

**Wind Farm Collie Hill**  
*Project Description Report*  
*DRAFT*

Prepared by: *M.K. Ince and Associates Ltd.*

July 20, 2010

# Table of Contents

<b>1</b>	<b>PROJECT OVERVIEW</b> .....	<b>1</b>
1.1	PROPONENT BACKGROUND AND CONTACT INFORMATION.....	1
1.2	REQUIRED AUTHORIZATIONS.....	2
<b>2</b>	<b>PROJECT DESCRIPTION</b> .....	<b>3</b>
2.1	PROJECT STRUCTURES & TURBINE TECHNOLOGIES .....	3
2.2	PROJECT ACTIVITIES .....	4
2.2.1	<i>Planning</i> .....	4
2.2.2	<i>Construction</i> .....	4
2.2.3	<i>Operation and Maintenance</i> .....	7
2.2.4	<i>Decommissioning</i> .....	8
2.3	PROJECT LOCATION .....	9
<b>3</b>	<b>PROJECT ENVIRONMENTAL FEATURES</b> .....	<b>11</b>
3.1	BIRDS AND BIRD HABITAT .....	11
3.2	WATER BODIES & CHARACTERISTICS.....	12
3.3	USE OF WATERWAYS .....	12
<b>4</b>	<b>DESCRIPTION OF ENVIRONMENTAL EFFECTS</b> .....	<b>13</b>
4.1	HERITAGE AND ARCHAEOLOGICAL RESOURCES .....	13
4.2	NATURAL HERITAGE FEATURES .....	13
4.3	WATER BODIES.....	13
4.4	AIR, ODOUR, DUST .....	13
4.5	NOISE.....	13
4.6	VISUAL IMPACTS.....	14
4.7	LAND USE AND RESOURCES.....	14
4.8	PROVINCIAL AND LOCAL INFRASTRUCTURE .....	14
4.9	PUBLIC HEALTH AND SAFETY .....	14
4.10	AREAS PROTECTED UNDER PROVINCIAL PLANS AND POLICIES.....	15
<b>5</b>	<b>CONCLUSION</b> .....	<b>15</b>
<b>6</b>	<b>APPENDIX A – REFERENCES</b> .....	<b>16</b>

## Table of Tables

Table 1.1	Municipal and Conservation Authority Permits / Approvals .....	2
Table 1.2	Provincial Permits / Approvals.....	2
Table 1.3	Federal Permits / Approvals .....	2
Table 2.1:	Construction, Operation and Decommissioning Activities .....	4

## Table of Figures

Figure 2.1	Wind Farm Collie Hill Study Area .....	10
------------	--	----

---

# 1 PROJECT OVERVIEW

The *Green Energy and Green Economy Act*, passed in the Province of Ontario in 2009, mandates a Renewable Energy Approval (REA) process under the *Environmental Protection Act, Ontario Regulation 359/09* for specified classes of renewable energy projects. The Wind Farm Collie Hill is subject to this process, which will evaluate the project's environmental and community impacts and mitigate or avoid them where necessary. M.K. Ince & Associates prepared this Project Description Report (PDR) to meet the requirements of *Ontario Regulation 359/09* and provide a brief overview of the proposed project to stakeholders.

Wind Farm Collie Hill LP proposes to build the Wind Farm Collie Hill, an up to 5.6 MW Class 4 Wind Energy Generation Facility, on privately-owned agricultural lands near the town of Hastings within the Township of Asphodel Norwood (see **Figure 2.1** on p. 10 for the project study area). It would consist of up to three Vestas V90-1.8MW VCUS wind turbine generators of 1.8 MW capacity. A Power Purchase Agreement (PPA) has been acquired for the project under Ontario's Feed-In Tariff (FIT) Program.

The Wind Farm Collie Hill would generate clean, renewable energy for the local grid and feed excess electricity into the Hydro One grid. This would displace greenhouse gases, air pollution, and toxic wastes produced by traditional energy sources. The natural environment in the municipality, the county and the province would benefit. It would also help the Province of Ontario meet future electricity demand.

Transformers at each turbine would step up the voltage from approximately 0.69 kV to 27.6 kV. Collector lines would run from each transformer to the substation, which would house a metering system, disconnection switch, supervisory control and data acquisition (SCADA) system for monitoring, a transformer to step up the voltage to the local distribution voltage of 44 kV, and a transfer trip communication. Overhead and/or underground 44 kV lines would conduct the electricity to the point of common coupling, located less than 10 km from the substation, and then feed it into the M28 Feeder of the Otonabee Transformer Station.

The proposal includes the construction, operation, maintenance, and decommissioning of this wind energy project and its associated access roads, substation, distribution lines and poles, and other infrastructure.

The turbine model is current as of the date of this draft report, but may change according to the results of studies completed during the REA process. All connection details are subject to capacity availability and have not been confirmed as of the writing of this document.

## 1.1 Proponent Contact Information

The proponent of the Wind Farm Collie Hill project is Wind Farm Collie Hill LP. M.K. Ince and Associates Ltd. (MKI) has been contracted to provide consulting services for the project. Contact information is as follows:

Wind Farm Collie Hill LP  
c/o Kelly Campbell  
Energy Farming Ontario  
14 Lakecrest Circle  
Brighton, ON. K0K 1H0  
Canada

Tel: 613-475-0969  
Fax: 613-475-9167  
WF\_Collie\_Hill@energyfarmingontario.com

Andrea McDowell  
M.K. Ince and Associates, Ltd.  
11 Cross Street  
Dundas, ON L9H 2R3

Tel: 905-628-0077  
Fax: 905-629-1329  
WF\_Collie\_Hill@energyfarmingontario.com

## 1.2 Required Authorizations

The project will require permits from Federal, Provincial, and Municipal levels of government. The list presented below covers some of the key permits and approvals that will be required in order to construct the Wind Farm Collie Hill.

**Table 1.1** Municipal and Conservation Authority Permits / Approvals

	<b>Responsible Agency</b>	<b>Info</b>
Building Permit	Township of Asphodel-Norwood	Ontario Building Code compliance
Work Permits	Otonabee Region Conservation Authority	Work permits for constructing water crossings and for construction in regulated areas

**Table 1.2** Provincial Permits / Approvals

<b>Permit</b>	<b>Responsible Agency</b>	<b>Info</b>
Renewable Energy Approval	Ministry of Environment, Ministry of Natural Resources	Project approval, environmental impact assessment
Connection Agreement	Ontario Hydro Networks Inc., IESO	Process requirements for project grid connection
Transportation Permit	Ministry of Transportation	Highway road traffic and safety
Generator's License	Ontario Energy Board	Interconnection to provincial grid

**Table 1.3** Federal Permits / Approvals

<b>Permit</b>	<b>Responsible Agency</b>	<b>Info</b>
EcoEnergy Application	Natural Resources Canada	May trigger a federal environmental screening under CEAA
Navigational Clearances	Transport Canada, NAV Canada	Radar, navigational lighting, blade markings, aeronautical clearance
<i>Navigable Waters Act</i> and/or <i>Fisheries Act</i> permits	Transport Canada, Fisheries and Oceans Canada	Transport Canada and/or DFO permits may be required for electrical line crossing of

		watercourses. Consultation with these agencies is ongoing.
--	--	--

## 2 PROJECT DESCRIPTION

### 2.1 Project Structures & Turbine Technologies

Wind turbines convert the kinetic energy of surface winds into electrical energy in the form of electricity. There are four major components to a wind turbine including the blades, the shaft, the generator, and the tower, which supports the first three. As the wind travels across the turbine blades, a lift force – similar to that which allows airplanes to fly – causes the blades to turn. The turbine blades rotate around the shaft which is connected to either a direct drive generator or an induction generator, thus producing electricity.

The project will consist of three turbines rated at 1.8 MW each. The wind turbine model proposed for the Wind Farm Collie Hill is the Vestas V90-1.8MW VCUS. This turbine has three (3) fibreglass blades equipped with lightning arrestors. The rotor diameter is 90 m and the hub height will be 95m for a maximum total height of 140 m above grade. Each tower will be conical, made of steel and be approximately 3 to 4 m in diameter at the base. During operation, the blades rotate clockwise at speeds varying between nine and 17 rpm (revolutions per minute). The blades of the Vestas V90-1.8MW VCUS are pitch-controlled and are designed to cut out when wind speeds exceed 25.0 m/s (90 km/h). The manufacturer's specifications of the Vestas V90-1.8MW VCUS wind turbine will be included in the *Wind Turbine Specifications Report* in the final REA submission.

The base of each turbine will be a poured concrete foundation with reinforcing steel bars. The foundation will contain a mounting ring to which the base of the tower will be attached. The foundation specifications will depend on the results of a geotechnical investigation of the proposed wind farm location.

A step-up transformer will be located at the base of each tower and in the collector substation to transform the electricity generated by the turbines at 0.69 kV to 27.6 kV. From each transformer, a combination of underground and overhead cables will transfer the electricity to a single common substation. The substation will serve as a collector station for the energy produced by the turbines and will house a metering system, disconnection switch, SCADA system, and a transfer trip communication, in addition to another transformer to step up voltage further to 44 kV. This electricity will be transported to end-users via interconnection facilities, including transformers and distribution lines.

The undertaking will include the construction, operation, maintenance, and decommissioning of a wind energy project and its associated infrastructure, including access roads, a substation and distribution lines and poles. All turbines are to be contained within the area between Centre Line to the North, River Road to the South, 7 Line to the West, and 4 Line to the East.

It is planned that power from the Wind Farm Collie Hill will feed in to the M28 Feeder of the Otonabee Transformer Station. The electricity will be conducted along overhead and/or underground lines at 44 kV to the point of common coupling, located less than 10 km from the substation. All connection details are subject to capacity availability and have not been confirmed as of the writing of this document.

## 2.2 Project Activities

### 2.2.1 Planning

#### *2.2.1.1 Meteorological Tower Installation and Wind Monitoring*

Wind Assessments have been conducted to establish local generation potential.

#### *2.2.1.2 Stakeholder Consultations, Including Planning and Permitting Authorities*

As required under the REA process, two open houses will be held in the community, currently planned for August 23 and December 2010 (TBD). Notices for the open houses will be published in local newspapers and mailed to local residents, representatives of the municipalities, aboriginal groups, provincial and federal agencies, and other relevant parties. The public meetings will be held in an accessible location at a date and time convenient for the local community to attend. Draft REA documents will be made available for public review prior to the second public meeting, according to the timelines set out in *O.Reg. 359/09*. Every effort to address concerns raised at these public meetings will be made, including response to inquiries made by phone, e-mail, mail, or in-person, when appropriate.

#### *2.2.1.3 Renewable Energy Approval Process*

The *Notice of Proposal to Engage* for the project was published concurrently with the *Notice of Public Meeting* in July 2010 under *Ontario Regulation 359/09*. Wind Farm Collie Hill LP has retained the services of M.K. Ince and Associates Ltd. to carry out the environmental studies and prepare the Renewable Energy Approval Application documents.

#### *2.2.1.4 Environmental Studies*

Surveys of local natural heritage features, archaeological assessments, setback assessments, and all other environmental studies required under *O Reg 359/09*, will be completed as part of the project planning process, and made available to the public 60 days before the final open house.

Information on the Wind Farm Collie Hill will be made public at the proponent's website:

[www.energyfarmingontario.com](http://www.energyfarmingontario.com) .

### 2.2.2 Construction

Turbine construction includes the steps outlined below. These steps will be described in detail in the *Construction Plan Report* to be submitted as part of the REA Application.

Turbine construction will take place in stages. For example, first all roads would be constructed and all sites prepared, and then all foundations would be constructed.

**Table 2.1:** Construction, Operation and Decommissioning Activities

<b>Construction</b>	<ul style="list-style-type: none"> <li>• Surveying and siting</li> <li>• Site clearing</li> <li>• Access road construction/modification</li> <li>• Delivery of equipment</li> <li>• Foundation construction</li> <li>• Tower and turbine assembly and installation</li> <li>• Interconnection from turbines to substation</li> <li>• Turbine commissioning</li> <li>• Site rehabilitation</li> </ul>
<b>Operation</b>	<ul style="list-style-type: none"> <li>• Turbine operation</li> <li>• Wind farm maintenance</li> </ul>
<b>Decommissioning</b>	<ul style="list-style-type: none"> <li>• Land clearing</li> <li>• Road construction/modification</li> <li>• Removal of turbines and ancillary equipment</li> <li>• Removal of power lines</li> <li>• Site rehabilitation</li> </ul>

#### **2.2.2.1 Road Construction/Modification**

Non-paved dirt track roads will be constructed to allow access to each individual wind turbine site. Construction of new roads will be kept to the minimum required for project access. These roads will be designed and constructed to support the heavy machinery and trucks that need to reach the turbine locations. The process of constructing roads will include the excavation of topsoil and the possible use of geotextile and/or aggregate material depending on local geotechnical conditions. The new roads will remain private and be maintained privately for ongoing turbine monitoring and maintenance throughout the life of the project. Roads will be kept to a minimum and will follow existing pathways, where possible, and be located to minimize the impact on current land use. This activity will take approximately one month for all turbines.

#### **2.2.2.2 Site Clearing**

Vegetation and trees on rights-of-way or at turbine sites will need to be cleared. Full details will be included in the *Construction Plan Report*, to be prepared as part of the REA Application.

#### **2.2.2.3 Site Preparation**

A 'pad' area of approximately 20 m x 40 m adjacent to each turbine location will be cleared, graded and constructed using geotextile (where appropriate) and aggregate material in order to support the weight of heavy machinery. This activity will take approximately two weeks.

#### **2.2.2.4 Foundation Construction**

Topsoil will be removed and stockpiled before excavating holes for the construction of the turbine foundations. The amount of fill removed for the foundations will depend on the type of foundation to be installed. Where possible, this excess fill will be used on-site for grading operations.

Foundations will be constructed of poured concrete and reinforcing steel. Wooden forms will be used in the construction process. Mounting hardware for the turbine tower will be attached to the foundation. This activity will take approximately one month for three turbines. The foundations will be left for a minimum of one month to set before tower erection.

Foundation design, including the foundation type and dimensions, will depend on the results of the geotechnical survey of the turbine locations.

#### ***2.2.2.5 Tower and Turbine Assembly and Installation***

The wind turbines including towers, blades and nacelles will be assembled and erected using a large crane supported on the 'pad' area adjacent to each turbine site. This activity will take approximately two weeks for three turbines.

A transformer will be installed adjacent to the base of each turbine tower. The size of the transformer (approximately 1 m x 2 m) will be relatively insignificant in relation to the base diameter of the tower (3 to 4 m). Alternatively, the transformer may be installed inside the tower or within the nacelle of the turbine itself. This activity will take approximately one to three weeks for three turbines and is highly dependent on the scheduling of other construction activities.

#### ***2.2.2.6 Electrical Connection System***

The proposed wind farm will be connected to the electrical grid via underground and/or overhead electric cables. The wind turbines will have 27.6 kV transformers at their base to step up the voltage for collection at the switching station. The switching station of the wind farm will house metering, line communication, control devices and another transformer to further step up the voltage to 44 kV.

#### ***2.2.2.7 Switching Station Construction***

The switching station site will be excavated to allow for the installation of gravel substrate and the construction of a concrete foundation. The switching station equipment will be grounded to a grounding grid installed in the gravel. Switching station equipment will be mounted on the concrete foundation and connected to the adjacent outgoing distribution line. The switching station will be fenced to prevent unauthorized access.

#### ***2.2.2.8 Turbine Commissioning***

Prior to start-up, a series of tests will be performed on the wind turbine to confirm system suitability and compatibility with the electricity grid. Interconnection to the grid will be undertaken as a final test. Physical adjustments may be carried out on the turbine at this point. This activity will be scheduled, but will ultimately depend on weather conditions. This activity will take approximately three weeks.

#### ***2.2.2.9 Site Rehabilitation and Waste Disposal***

Upon commissioning of the turbines, construction crews and equipment will be demobilized and the construction areas rehabilitated. All lands that were previously used for agriculture will be graded, the tile drainage repaired where necessary, and topsoil re-applied. Non-agricultural areas will have topsoil re-applied; they will be re-graded with due consideration to natural drainage patterns and seeded with non-invasive native grasses and herbaceous plants. This activity will take approximately four weeks.

Construction wastes generated may include oil-containing rags, brushes & detergents, scrap metal, construction wood waste, plastics, paper and cardboard, cables, tin and tin cans. All wastes generated during project construction will be recycled if possible, and if not, disposed of at licensed waste disposal facilities in accordance with all provincial legislation and regulations.

The *Construction Plan Report* to be included with the Renewable Energy Approval documentation will include more detailed information about the construction activities associated with the Wind Farm Collie Hill.

#### **2.2.2.10 Water-Taking**

No water-taking will be required for this project.

### **2.2.3 Operation and Maintenance**

The operation phase for each turbine will include the steps outlined below. This phase is expected to be carried out continuously over the anticipated project life of 25 years. Further details will be included in the *Design and Operations Report* to be included in the REA submission for the project.

#### **2.2.3.1 Wind Turbine Operation**

The daily operation of wind turbines requires almost no human intervention. When winds are sufficient, the turbine blades will rotate at a speed of nine and 17 revolutions per minute (rpm). The turbines will not operate in cases of mechanical breakdown, extreme weather conditions and during periods of maintenance. Dedicated supervisory control and data acquisition (SCADA) systems will be used to capture real-time turbine feedback and monitor behavioural outputs.

#### **2.2.3.2 Wind Farm Maintenance**

The wind turbines will be subject to regular inspections and maintenance, including routine oil changes, motor maintenance and lubricant and fluid replacement. Periodically, major components of the wind turbines such as blades or generators may require replacement. This work will be performed with similar equipment and methods as used in the construction phase. Access roads will be cleared, graded and maintained as required for maintenance and emergency personnel. At the end of the useful life of a wind turbine, typically 20 to 25 years, the turbines may be decommissioned.

Typically, each wind turbine requires maintenance four times per year. Each maintenance visit takes one to five days per turbine to complete. Maintenance visits involve changing hydraulic and lubricating fluids, and mechanical and structural inspections of the turbine, tower and transformer.

#### **2.2.3.3 Environmental Monitoring**

Post-construction monitoring of environmental impacts, such as impacts to wildlife, will be described in detail in the *Design and Operations Report* and its *Environmental Effects Monitoring Plan*, and be carried out over a period of years to be determined during the forthcoming environmental studies.

The *Design and Operations Report* will also include all relevant information about all activities associated with the Wind Farm Collie Hill during its operational phase.

#### **2.2.3.4 Emissions**

No emissions will be generated by the operation of this wind energy facility.

#### **2.2.3.5 Sewage and Stormwater Management**

No sewage will be generated by the operation of this wind energy facility. Stormwater drainage will not be affected.

#### **2.2.3.6 Waste Management**

Waste materials for the Vestas V90-1.8MW VCUS are limited to oils and lubricants which will be replaced during regular maintenance activities, and physical parts that must occasionally be replaced. These wastes will be collected and disposed of in accordance with all relevant legislation and regulations.

### **2.2.4 Decommissioning**

This project's Feed-in Tariff (FIT) contract has a 20-year term from the Commercial Operation Date (i.e. the date upon which the turbines are commissioned). At the conclusion of this term, the decision will be made whether to continue operating the facility – conducting maintenance and upgrades as necessary and selling the electricity through a new power purchase agreement or through the spot market – or to decommission the wind farm entirely.

Regardless of any decisions to extend the life of the project, decommissioning will eventually be necessary. The following sections provide an overview of the activities planned in the decommissioning phase of the Wind Farm Collie Hill. Additional details will be provided in the *Decommissioning Plan Report* to be included in the REA submission package.

#### **2.2.4.1 Land Clearing**

As in the construction phase of the project, a 'pad' area, approximately 20m x 40m adjacent to the turbine location, will be cleared, graded and constructed using geotextile and aggregate material in order to support the weight of the heavy machinery required to disassemble the turbine. This activity will take approximately two weeks.

#### **2.2.4.2 Road Construction/Modification**

Existing roads used during the operation phase of the project will be upgraded as required by the passage of time with geotextile and aggregate material if deemed necessary, based on the geotechnical conditions of each site. This activity will take approximately one month.

#### **2.2.4.3 Removal of Turbines & Ancillary Equipment**

The turbines will be disassembled on site and the parts removed, then reused or recycled where possible. This activity will take approximately two months.

#### **2.2.4.4 Foundation Removal**

The removal of the turbine foundations will depend on the type of foundation used and will likely involve the use of heavy machinery to remove foundations to a depth of one metre below ground surface. This activity will take approximately three weeks.

#### **2.2.4.5 Removal of Power Line**

Any above-ground distribution lines and poles will be removed from the site and recycled, reused or disposed appropriately. Below-ground wires buried at a depth of greater than one metre do not present a significant hazard to the environment if left in place; removal of the buried wires may create more disturbance to the local environment and agriculture due to required excavation. The decision to remove the cables from the ground or leave them buried will be made in consultation with the landowners.

#### **2.2.4.6 Site Rehabilitation and Waste Management**

The disturbed portions of the site will be remediated and re-vegetated. Topsoil stripped during decommissioning will be re-applied. Agricultural areas will be returned to agricultural use. All damaged tile drains will be fixed. Re-vegetation will use native non-invasive grasses and herbaceous plants. This activity will take approximately two weeks.

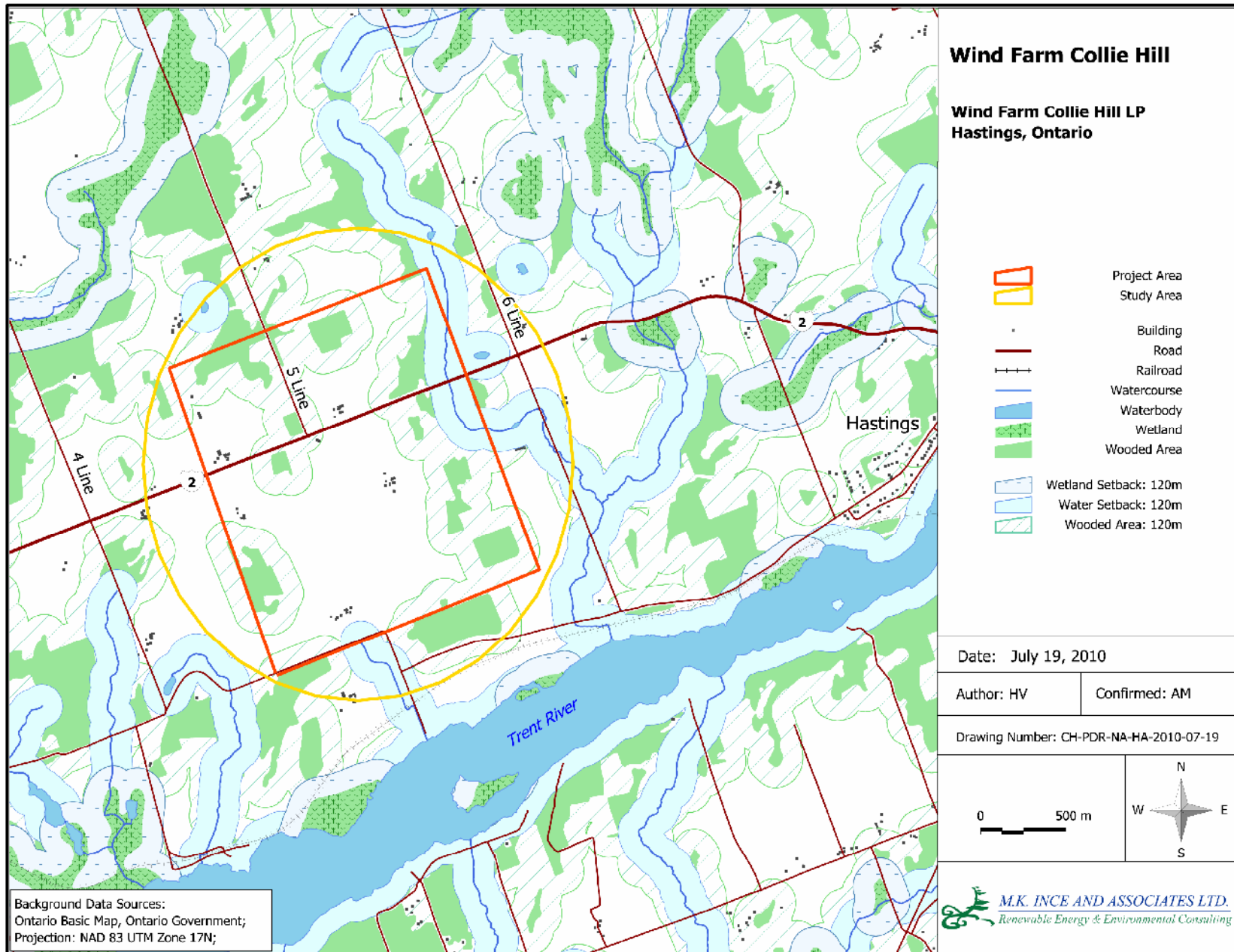
The *Decommissioning Plan Report* to be included with the Renewable Energy Approval documentation will include all relevant information about the decommissioning activities associated with the Wind Farm Collie Hill.

All wastes generated by the decommissioning of this project will be disposed of at licensed waste management facilities in accordance with all provincial legislation and regulations.

## **2.3 Project Location**

The Wind Farm Collie Hill is being proposed in the vicinity of the community of Hastings in the adjacent Township of Asphodel-Norwood, Ontario. The 2006 census showed a population for Asphodel-Norwood of 4,247 people. This section of the Township of Asphodel-Norwood is rural almost entirely agricultural in land use.

**Figure 2.1** below shows the study area and approximate project location for the project.



### 3 PROJECT ENVIRONMENTAL FEATURES

Ontario Regulation 359/09 contains several setbacks for noise receptors, cultural heritage features, and natural heritage features such as woodlands, wetlands, water bodies, etc. A selection of these have been reflected on the above map. The Wind Farm Collie Hill will comply with all setbacks as contained in the regulation or, where setbacks cannot be adhered to and the possibility of exceptions exist, will complete all additional required assessments and reports, as indicated in the relevant sections under S. 4, Description of Environmental Effects, below.

There are no known significant sites immediately adjacent to the study area; Wind Farm Collie Hill study area is surrounded by agricultural land. Nearest significant sites to the project area include:

- a) Ouse River Marsh Life Science Area of Natural and Scientific Importance (ANSI-LS), located approximately 3.3 kilometres on-centre from the project site.
- b) Birdsall Wetland Conservation Area located approximately 4.7 kilometres on-center from the project area.
- c) Morrow Bay Woods Life Science Area of Natural and Scientific Importance (ANSI-LS), located approximately 5.3 kilometres on-center from the project site.
- d) Birdsalls Point Marsh Life Science Area of Natural and Scientific Importance (ANSI-LS), located approximately 5.9 kilometres on-center from the project site.
- e) Wakefield Conservation Area, located approximately 6.2 kilometres on-center from the site.
- f) Westwood Drumlin Field Life Science Area of Natural and Scientific Importance (ANSI-LS), located approximately 6.4 kilometres on-center from the project area.
- g) Villiers Drumlin Earth Science Area of Natural and Scientific Importance (ANSI-ES), located approximately 9.6 kilometres on-center from the site.

#### 3.1 Birds and Bird Habitat

Preliminary pre-construction bird monitoring work has already been completed in the project study area. With Environment Canada's guidance, a bird monitoring protocol was developed and implemented during 2008 and 2009, including spring passage migration counts (weekly from April 14-May 26, 2009), fall passage migration counts (weekly from early August to early October, 2009), breeding bird surveys (June 8 and 15, 2009) and winter bird surveys (January 20, February 15 and March 10, 2009). Pre-monitoring research on birds known to be in the area was also conducted with the aid of the *Ontario Breeding Bird Atlas, Atlas of the Breeding Birds of Ontario* and the Ontario Landbird Conservation Plan.

While work on avian impacts from the Wind Farm Collie Hill has not yet been finalized, information to date indicates that the project study area, as it consists of already-disturbed primarily agricultural lands

with low value for bird species, is not sensitive habitat, nor is it a major migration route for birds. Impacts of the wind farm on birds are thus expected to be low.

There are three Important Bird Areas near the Wind Farm Collie Hill that may be affected by this project. These include: Presqu'ile Provincial Park (approx. 36 km southeast of the site), Napanee Limestone Plain (approx. 65 km east), and Prince Edward Point (approx. 83 km southeast).

There are six Provincially Significant Wetlands close to the Wind Farm Collie Hill. Ouse River Mouth Wetland is located approximately 3 km southwest of the project area. The majority of the wetland is dominantly composed of Swamp (80%), with only 20% Marsh. The Hastings North Complex Wetland is located approximately 3 km northeast of the project area. This Provincially significant wetland complex is also dominantly composed of Swamp (95%), with only 5% Marsh. The Ouse River Middle Wetland is located approximately 5 km north by northeast of the project area. This provincially significant wetland is primarily 100% Swamp. The Killoran Lake Wetland is located approximately 5 km east by southeast of the project area. The majority of the wetland is composed of Marsh (53.5%) and Swamp (45.5%). The O'Melia-Lamey Lakes Wetland is located approximately 5 km southeast of the project area. This provincially significant wetland is dominantly composed of Marsh (85.1%), with only 14.9% Swamp. And the Barry Lake Wetland is located approximately 6 km east of the project area. The majority of the wetland complex is composed of Swamp (83%), with only 17% Marsh.

There are several small Provincial Parks in the vicinity of the Wind Farm Collie Hill project area. The closest is the Serpent Mounds Provincial Park, which is classified as being a Historical park. It is located approximately 12 km southwest of the project site. Ferris Provincial Park is located approximately 17 km east of the project site and is classified as being a Recreation park. Mark S. Burnham Provincial Park is located approximately 18 km northwest of the site and is classified as being a Recreation park. And the Kawartha Highlands Provincial Park is the furthest away, located approximately 53 km northwest of the site. This has a Wilderness park classification.

## 3.2 Water Bodies & Characteristics

There are no named water bodies in the Wind Farm Collie Hill project study area. There is one small pond and one small seasonal watercourse which drains into the Trent River, 300 m south of the project area. Setbacks will be calculated for all project components in compliance with the *O Reg 359/09*, and described in the *Natural Heritage Evaluation of Significance Report* and *Water Assessment Report*, to be submitted as part of the REA application.

## 3.3 Use of Waterways

It is not yet known if or how any of the above waterways will be crossed by project components such as overhead or underground connection lines. If it is determined that such crossings are necessary, the Navigable Waters Protection Programme will be contacted to ensure that all components of the *Navigable Waters Protection Act* are complied with and all required permits received before construction begins.

## 4 DESCRIPTION OF ENVIRONMENTAL EFFECTS

### 4.1 Heritage and Archaeological Resources

A Stage I Archaeological Assessment of the project area will be commissioned.

### 4.2 Natural Heritage Features

A records review and site visit to ascertain the presence of natural heritage features on site will be coordinated as part of the REA application. Such features may include wetlands, water bodies, Areas of Natural and Scientific Interest (ANSI), parks and conservation areas. REA-mandated setbacks from these features will be established for all wind farm components. Further details will be available in the *Natural Heritage Evaluation of Significance Report* to be submitted as part of the REA application.

Impacts to natural heritage features may involve some loss of vegetation and/or habitat. Where project components exist within REA-mandated setbacks, the appropriate assessments and reports will be completed to mitigate those impacts. We do not anticipate significant residual impacts as a result of this project.

The project area will also be evaluated for site sensitivity for bats. If hibernacula or maternity roosts are determined to exist nearby, pre-construction bat monitoring activities will be conducted in consultation with the Ontario Ministry of Natural Resources. Acoustic bat monitoring has already been conducted at the site during the peak migration period. If the site is deemed to be low sensitivity, no additional pre-construction monitoring will be conducted. Post-construction monitoring will be conducted in accordance with the OMNR's *Bats and Bat Habitats: Guidelines for Wind Power Projects* (March 2010 Draft) and will be described in further detail in the *Environmental Effects Monitoring Plan (EEMP)* submitted as part of the *Design and Operations Report* in the REA Application.

### 4.3 Water Bodies

A records review and site visit to ascertain the presence of water bodies and watercourses on site will be conducted as part of the REA Application. Any water bodies and streams in close proximity to proposed infrastructure will be noted, and an assessment of REA setbacks from these environments undertaken. Further details will be available in the *Water Bodies Assessment Report* to be submitted as part of the REA application.

Impacts to water bodies may include sedimentation, impacts to aquatic habitats and fish or other aquatic species, or erosion. Where project components are sited within REA-mandated setbacks, a Water Bodies Impact Assessment Report will be completed to assess and mitigate any resulting impacts. We do not anticipate significant residual impacts as a result of this project.

### 4.4 Air, Odour, Dust

Wind energy is a clean form of electricity generation. No air emissions, dust or odours will result from wind farm operation. Mitigation measures for air, odour, and dust emissions related to project construction and decommissioning phases can be found in the *Construction Plan Report* and *Decommissioning Report* to be included with the REA documentation.

## 4.5 Noise

The Wind Farm Collie Hill will use modern, quiet wind turbine technologies. Setback distances between turbines and potential noise receptors will be established during the forthcoming environmental studies and will comply with the minimum 550 m setback established under *O.Reg. 359/09*. Noise from any source can be a source of annoyance if it is protracted or at an unreasonable volume. In recognition of this, predictive noise modeling will be conducted to assess turbine-related sound levels at nearby receptors under worst-case conditions and ensure compliance with the Ontario Ministry of Environment's *Noise Guidelines for Wind Parks* (October 2008). As these guidelines mandate a limit of 40 dBA at the nearest noise receptors, noise impacts from this wind energy facility will be negligible.

## 4.6 Visual Impacts

The visual impact of a wind farm depends considerably on the local community. The value that residents place on the landscape is highly subjective, as is the perceived effect of turbines on that landscape. While some consider turbines to be an eyesore, others enjoy them and the contribution they make to the local landscape.

Photomontages illustrating how the final turbine layout will appear will be prepared using detailed computer modeling and included in the REA Application reports. Turbine lighting will be installed in accordance with Transport Canada's requirements for aeronautical safety.

## 4.7 Land Use and Resources

The lands in the study area for the Wind Farm Collie Hill are designated as agricultural under the Township of Asphodel-Norwood Zoning Bylaws. The land is currently used for the cultivation of cash crops, notably corn, alfalfa, and soy.

## 4.8 Provincial and Local Infrastructure

Construction of large projects involves large and often heavy machinery sometimes operating on roads not designed for them, which can cause damage to such infrastructure. The volume and size of construction traffic can also inconvenience local residents. However, we expect minimal impacts to provincial and local infrastructure as a result of the Wind Farm Collie Hill, and increases to traffic volumes will be limited in extent and duration.. A *Construction Plan Report*, to be submitted as part of the REA Application documents, will elaborate on these impacts and fully describe appropriate mitigation measures.

## 4.9 Public Health and Safety

Impacts to public health and safety from the wind farm are expected to be minimal. Detailed assessment of potential health and safety impacts including turbine icing, electromagnetic fields, and health concerns will be included in the *Design and Operations Report* to be included with the REA Application documents.

## 4.10 Areas Protected under Provincial Plans and Policies

The Wind Farm Collie Hill project area is not located in any of the following areas which are protected under Provincial Plans or Policies:

- the Protected Countryside or Natural Heritage System as described in the Greenbelt Plan and *Greenbelt Act*,
- the Oak Ridges Moraine Conservation Plan Area,
- the Niagara Escarpment Plan Area,
- the Lake Simcoe Watershed Plan Area.

As such there will be no impacts to any areas protected under provincial plans or policies.

## 5 CONCLUSION

The Wind Farm Collie Hill, proposed by Wind Farm Collie Hill LP, will have a nameplate capacity of up to 5.6 MW, consisting of up to three Vestas V90-1.8MW VCUS wind turbine generators of 1.8 MW capacity. It will be constructed on privately-owned agricultural lands near the community of Hastings in the adjacent Township of Asphodel-Norwood (see **Figure 2.1** on p. 10 for the project study area). The Wind Farm Collie Hill has received a contract under Ontario's Feed-In Tariff (FIT) program. Under Ontario's *Green Energy and Green Economy Act*, this wind energy project is subject to the Renewable Energy Approval (REA) process per *Ontario Regulation 359/09* under the *Environmental Protection Act*. Environmental studies carried out under the REA process will ensure that the Wind Farm Collie Hill produces clean, emissions-free electricity while minimizing negative environmental effects

## 6 APPENDIX A – REFERENCES

- Important Bird Areas of Canada. [www.ibacanada.com](http://www.ibacanada.com)
- M.K. Ince and Associates Ltd. 2009. *Clean Breeze (Grafton) Wind Farm Pre-construction Avian Baseline Survey and Risk Assessment (Draft)*.
- Township of Asphodel-Norwood. *Official Plan 2008*.  
<http://www.asphodelnorwood.com/documents/Official%20Plan.pdf>
- Ontario Breeding Bird Atlas. <http://www.birdsontario.org/atlas.html>
- Ontario Ministry of Environment (MOE). 2008. *Noise Guidelines for Wind Farms: Interpretation for Applying MOE NPC Publications to Wind Power Generation Facilities*.  
<http://www.ene.gov.on.ca/publications/4709e.pdf> Last retrieved May 28, 2010.
- Ontario Ministry of Municipal Affairs and Housing (OMMAH). 2008. *Oak Ridges Moraine Atlas*  
<http://ormatlas.lrc.gov.on.ca> Last retrieved June 28, 2010.
- Ontario Ministry of Natural Resources (OMNR) Natural Heritage Information Centre (NHIC). 2009. *Biodiversity Explorer*. <https://www.biodiversityexplorer.mnr.gov.on.ca/nhicWEB/main.jsp>. Last retrieved May 27, 2010.
- Ontario Ministry of Natural Resources (OMNR). 2010. *Bats and Bat Habitats: Guidelines for Wind Power Projects (DRAFT)*.  
<http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@renewable/documents/document/289694.pdf> Last retrieved May 28, 2010.
- Ontario Partners in Flight. 2008. *Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13*. Ontario Ministry of Natural Resources, Bird Studies Canada, Environment Canada. <http://www.bsc-eoc.org/PIF/PIFOBCR13Plan.pdf>
- Renewable Energy Approvals Under Part V.0.1 of the Act, Ontario Regulation 359/09 made under the Environmental Protection Act, R.S.O. 1990, Chapter E.19.*
- Vestas. 2010. Product Brochure V90 1.8MW.
- Statistics Canada.. 2006 *Census of Canada*. <http://www12.statcan.ca/english/census06/data/>