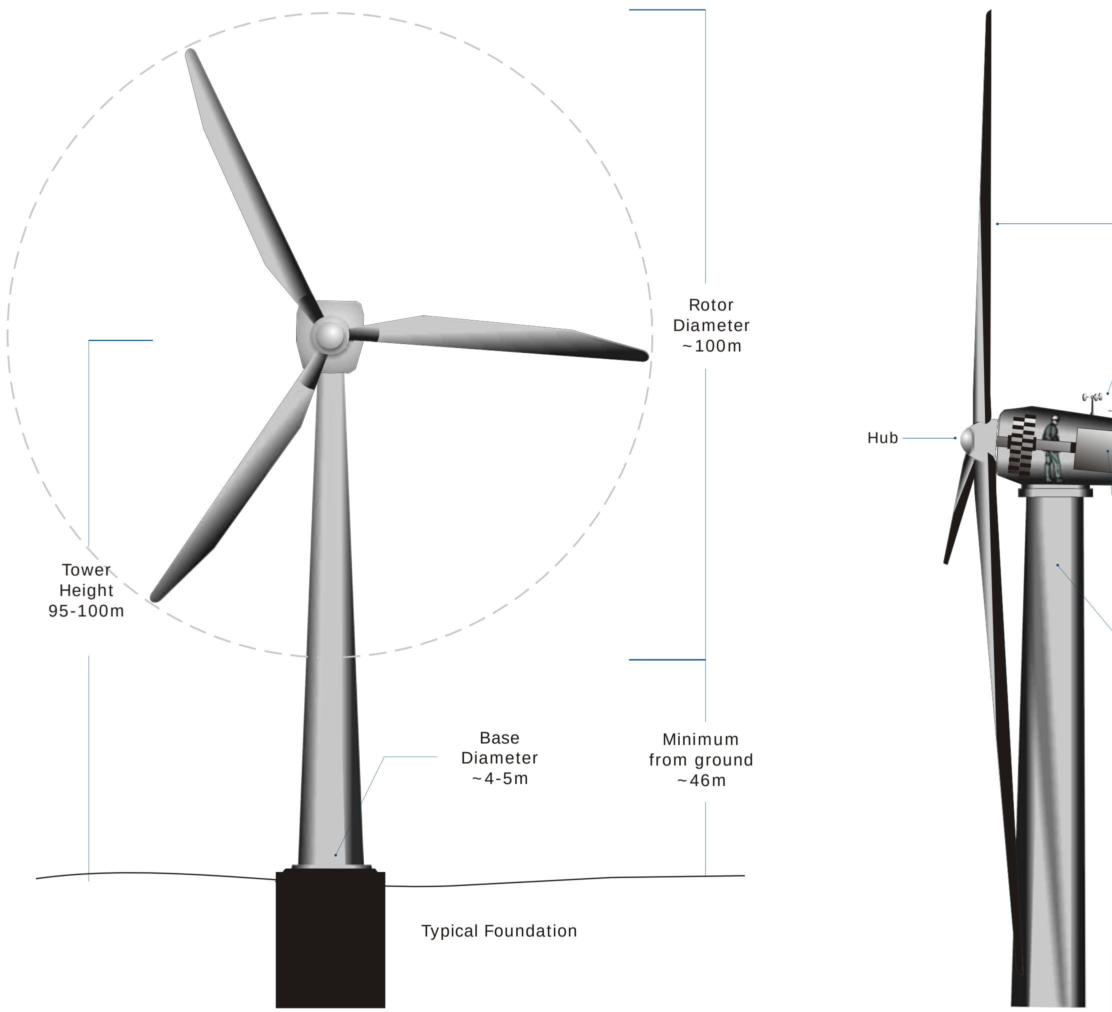
Corrosion
- DS/EN ISO 12944-1:2000, Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 1: General introduction (class C3 to C4).

SAMSUNG RENEWABLE ENERGY INC.

GRAND RENEWABLE ENERGY PARK

Typical Wind Turbine Schematic

- Turbine technology (i.e., make and model) will be selected during the Renewable Energy Approval process.
- Schematic at right shows generalized turbine components and dimensions.
- Final design selected for Project may vary from schematic.



Note: not to scale

Stantec

GRAND RENEWABLE ENERGY PARK

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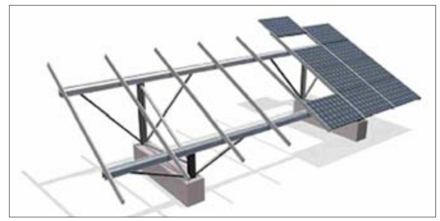
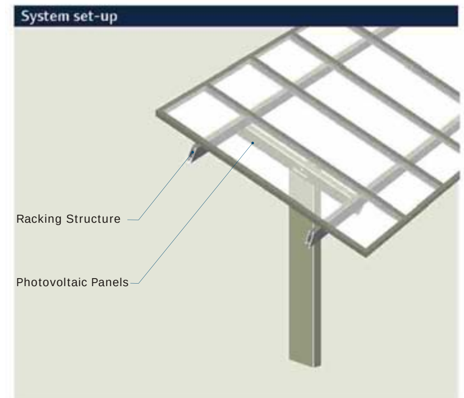
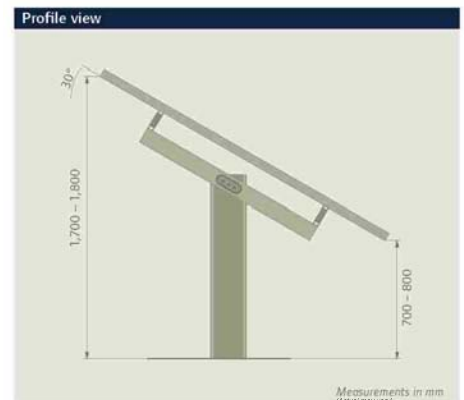
Typical Solar Panel Schematic and Photos

- Solar panels will utilize crystalline solar cells mounted on ground-based racking systems.
- Solar panel and mounting (i.e., single post, double post, or ballast mount) technology will be selected during the Renewable Energy Approval process.
- Schematics and photos at right show a variety of panel types and mounting designs.
    - Final design selected for Project may vary from those shown.





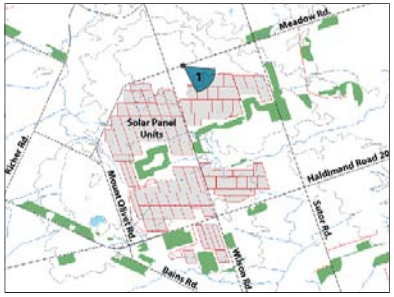


APPENDIX B

Solar Panel Visual Simulations

EXISTING CONDITION

VANTAGE POINT KEY MAP



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VISUAL SIMULATION

FIGURE NO. March 15, 2011

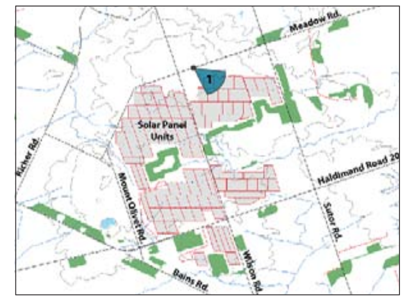
1.0

Vantage Point 1

FILE: 161010625_cayuga_vissim.indd		PROJECT NUMBER: 161010625
REV NO. 0	SHEET NO. 1 OF 9	DRAWN BY: DL

INSTALLATION OF SOLAR PANELS

VANTAGE POINT KEY MAP



SAMSUNG RENEWABLE ENERGY INC.
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VISUAL SIMULATION

FIGURE NO. March 15, 2011

2.0

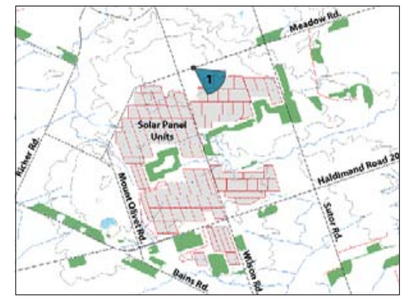
Vantage Point 1

FILE: 161010625_cayuga_vissim.indd	PROJECT NUMBER: 161010625

REV NO. 0	SHEET NO. 2 OF 9	DRAWN BY: DL

BERM CONSTRUCTED TO MITIGATE VIEW

VANTAGE POINT KEY MAP



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VISUAL SIMULATION

FIGURE NO. March 15, 2011

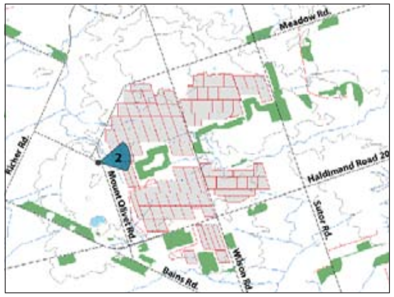
3.0

Vantage Point 1

FILE: 161010625_cayuga_vissim.indd		PROJECT NUMBER: 161010625
REV NO. 0	SHEET NO. 3 OF 9	DRAWN BY: DL

EXISTING CONDITION

VANTAGE POINT KEY MAP



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VISUAL SIMULATION

FIGURE NO. March 15, 2011

4.0

Vantage Point 2

FILE: 161010625_cayuga_vissim.indd

PROJECT NUMBER: 161010625

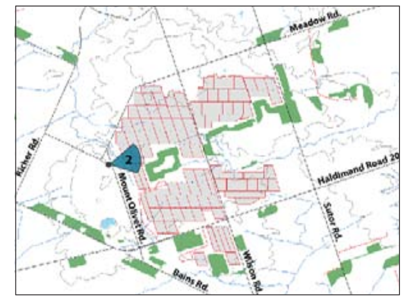
REV NO. 0

SHEET NO. 4 OF 9

DRAWN BY: DL

INSTALLATION OF SOLAR PANELS

VANTAGE POINT KEY MAP



SAMSUNG RENEWABLE ENERGY INC.
Grand Renewable Energy Park

VISUAL SIMULATION

FIGURE NO. March 15, 2011

5.0

Vantage Point 2

FILE:
161010625_cayuga_vissim.indd

PROJECT NUMBER:
161010625

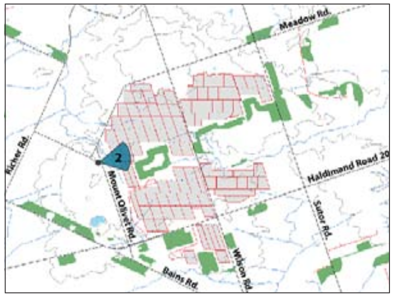
REV NO.
0

SHEET NO.
5 OF 9

DRAWN BY:
DL

BERM CONSTRUCTED TO MITIGATE VIEW

VANTAGE POINT KEY MAP



SAMSUNG RENEWABLE ENERGY INC.
Grand Renewable Energy Park

VISUAL SIMULATION

FIGURE NO. March 15, 2011

6.0

Vantage Point 2

FILE: 161010625_cayuga_vissim.indd

PROJECT NUMBER: 161010625

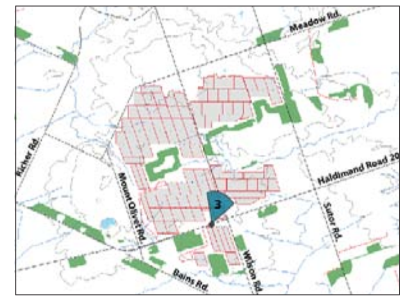
REV NO. 0

SHEET NO. 6 OF 9

DRAWN BY: DL

EXISTING CONDITION

VANTAGE POINT KEY MAP



SAMSUNG RENEWABLE ENERGY INC.
Grand Renewable Energy Park

VISUAL SIMULATION

FIGURE NO. March 15, 2011

7.0

Vantage Point 3

FILE: 161010625_cayuga_vissim.indd

PROJECT NUMBER: 161010625

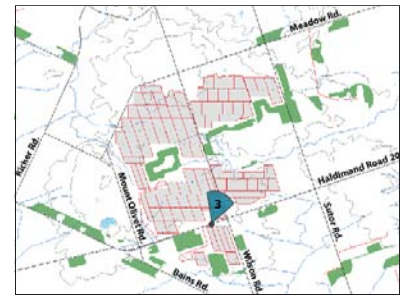
REV NO. 0

SHEET NO. 7 OF 9

DRAWN BY: DL

INSTALLATION OF SOLAR PANELS

VANTAGE POINT KEY MAP



SAMSUNG RENEWABLE ENERGY INC.
Grand Renewable Energy Park

VISUAL SIMULATION

FIGURE NO. March 15, 2011

8.0

Vantage Point 3

FILE:
161010625_cayuga_vissim.indd

PROJECT NUMBER:
161010625

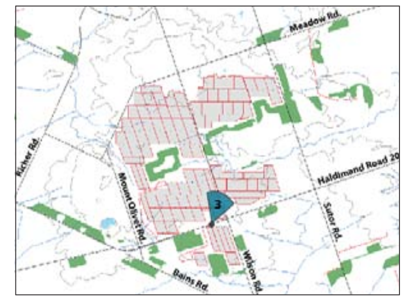
REV NO.
0

SHEET NO.
8 OF 9

DRAWN BY:
DL

BERM CONSTRUCTED TO MITIGATE VIEW

VANTAGE POINT KEY MAP



SAMSUNG RENEWABLE ENERGY INC.
Grand Renewable Energy Park

VISUAL SIMULATION

FIGURE NO. March 15, 2011

9.0

Vantage Point 3

FILE:
161010625_cayuga_vissim.indd

PROJECT NUMBER:
161010625

REV NO.
0

SHEET NO.
9 OF 9

DRAWN BY:
DL