BROOKE-ALVINSTON WIND FARM
PROJECT DESCRIPTION REPORT

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Prepared for:

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1.0 Introduction

1.1 PROJECT OVERVIEW

Zephyr Farms Limited (Zephyr Farms) is proposing to develop the Brooke-Alvinston Wind Farm (the Project) in the Township of Brooke-Alvinston, Lambton County, Ontario. The Project has been awarded a Power Purchase Agreement with the Ontario Power Authority (RESOP 11836). The basic components of the Project include four Samsung Heavy Industries 2.5 MW wind turbine generators for a total installed nameplate capacity of 10 MW, transformers at each turbine, electrical collector lines and fibre optic data lines, a switchyard with associated control room, a meteorological tower (met tower) and associated power and data cabling, and turbine access roads. The electrical transmission system would transport the electricity generated from each turbine to Hydro One Networks Inc.'s (HONI's) distribution network. The Project also includes interconnection equipment and installations specified by HONI. All Project components will be situated on private land and municipal road allowance. A copy of the Site Plan map is provided in Appendix A.

Zephyr Farms 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). According to subsection 6(3) of O.Reg.359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements identified in O.Reg.359/09 for such a facility.

1.2 REPORT REQUIREMENTS

The purpose of the Project Description Report is to provide the public, aboriginal communities, municipalities, and regulatory agencies with an understanding of the Project, including any environmental effects that may result from engaging in the Project.

This Project Description Report is one component of the REA Application for the Project, and has been prepared in accordance with Item 10, Table 1 of O. Reg. 359/09, and the Ontario Ministry of the Environment's (MOE's) draft guidance document *Technical Bulletin One: Guidance for preparing the Project Description Report* (MOE, 2010).

O.Reg.359/09 sets out specific content requirements for the Project Description Report as provided in the following table (Table 1.1).

Table 1.1: Project Description Report Contents: O.Reg. 359/09

Required Documentation	Requirement Met	Location in Submission
1. Any energy sources to be used to generate electricity at the renewable energy generation facility.	ü	Section 3.1
2. The facilities, equipment or technology that will be used to convert the renewable energy source or any other energy source to electricity.	ü	Section 3.3
3. If applicable, the class of the renewable energy generation facility.	ü	Section 1.1
4. The activities that will be engaged in as part of the renewable energy project.	ü	Section 3.4
5. The name plate capacity of the renewable energy generation facility.	ü	Section 1.1
6. The ownership of the land on which the project location is to be situated	ü	Section 3.2
7. Any negative environmental effects that may result from engaging in the project.	ü	Section 4.0, Appendix B
8. An unbound, well marked, legible and reproducible map that is an appropriate size to fit on a 215 millimetre by 280 millimetre page, showing the project location and the land within 300 metres of the project location.	ü	Appendix A

The MOE's Draft Technical Bulletin One further elaborates on content guidance for the Project Description Report, as summarized in the following table (Table 1.2).

Table 1.2: Project Description Report Requirements: MOE Draft Technical Bulletin One

Required Documentation	Requirement Met	Location in Submission
1. General Information		
- The name of the project	ü	Section 1.1
- A description of the project location	ü	Section 2.1
2. Contacts		
- The name of the application and, if any, co-applicant	ü	Section 2.2
- The name of a project consultant representing the applicant	ü	Section 2.2
- Contact information (address, telephone, fax, e-mail) of the applicant and consultant	ü	Section 2.2
3. Authorizations Required	ü	Section 2.3
4. Federal Involvement	ü	Section 2.3.1
5. Project Components		
- Wind turbine information (make, model, name plate capacity, tower height, hub height above grade, blade length, blade sweep area, rotational speeds, sound power level, frequency spectrum)	ü	Section 3.3.1
- Associated facilities/equipment (roads, transmission lines, transformers, laydown areas, storage infrastructure, temporary office buildings, water crossings)	ü	Section 3.3, Appendix A
6. Project Activities		
- Describe any of the regulated activities (construction, installation, use, operation, changing and retiring) that will be engaged in as part of the project	ü	Section 3.4.1
- Describe the facility phases and the timing and scheduling of each phase	ü	Section 3.4.2

Table 1.2: Project Description Report Requirements: MOE Draft Technical Bulletin One

Required Documentation	Requirement Met	Location in Submission
- Identify the nature of any solid, liquid or gaseous wastes, air and noise emissions likely to be generated, and plans to manage these wastes	ü	Sections 3.4.3 to 3.4.6
- Describe disposal procedures for any toxic or hazardous materials to be used or any by-products to be generated	ü	Section 3.4.7
- Describe sewage and stormwater management	ü	Section 3.4.8 and 3.4.9
- Describe any water-taking activity	ü	Section 3.4.10
7. Project Location Map		
- On-site land uses	ü	Appendix A
- Off-site land uses within 300 metres	ü	Appendix A
- Crown land users	N/A	N/A
- Features identified in the records review	ü	Appendix A
- Required setbacks	ü	Appendix A

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2.0 General Requirements

2.1 PROJECT LOCATION

The Project would be located on privately-owned land and within municipal road allowance in the Township of Brooke-Alvinston, Lambton County, Ontario (see Appendix A).

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

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

For the purposes of this Project, the Project Location includes the footprint of the facility components, plus any temporary work and storage locations. The boundary of the Project Location is used for defining setback and site investigation distances according to O.Reg.359/09. All construction and installation activities would be conducted within the Project Location; this includes ensuring that construction vehicles and personnel stay within the demarcated areas.

Although O. Reg. 359/09 considers the REA process in terms of the Project Location, the siting process for wind farm projects is an iterative process, and therefore final location of Project components is not available at Project outset. Therefore, a Project Study Area is developed to examine the general area within which the wind Project components may be sited; information gathered within this larger area feeds into the siting exercise. The Project Study Area was determined through professional judgment and experience with the well-known and generally predictable environmental effects of the construction and operation of wind farm facilities. The Project Study Area is generally bounded by: i) Churchill Line to the North; ii) Ebenezer Road to the West; and iii) Walnut Road to the East.

Project siting has been refined over the course of the Project assessment, and results can now be presented in terms of Project Location instead of Project Study Area. The Project Study Area encompasses approximately 171.63 hectares. The Project Location encompasses approximately 9.45 hectares.

2.2 CONTACTS

The proponent for the Project is Zephyr Farms Limited. The principle contact for the applicant is:

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The principle project consultant representing the applicant is:

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2.3 AUTHORIZATIONS REQUIRED

At the federal, provincial and municipal level multiple permits, licenses and authorizations may be required to facilitate the development of the Project, in addition to the REA. The ultimate applicability of all permits, licenses and authorizations will be determined based on the Project's detailed design.

2.3.1 Federal

It is expected that a Federal Screening report will not be required for the Project, as it is not anticipated that the Project would cause a 'trigger' under the *Canadian Environmental Assessment Act*. However, the agency consultation program for the Project included all federal departments and agencies typically interested in wind power projects (e.g., Department of National Defense, Environmental Canada, Transport Canada, etc.). All federal permits, licenses and authorizations potentially required for the Project include those listed in Table 2.1. Results of correspondence with the relevant agencies are outlined in the Consultation Report.

Table 2.1: Federal Permits, Licenses and Authorizations

Permit/License/Authorization	Administering Agency	Rationale
Aeronautical Obstruction Clearance	Transport Canada – Aviation Division	Turbine lighting and marking
Land Use Clearance	NavCanada	Aeronautical safety mapping and designations

2.3.2 Provincial

All provincial permits, licenses and authorizations required for the Project will be determined, and may include those listed in Table 2.2.

Table 2.2: Provincial Permits, Licenses and Authorizations

Permit /License/Authorization	Administering Agency	Rationale
Certificate of Inspection	Electrical Safety Authority	A record that electrical work complies with the requirements of the Ontario Electrical Safety Code
Customer Impact Assessment	HONI	Integration of project with HONI and effects to customers
Connection Cost Recovery Agreement (CCRA)	HONI	Recovery of costs to grid operator of changes to allow connection
Approval of Connection	Independent Electricity System Operator (IESO)	Electrical interconnect with IESO regulated network
System Impact Assessment	IESO	Integration of project with IESO-controlled transmission system
Notice of Project	Ministry of Labour	Notify the Ministry of Labour before construction begins
Change of Access and Heavy/Oversize Load Transportation Permit	Ministry of Transportation (MTO)	Compliance with provincial highway traffic and road safety regulations. Transportation of large or heavy items on provincial highways
Special vehicle configuration permit	MTO	Use of non-standard vehicles to transport large components
Transportation Plan	MTO	Adherence to road safety and suitability
Generator's License	Ontario Energy Board (OEB)	Generation of electrical power for sale to grid

2.3.3 Municipal

All municipal permits, licenses and authorizations required for the Project will be determined, and may include those listed in Table 2.3.

Table 2.3: Municipal Permits, Licenses and Authorizations

Permit /License/Authorization	Rationale
Building Permits	Compliance with building codes for turbines and substation
Entrance Permits	Entrance from county roads
Oversize/Overweight Permit	For moving oversized or heavy loads

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3.0 Project Information

3.1 ENERGY SOURCES

Wind turbines capture the kinetic energy in surface winds and convert it into electrical energy in the form of electricity. In addition to the tower, wind turbines are comprised of three basic parts: blades, a shaft, and a generator. As wind moves over the turbine's blades it causes "lift"; the same effect used by airplane wings. This lift force causes the blade assembly to rotate. The rotational energy resulting from the movement of the blades is directly transferred to the drive shaft. The rotating shaft transfers the energy through a gearbox and into an alternating current generator which then converts the mechanical energy into useable 60 Hz electricity.

No supplementary fuel sources would be used to generate electricity for the Project.

3.2 LAND OWNERSHIP

The Project would be located on privately owned lands and a portion of municipal road allowance. The legal descriptions of the parcels of land that will be used for the Project are:

- Roll#38 15 120 040 16900 0000; Con 14 S pt lot 13 S ½ lot 13
- Roll#38 15 120 040 17200 0000; Con 14 S pt lot 14
- Roll#38 15 120 040 17400 0000; Con 14 N pt lot 15 pt W ¾ of N ¾ of lot 15

3.3 PROJECT COMPONENTS

The basic components of the Project include four Samsung Heavy Industries 2.5 MW wind turbine generators for a total installed nameplate capacity of 10 MW, transformers at each turbine, electrical collector lines and fibre optic data lines, a switchyard with associated control room, a meteorological tower (met tower) and associated power and data cabling, and turbine access roads. Temporary components during construction and decommissioning include staging areas at the turbines, crane pads at the turbines, work areas to construct access roads, an access road entrance, and access to the met tower. The electrical transmission system would transport the electricity generated from each turbine to HONI's distribution network. The Project also includes interconnection equipment and installations specified by HONI.

No equipment in the facility design relate to water taking, sewage or stormwater management, air discharges and/or water and biomass management.

Construction of the Project components, and types of equipment that would be used, are described in the Construction Plan Report.

3.3.1 Wind Turbine Generators

The Project includes four Samsung Heavy Industries 2.5 MW wind turbine generators for a total installed nameplate capacity of 10 MW. A summary of the basic specifications of the turbine model is provided in Table 3.1 below.

Table 3.1 Basic Wind Turbine Specifications

Manufacturer	Samsung
Model	25xc
Name plate capacity (MW)	2.5 MW
Hub height above grade	80 m
Blade length	48.7 m
Rotor diameter	99.8 m
Blade sweep area	7,823 m^2
Nominal revolutions (rotational speed)	14.35 rpm
Frequency Spectrum	57.5 Hz – 61.5 Hz
Sound power	4 m/s – 89 dBA 5 m/s – 94.6 dBA 6 m/s – 99.1 dBA 7 m/s – 102.9 dBA 8 m/s – 106.2 dBA

3.3.2 Electrical Infrastructure

Electrical Collector Lines

A step-up transformer located at each turbine is required to transform the electricity created in the nacelle (i.e. 690 V to 27.6 kV). From each step-up transformer, underground collector lines would carry the electricity to the Project's switchyard. Underground collector lines would be incorporated into the design of the access roads to reduce the area required for construction and minimize potential construction impacts. The cables would be installed immediately to one side of the access road, just off the gravelled surface. Fibre optic communication lines would run with the collector lines.

Switchyard

The switchyard would house the switching, control, protection, communication and metering system required to support the operation of the Project. A chain link fence would enclose the yard and would be equipped with a locked vehicle gate to allow for maintenance access. The high voltage side of the switchyard would be connected to the HONI distribution network via installation equipment and installations specified by HONI.

3.3.3 Met Tower

One permanent met tower would be installed for use during the operation phase of the Project. Power and data cabling for the tower would be trenched in from the nearest collector line system. Access for installation of the met tower is required. No road would be constructed for the met tower; the truck used to deliver the met tower and installation equipment would travel the access route that is delineated, and then the area would be restored to pre-existing conditions as necessary.

3.3.4 Access Roads

Approximately 2.3 kilometres (km) of new access roads would be constructed to support construction and transportation vehicles to each turbine site, and for use during the operation phase.

Access roads would be approximately 5 metres (m) wide, with the exception of the entrance off Ebenezer Road which would require a wider turning radius of 15 m. This area would be reduced in size at the end of the construction phase.

3.3.5 Temporary Components

Lands to be temporarily used during the construction of the Project are staging areas at the turbines, crane pads, work areas for access road construction, the access road entrance and the met tower access route. The land use prior to construction at all of these areas is agricultural.

Following construction activities, all of the following locations would be restored to pre-impact conditions. Restoration work would start following installation of each wind turbine and removal of all construction materials and equipment from each turbine site. This includes removal of the granular and geotextile material from applicable areas. Restoration activities would follow the Site Restoration Plan outlined in Section 3.4 of the Decommissioning Plan Report, and include decompaction as necessary.

Staging Areas

A temporary work and storage area at each turbine location would be used for temporary storage of the turbine components, staging, parking, and foundation spoil pile. Staging areas would be initiated in June 2011, and would be rehabilitated to pre-construction conditions following the end of the construction phase (November 2011). Staging areas would not be excavated or gravelled. The areas would be actively used throughout the construction phase, to varying degrees, during all construction activities at the turbine siting areas.

Crane Pads

Crane pads would be constructed at each turbine location at the end of each access road. The crane pads would be used for turbine assembly, and would be approximately 20 m x 40 m. The crane pads would be rehabilitated to pre-existing conditions once assembly of the turbines is complete.

Working Areas

A working area would be used within the Project Location along access roads for construction of the 5 m wide access road. The timing of the temporary use of land for the access road working areas would begin with the construction of the access roads (June 2011) and these areas would be rehabilitated to pre-existing conditions at the end of the construction phase (November 2011).

Access Road Entrance

Access roads would be approximately 5 m wide, and would not require resizing for the operation phase, with the exception of the entrance off Ebenezer Road which requires a wider turning radius. This area would be rehabilitated to pre-existing conditions at the end of the construction phase (November 2011).

Met Tower Access Route

The route used by the truck to access the met tower site for installation would be approximately 15 m wide, and would require no site preparation. This area would be rehabilitated to pre-existing conditions at the end of the construction phase (November 2011).

3.4 PROJECT ACTIVITIES

3.4.1 Description of Regulated Activities

A general overview of the activities that would be engaged in during construction, operation, and decommissioning of the Project are provided below in Table 3.2. More specific details on the project phases and related activities are outlined in Construction Plan Report, Design and Operations Report, and Decommissioning Plan Report.

Table 3.2 Key Project Activities

Project Phase	Activities
Construction	**Turbine Sites**
	Surveying
	Access road construction and installation of collector lines
	Installation of turbine and met tower foundations
	Installation of crane pads
	Tower/turbine delivery and erection
	Restoration of temporary work areas
	Switchyard Site
	Installation of switchyard
	Project testing and connection with grid
	Restoration of temporary work areas
	Additional Activities
	Component transportation to Project Location
Operation	**Turbine Sites**
	Commercial operation
	Preventative and routine maintenance
	Unplanned maintenance

Table 3.2 Key Project Activities

Project Phase	Activities
	Meter calibrations
	Grounds keeping
	Switchyard Site
	Preventative and routine maintenance
	Unplanned maintenance
	Remote wind farm condition monitoring
Decommissioning	**Turbine Sites**
	Removal of tower and turbine infrastructure
	Possible removal of access roads dependent upon agreement with landowner
	Possible excavation and removal of underground collector lines depending upon depth and agreement with landowner
	Switchyard Site
	Disconnection from provincial grid
	Removal of switchyard and associated control room
	Additional Activities
	Component removal and reuse, recycling, or proper disposal at a landfill
	Removal of electrical components in municipal road allowance

3.4.2 Facility Phases, Timing & Scheduling

The projected starting dates for Project construction, operation and decommissioning activities are provided in Table 3.3 below.

The construction schedule is detailed in the Construction Plan Report. Operation and maintenance activities will occur as required throughout the life of the Project, and are detailed in the Design and Operations Report. While the specific schedule for decommissioning will be determined at the time it is undertaken, the general staging of undertakings are outlined in the Decommissioning Plan Report.

The wind turbines used for the Project have a typical operational lifespan of 20 years. At the end of the equipment's useful life, a decision would be made regarding whether to extend the life of the facility or to decommission.

Barring routine scheduled maintenance, the turbines are expected to be operational 24 hours a day, 7 days a week, assuming appropriate wind conditions.

Table 3.3 Major Project Phases and Scheduling Milestones

Construction	Operation	Decommissioning/Repowering
Summer/Fall 2011	Fall 2011	Fall 2031

3.4.3 Waste Generation

Construction/Decommissioning

Waste materials expected to be generated during construction are described in Section 2.8, and would be temporarily stored on-site and would require reuse, recycling, and/or disposal at an appropriate MOE-approved off-site facility. Improper disposal of waste material generated during construction may result in contamination to soil, groundwater, and/or surface water resources on and off the Project sites. Litter generated during construction may also become a nuisance to nearby residences if not appropriately contained and allowed to blow off the construction-site. Similar waste material may be generated during decommissioning.

The Contractor would implement a site-specific waste collection and disposal management plan, which may include site practices such as:

- systematic collection and separation of waste materials within on-site storage areas in weather-protected areas located at the switchyard;
- all waste materials and recycling would be transported off-site by private waste material collection contractors licensed with a Certificate of Approval – Waste Management System;
- contractors would be required to remove their excess materials from the site (e.g. extra cable, formwork, scrap metals, pallets, etc.);
- excess materials generated during the course of excavations of soil would be handled in accordance with the MOE's Protocol for the Management of Excess Materials in Road Construction and Maintenance;
- excess excavated soils may be reused elsewhere on the property with landowner permission;
- labelling and proper storage of hazardous and liquid wastes (e.g. used oil, drained hydraulic fluid, and used solvents) in a secure area that would ensure containment of the material in the event of a spill. As per S.13 of the *Environmental Protect Act*, all spills that could potentially have an adverse environmental effect, are outside the normal course of events, or are in excess of the prescribed regulatory levels would be reported to the MOE's Spills Action Centre;
- dumping or burying wastes within the Project sites would be prohibited;
- should contaminated soil be encountered during the course of excavations the contaminated material would be disposed of in accordance with the current appropriate provincial legislation, such as Ontario Regulation 347, the General – Waste Management Regulation;

- disposal of non-hazardous waste at a registered waste disposal site(s);
- if waste is classified as waste other than solid non-hazardous, a Generator Registration Number is required from the MOE and the generator would have obligations regarding manifesting of waste. Compliance with Schedule 4 of Regulation 347 is mandatory when determining waste category;
- implementation of an on-going waste management program consisting of reduction, reuse, and recycling of materials; and
- disposal of sanitary wastes would be the responsibility of the contracted third party and they would ensure disposal in accordance with appropriate legislation, standards and policies.

During construction, the cement provider would be responsible for ensuring that wash water from the cleaning of cement truck drums is disposed of in a sewage works designed for that purpose and approved under Section 53.(1) of the *Ontario Water Resources Act*, or under Part 8 of the *Building Code Act*.

In terms of accidental spills or releases to the environment, standard containment facilities and emergency response materials would be maintained on-site as required. Refuelling, equipment maintenance, and other potentially contaminating activities would occur in designated areas, and as appropriate spills would be reported immediately to the MOE Spills Action Centre.

Operation

During operation, there will be waste generated as a result of ongoing maintenance activities (e.g., used lubricants and oils).

The Operations & Maintenance Contractor would implement environmental procedures for both hazardous and non-hazardous waste management. For hazardous waste management, the Contractor would outline the procedures for proper identification, storage, handling, transport, and disposal of hazardous waste. In addition, the procedures would outline specific requirements for such items as personnel training, emergency response, product review and approval, and record keeping. For non-hazardous waste management, the Contractor would establish procedures for the management and disposal of used lubricants, drums and general waste, including reuse and recycling where appropriate.

3.4.4 Air Emissions

Construction/Decommissioning

Construction and decommissioning activities would result in minor localized air emissions from the operating of equipment. Traffic delays also result in increased emissions from vehicles traveling slowly through construction/decommissioning zones. The movement of materials to and from the site would also generate emissions.

To reduce emissions from equipment and vehicles, several mitigation measures would be employed:

- Multi-passenger vehicles would be utilized to the extent practical;
- Company and contractor personnel would avoid idling of vehicles when not necessary for activities;
- Equipment and vehicles would be turned off when not in use unless required for activities and/or effective operation;
- Equipment and vehicles would be maintained in good working order with functioning mufflers and emission control systems as available;
- All vehicles would be fitted with catalytic converters as required;
- All equipment and vehicles would meet the emissions requirements of the MOE and/or MTO;
- As appropriate, records of vehicle maintenance would be retained and made available for periodic review by the Contractor; and
- All vehicles identified through the monitoring program that fail to meet the minimum emission standards would be repaired immediately or replaced as soon as practicable.

Operation

Aside from the use of maintenance equipment and vehicles no other potential effects to air quality have been identified with the operation of the Project.

To reduce emissions from equipment and vehicles, the mitigation measures mentioned above would be utilized as applicable.

3.4.5 Dust and Odour Generation

Construction/Decommissioning

Construction and decommissioning related traffic and various activities (e.g. excavation, grading, soil stripping and exposed areas) have the potential to create nuisance dust effects in the immediate vicinity of the Project. High winds during dry weather may erode and disperse loose soil material away from the area, which may be a nuisance to residential properties located in close proximity. Storage piles exposed to wind can also be a source of fugitive dust emissions, as can various road surfaces such as unpaved roads. No odour emissions are anticipated during construction and decommissioning of the Project.

To protect adjacent receptors from potential off-site dust concerns, the Contractor would implement good site practices which may include:

- Maintaining equipment in good running condition and in compliance with regulatory requirements;
- Protecting stockpiles of friable material with a barrier or windscreen and in the event of dry conditions and excessive dust;
- Dust suppression (e.g. water and/or calcium chloride) of source areas; and
- Covering loads of friable materials during transport.

Operation

Aside from the use of maintenance vehicles generating dust, no other potential effects to air quality from dust have been identified with the operation of the Project. No odour emissions are anticipated during operation of the Project.

To reduce dust emissions during operations and maintenance, the mitigation measures mentioned above would be utilized as applicable.

3.4.6 Environmental Noise

Construction/Decommissioning

During construction/decommissioning of the Project, noise would be generated by the operation of heavy equipment at the work areas and associated vehicular traffic on-site and on haul routes.

To minimize inconvenience brought on by noise, all engines associated with equipment would be equipped with mufflers and/or silencers in accordance with MOE and/or MTO guidelines and regulations. Noise levels arising from equipment would also be compliant with sound levels established by the MOE. To the greatest extent possible, activities that could create excessive noise would be restricted to regular construction hours and adhere to any local noise by-laws. If activities that cause excessive noise must be carried out outside of these time frames, adjacent residents would be notified in advance and by-law conformity would occur, as required. Sources of continuous noise, such as portable generator sets, would be shielded as appropriate or located so as to minimize disturbance to local residents.

Operation

Mechanical and aerodynamic noise would be emitted from the wind turbines in addition to environmental noise from transformers. An environmental noise report has confirmed that all turbines and transformers proposed as part of the Project meet regulatory setbacks (see the Design and Operations Report).

The Project would be required to operate according to the terms and conditions of the REA. In the event the Project does not operate according to the terms and conditions of the REA, the non-compliant turbine(s) would be shut down until the problem is resolved.

3.4.7 Hazardous Materials

Construction and Decommissioning

Hazardous materials are limited to fuels and lubricants that would be on-site for use in equipment. These materials would be stored in appropriate storage containers during the construction phase by the Construction Contractor. Designated storage areas and the type of storage areas would be confirmed by the Construction Contractor prior to construction.

Operation

Hazardous materials to be used during the course of Project operation are limited to lubricants and fluids for the operation and maintenance of the turbines, switchyard, and other equipment. These would be stored in the control room at the switchyard. There are no other known hazardous by-products of the wind energy generation process itself.

3.4.8 Sewage

Construction and Decommissioning

Sanitary waste generated by the construction and decommissioning crews would be collected via portable toilets and wash stations supplied by a contracted third party. Disposal of these wastes would be the responsibility of the contracted party and would be done in accordance with regulatory requirements.

Operation

The switchyard would not be equipped with sewage infrastructure.

3.4.9 Stormwater Management

Construction and Decommissioning

During construction and decommissioning, proper grading would be conducted and mitigation measures implemented to reduce potential for runoff at the work areas.

Operation

The switchyard property will have little impact to existing land grade or stormwater flow patterns, and therefore no stormwater management will be required.

3.4.10 Water-taking Activities

Construction and Decommissioning

There is potential for groundwater to be encountered during the installation and/or removal of the turbine foundations, underground collector lines and/or fibre optic cable. Therefore, it is possible that some dewatering activities would be required. Review of the hydrogeology at the site indicate that water withdrawn would be minimal and would not exceed 50,000 litres (L) per day.

Operation

No groundwater or surface water-taking activities are planned as part of the operation of the facility.

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4.0 Description of Potential Environmental Effects

4.1 POTENTIAL ENVIRONMENTAL EFFECTS

Based upon the current understanding of the potential effects of constructing, operating, and decommissioning a wind farm, Project-specific potential environmental effects have been identified (see Appendix B). Please note that Appendix B contains a summary of the potential effects and monitoring plans during the construction, operation, and decommissioning of the Project. Detailed descriptions of all potential effects, mitigation measures, and monitoring plans are provided in the following reports:

- Construction Plan Report;
- Design and Operations Report;
- Decommissioning Plan Report;
- Wind Turbine Specifications Report;
- Natural Heritage Assessment Report;
- Water Report;
- Heritage Resource Assessment Report; and
- Stage 1 and Stage 2 Archaeology Assessment Reports.

4.2 PROJECT LOCATION AND SETBACKS MAPPING

A key component of the REA process is the establishment of common setbacks for all renewable energy facilities in the Province. The Project meets the mandatory setbacks within O. Reg. 359/09 in all cases, with the exception of one turbine which necessitated a Property Line Setback Assessment (see the Design and Operations Report). A Site Plan that identifies on-site and off-site land uses within 300 m of the Project Location, including natural heritage features, water bodies, and built heritage features as identified in the records review and site investigations, is provided in Appendix A.

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5.0 Closure

The Brooke-Alvinston Wind Farm Project Description Report has been prepared by Stantec Consulting Ltd. for Zephyr Farms Limited in accordance with Item 10, Table 1 of O.Reg. 359/09, and the MOE's draft guidance document *Technical Bulletin One: Guidance for preparing the Project Description Report* (MOE, 2010).

This report has been prepared by Stantec for the sole benefit of Zephyr Farms Limited, and may not be used by any third party without the express written consent of Zephyr Farms Limited. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

STANTEC CONSULTING LTD.

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