

NATION RISE WIND FARM

Design and Operations Report

Nation Rise Wind Farm Limited Partnership

Document No.: 10021027-CAMO-R-03

Issue: E, **Status:** FINAL

Date: 29 November 2017



IMPORTANT NOTICE AND DISCLAIMER

1. This document is intended for the sole use of the Customer as detailed on the front page of this document to whom the document is addressed and who has entered into a written agreement with the DNV GL entity issuing this document ("DNV GL"). To the extent permitted by law, neither DNV GL nor any group company (the "Group") assumes any responsibility whether in contract, tort including without limitation negligence, or otherwise howsoever, to third parties (being persons other than the Customer), and no company in the Group other than DNV GL shall be liable for any loss or damage whatsoever suffered by virtue of any act, omission or default (whether arising by negligence or otherwise) by DNV GL, the Group or any of its or their servants, subcontractors or agents. This document must be read in its entirety and is subject to any assumptions and qualifications expressed therein as well as in any other relevant communications in connection with it. This document may contain detailed technical data which is intended for use only by persons possessing requisite expertise in its subject matter.
2. This document is protected by copyright and may only be reproduced and circulated in accordance with the Document Classification and associated conditions stipulated or referred to in this document and/or in DNV GL's written agreement with the Customer. No part of this document may be disclosed in any public offering memorandum, prospectus or stock exchange listing, circular or announcement without the express and prior written consent of DNV GL. A Document Classification permitting the Customer to redistribute this document shall not thereby imply that DNV GL has any liability to any recipient other than the Customer.
3. This document has been produced from information relating to dates and periods referred to in this document. This document does not imply that any information is not subject to change. Except and to the extent that checking or verification of information or data is expressly agreed within the written scope of its services, DNV GL shall not be responsible in any way in connection with erroneous information or data provided to it by the Customer or any third party, or for the effects of any such erroneous information or data whether or not contained or referred to in this document.
4. Any energy forecasts estimates or predictions are subject to factors not all of which are within the scope of the probability and uncertainties contained or referred to in this document and nothing in this document guarantees any particular energy output, including factors such as wind speed or irradiance.

KEY TO DOCUMENT CLASSIFICATION

Strictly Confidential	:	For disclosure only to named individuals within the Customer's organization.
Private and Confidential	:	For disclosure only to individuals directly concerned with the subject matter of the document within the Customer's organization.
Commercial in Confidence	:	Not to be disclosed outside the Customer's organization.
DNV GL only	:	Not to be disclosed to non-DNV GL staff
Customer's Discretion	:	Distribution for information only at the discretion of the Customer (subject to the above Important Notice and Disclaimer and the terms of DNV GL's written agreement with the Customer).
Published	:	Available for information only to the general public (subject to the above Important Notice and Disclaimer).

Project name:	Nation Rise Wind Farm	DNV GL - Energy
Report title:	Design and Operations Report	Advisory Americas
Customer:	Nation Rise Wind Farm Limited Partnership 110 Spadina Ave. Suite 609 Toronto, ON, M5V 2H2	4100 Rue Molson, Suite 100, Montreal, QC, H1Y 3N1 CANADA Tel: 514 272-2175 Enterprise No.: 860480037
Contact person:	Kenneth Little	
Date of issue:	29 November 2017	
Project No.:	10021027	
Document No.:	10021027-CAMO-R-03	
Issue/Status	E/FINAL	

Prepared by:

Verified by:

Approved by:

Claudia Pilas
Project Analyst, Environmental and
Permitting Services

Gabriel Constantin
Team Leader, Environmental and
Permitting Services

Michael Roberge,
Head of Section, Environmental and
Permitting Services

- Strictly Confidential
 Private and Confidential
 Commercial in Confidence
 DNV GL only
 Customer's Discretion
 Published

© 2016 GL Garrad Hassan Canada Inc.. All rights reserved.

Reference to part of this report which may lead to misinterpretation is not permissible.

Issue	Date	Reason for Issue	Prepared by	Verified by	Approved by
A	22 March 2017	Draft report	C. Pilas	G. Constantin	M. Roberge
B	12 April 2017	Updated draft report	C. Pilas	G. Constantin	M. Roberge
C	7 July 2017	Updates to report for final submission	C. Pilas	G. Constantin	M. Roberge
D	4 August 2017	Minor updates	C. Pilas	G. Constantin	M. Roberge
E	29 November 2017	Rectify the number of petroleum wells within 75m of the Project to 0	C. Pilas	G. Constantin	M. Roberge



Table of contents

1 PREAMBLE.....	1
2 GENERAL INFORMATION.....	2
2.1 Project Name and Project Proponent.....	2
2.2 Location of Project.....	2
2.3 Energy Source, Nameplate Capacity, and Class of Facility.....	5
2.4 Contact Information.....	5
3 SITE PLAN.....	6
3.1 Project Optimization Strategy.....	6
3.2 Facility Components.....	7
3.3 Features of the Project Area.....	8
4 FACILITY DESIGN PLAN.....	12
4.1 Name Plate Capacity and Facility Classification.....	12
4.2 Turbine Specifications.....	12
4.3 Permanent Meteorological Tower(s).....	13
4.4 Access Roads.....	13
4.5 Electrical Collector Lines, Substation and Switchyard.....	13
4.6 Construction Staging and Laydown Areas.....	14
5 FACILITY OPERATIONS PLAN.....	15
5.1 General.....	15
5.2 Use of Meteorological Data.....	15
5.3 Routine Turbine Maintenance.....	15
5.4 Unplanned Turbine Maintenance.....	15
5.5 Electrical System Maintenance.....	16
5.6 Waste Management.....	16
5.7 Water Takings.....	16
6 ENVIRONMENTAL EFFECTS MONITORING PLAN.....	17
7 EMERGENCY RESPONSE PLAN.....	52
7.1 Emergency Response.....	52
7.2 Fire Response.....	52
7.3 Personal Injury Response.....	53
7.4 Spills Response.....	53
7.5 Communications Plan.....	54
8 REFERENCES.....	56

Appendices

APPENDIX A – SITE PLAN MAPS

APPENDIX B – WIND TURBINE SPECIFICATION REPORT

APPENDIX C – STAGE 1 AND STAGE 2 ARCHAEOLOGICAL ASSESSMENTS

APPENDIX D – HERITAGE IMPACT ASSESSMENT

APPENDIX E – NATURAL HERITAGE ASSESSMENT

APPENDIX F – WATER BODY AND WATER ASSESSMENT REPORTS

APPENDIX G – NOISE IMPACT ASSESSMENT

APPENDIX H – PROPERTY SETBACK ASSESSMENT

List of tables

Table 1-1: Design and Operations Report Requirements and Corresponding Sections	1
Table 2-1: Geographic coordinates of Project study area	2
Table 3-1: Ontario Regulation 359/09 Setback Distances	7
Table 4-1: Summary of Turbine Technical Specifications	12
Table 6-1: Potential Negative Effects and Mitigation Measures – Construction and Decommissioning	18
Table 6-2: Potential Negative Effects and Mitigation Measures – Operations	42

List of figures

List of abbreviations

Abbreviation	Meaning
ANSI	Life Science Area of Natural and Scientific Interest
APRD	Approval and Permitting Requirements Document
CEAA	<i>Canadian Environmental Assessment Act</i>
CHVI	Cultural Heritage Value or Interest
DFO	Department of Fisheries and Ocean Canada
DNV GL	GL Garrad Hassan Canada Inc.
EC	Environment Canada
EEMP	Environmental Effects Monitoring Plan
EIS	Environmental Impact Study
ESA	<i>Endangered Species Act</i>
EPA	<i>Ontario Environmental Protection Act</i>
HONI	Hydro One Networks Inc.
IBA	Important Bird Areas
IESO	Independent Electricity System Operator
LRP	Large Renewable Procurement
MNRF	Ontario Ministry of Natural Resources and Forestry
MOECC	Ontario Ministry of the Environment and Climate Change

MTCS	Ontario Ministry of Tourism, Culture and Sport
MTO	Ontario Ministry of Transportation
MW	Megawatt
NIA	Noise Impact Assessment
OHSA	<i>Ontario Occupational Health and Safety Act (OHSA)</i>
<i>O.Reg.</i>	<i>Ontario Regulation</i>
PDR	Project Description Report
PORs	Points of Reception
PSWs	Provincially Significant Wetlands
RCMP	Royal Mounted Canadian Police
REA	Renewable Energy Approval
SCADA	Supervisory Control and Data Acquisition
SARA	<i>Species at Risk Act</i>
SNCA	South Nation Conservation Authority
SWH	Significant Wildlife Habitat

1 PREAMBLE

Nation Rise Wind Farm Limited Partnership (the "Proponent") is proposing to develop the Nation Rise Wind Farm (the "Project") which is subject to *Ontario Regulation (O. Reg.) 359/09 (Renewable Energy Approvals (REA) [1] under Part V.0.1 of the Ontario Environmental Protection Act (EPA))*, as amended. The Proponent was awarded a contract for this Project in March 2016 from the Independent Electricity System Operator (IESO) under the Large Renewable Procurement (LRP), and is seeking a Renewable Energy Approval (REA) from the Ontario Ministry of the Environment and Climate Change (MOECC). The Project will be owned and operated by Nation Rise Wind Farm Limited Partnership, a wholly-owned subsidiary of EDP Renewables Canada Ltd.

This Design and Operations Report (DOR) has been prepared in accordance with Table 1 of *O. Reg. 359/09* and the Technical Guide to Renewable Energy Approvals, Chapter 6: Guidance for preparing the Design and Operations Report [2]. Table 1-1 below presents the corresponding sections within this report that satisfy each DOR requirement, as per these guidelines.

Table 1-1: Design and Operations Report Requirements and Corresponding Sections

Requirement	Section
Site Plan	3
Facility Design Plan	4
Facility Operations Plan	5
Environmental Effects Monitoring Plan	6
Emergency Response (and Communication) Plan	7

2 GENERAL INFORMATION

2.1 Project Name and Project Proponent

The name of the Project is Nation Rise Wind Farm (hereafter referred to as “the Project”) and Nation Rise Wind Farm Limited Partnership is the Project Proponent (hereafter referred to as the “Proponent”).

2.2 Location of Project

The Nation Rise Wind Farm is located in eastern Ontario, within the Township of North Stormont and the United Counties of Stormont, Dundas and Glengarry, Ontario. More specifically, the Project is located in the western portion of North Stormont bounded to the south by the Township of South Stormont and to the west by the boundary of the Township of North Dundas. The north portion of the Project is delimited by the municipality boundaries of Russell and The Nation. Courville Road and MacMillan Road are the east boundaries of the Project. The Project has a total study area of approximately 8,974 hectares.


Project components will be installed predominantly on privately-owned agricultural lots. It is anticipated that the electrical collector lines will be partially sited within public road allowances to connect to the substation that is located in the northern section of the Project study area. There is no proposed transmission line for the Project.

The proposed Project study area is located on private and public lands; the geographic coordinates of the extreme points of the Project study area are presented in Table 2-1 and Figure 2-1. The location of the study area was defined early in the planning process and was selected based on the availability of wind resources, the approximate area required for the proposed Project, and availability of existing infrastructure for connection to the electrical grid. The Project substation is located along the existing L24A 230 kV transmission line just south of County Road 13. Most of the agricultural fields are planted annually with common crops (e.g. corn, soybeans and winter wheat) or are used as pasture lands.

Table 2-1: Geographic coordinates of Project study area

Site Location	Easting	Northing
North	483970	5008222
East	480929	5004950
West	494722	5001252
South	487941	4992782

The Project Location, situated within the broader Project study area, is defined in *O. Reg. 359/09* 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 is engaging in or proposes to engage in the project”. As described therein, the Project Location boundary is the outer limit of where site preparation and construction activities will occur (i.e., *Disturbance Areas* described below) and where permanent infrastructure will be located, including the air space occupied by turbine blades.



Disturbance Areas surrounding various Project components have been identified; such areas correspond to the “Project Location” boundaries on the Site Plan Maps provided in Appendix A. These areas represent zones where temporary disturbance during the construction phase may occur such as temporary Project component laydown and storage areas. With the exception of the Project components described below, no permanent infrastructure is proposed within these areas. Following construction activities, the land will be returned to pre-construction conditions.

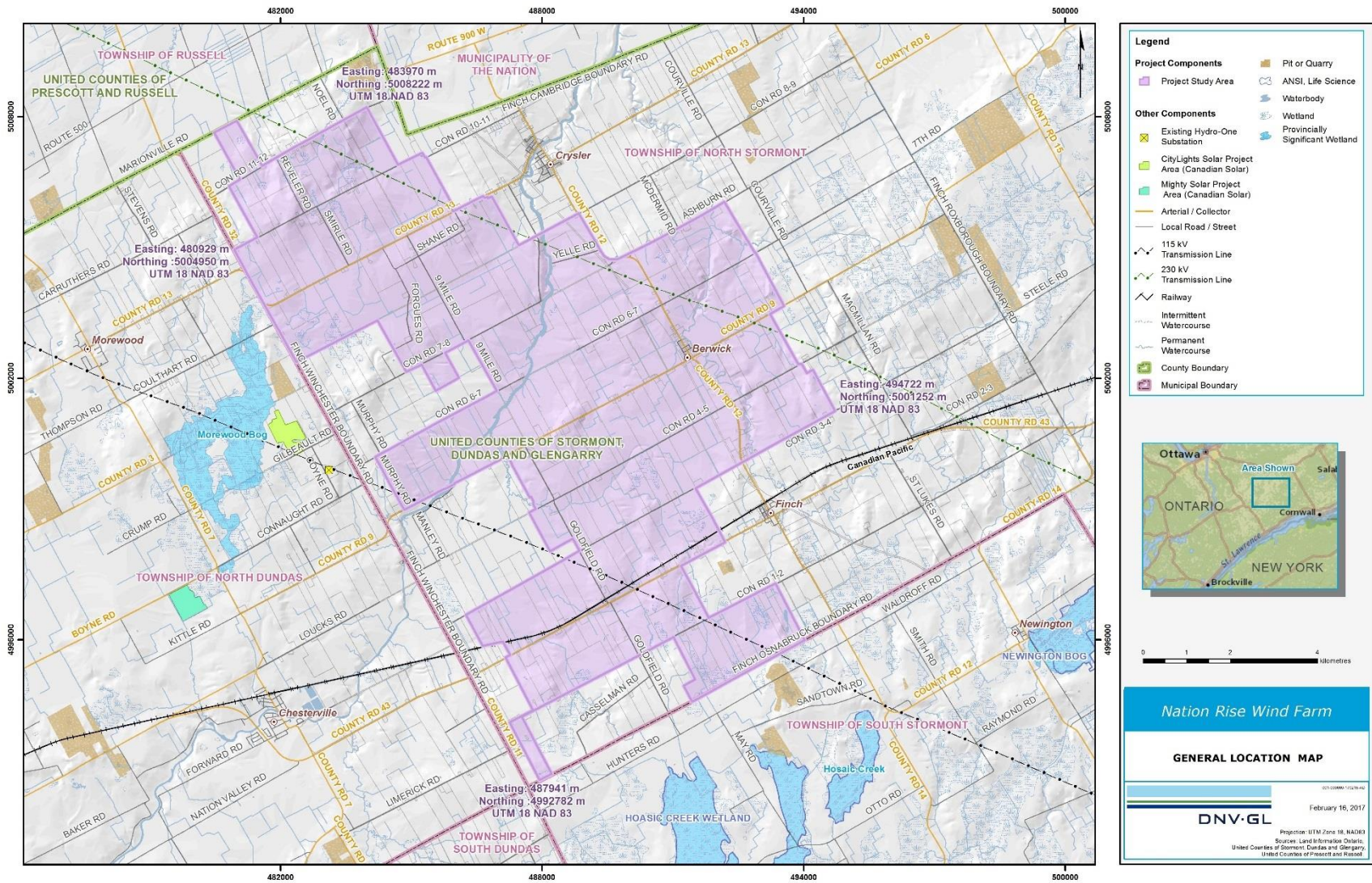


Figure 2-1 General Project study area

2.3 Energy Source, Nameplate Capacity, and Class of Facility

The wind turbine generators of the Project will convert wind energy into electricity to feed into the Ontario IESO transmission system. This Project, with a total nameplate capacity of approximately 100 megawatts (MW), is considered to be a Class 4 wind facility. A total of 33 wind turbine locations are being permitted and the Proponent is currently evaluating different wind turbine technologies for the Project. The technology selected is likely to be a 3.0 to 3.6 MW turbine model and for the purposes of reference throughout this REA application, the Vestas V136-3.45 MW turbine model has been considered, although an acoustically equivalent wind turbine model may be selected.

2.4 Contact Information

2.4.1 Project Proponent

The Project proponent is the Nation Rise Wind Farm Limited Partnership, a renewable energy developer, owner and operator, with an office in Toronto, Ontario. The primary contact for this Project is:

Kenneth Little

Development Project Manager
Nation Rise Wind Farm Limited Partnership
110 Spadina Ave., Suite 609,
Toronto (ON), M5V 2K4, Canada
(416) 502-9463

Project email: nationrise@edpr.com

Project website: <http://nationrisewindfarm.com/>

2.4.2 Project Consultant

GL Garrad Hassan Canada Inc. (hereafter referred to as "DNV GL"), a member of the DNV GL Group and part of the DNV GL brand, has been retained to lead the REA work for the Project. The Environmental and Permitting Services team of DNV GL has completed mandates throughout Canada, the United States and in many other parts of the world. These mandates include permitting management, permit applications, environmental impact assessment, and various environmental studies for more than 15,000 MW of wind and solar-PV projects.

DNV GL's environmental team is composed of over 20 environmental professionals, including environmental impact specialists, planners, GIS, technicians and engineers. DNV GL has no equity stake in any Project, distinguishing it from many other players and underscoring its independence.

The primary DNV GL contact for this project is:

Gabriel Constantin

Team Leader, Environmental and Permitting Services
DNV GL – Energy Advisory
4100 Molson Street, Suite 100,
Montreal (QC), H1Y 3N1, Canada
(416) 320-4636

Email: gabriel.constantin@dnvgl.com



3 SITE PLAN

3.1 Project Optimization Strategy

The site plan presented in this section and displayed visually in the Site Plan Maps included in Appendix A, details the location of facility components, natural features, noise receptors, required setbacks and lands within 300 m of the Project Location.

The exercise of siting a wind farm is an iterative process that involves balancing several design factors, such as the wind resource, prescribed setbacks, environmental and cultural heritage constraints, engineering constraints, landowner preferences, and feedback received from public consultation activities.

The proposed Project design takes into consideration all these factors, namely the setback distances prescribed in *O.Reg. 359/09*, as outlined in the following table, as well as several other best practice setbacks to minimize impact as much as possible. As per REA, “consultation zone” buffers are also set to indicate within which distance an Environmental Impact Study (EIS) or a property setback assessment may be required. Wherever possible, the Project was sited to avoid these consultation zone buffers.

Table 3-1: Ontario Regulation 359/09 Setback Distances

Components	Setback	Note
Built Environment Setbacks		
Point of Reception (dwelling, campground, school, church, picnic site, cemetery, Vacant Lot Receptor, etc.)	550 m and max PSL of 40 dBA as per MOECC noise guidelines	The setback distance is to be measured from the center of the turbine base to the noise receptor.
Lot line	Hub Height	Blade length + 10 m (requires Property Setback Assessment) ¹ . The Property Setback Assessment for the Project is located in Appendix H of this report.
Road and railways	Blade + 10 m	Blade length + 10 m, measured from the center of the turbine base to the boundary of the right-of-way.
Natural Features and Water Bodies Setbacks²		
Significant Natural Feature	120 m	Measured from the Project Location boundary to the nearest point of the natural feature. Project components may be sited closer than the prescribed setback if an Environmental Impact Study (EIS) is completed.
Water Body	120 m	Measured from the average annual high water mark of a lake, or permanent/intermittent stream. Components may be sited closer than the prescribed setback if a Water Body Report is prepared. Turbines or transformers may not be sited closer than 30 m to these features.
Petroleum Resource	75 m	Setback distances may be reduced with the submission of a Petroleum Engineer report submission to the Ministry of Natural Resources and Forestry (MNRF).

¹ Can be reduced if lot abutting parcel of land is owned by the Proponent, or if landowner of abutting parcel has a written agreement with the Proponent to place a turbine closer than blade + 10 m.

² Can be reduced with appropriate EIS or engineers report.

The resulting Project design is presented in the detailed Site Plan Maps found Appendix A. A description of the significant features found on the maps, including Project components, cultural heritage features, natural features and noise receptors is included in the following sub-sections.

3.2 Facility Components

The Project will be made up of the following main components:

- Wind turbine generators;
- Meteorological tower(s);
- Access roads and crane pads;
- Electrical collector lines, substation and switchyard; and

- Construction staging and laydown areas (including temporary staging areas).

Facility components have been clearly depicted in the Site Plan Maps included in Appendix A and are described in greater detail within Section 4 of this report.

3.3 Features of the Project Area

Desktop and field studies were undertaken to identify and describe the features in the area that may be affected by the construction and/or operation of the Project. The following sections summarize the results of these studies.

3.3.1 Cultural Heritage (Archaeological and Heritage Resources)

Detailed archaeological and cultural heritage assessments were prepared and submitted to the Ministry of Tourism, Culture and Sport (MTCS) for acceptance. A copy of the complete reports and confirmation letters from the MTCS are included within Appendix C and Appendix D of this report, as part of the complete REA application submission package for this Project.


Archaeological Features

Stage 1 [4] and Stage 2 archaeological assessments [5] were conducted by Golder Associates Ltd.

The Stage 1 archaeological assessment reports identified that the entire Project Location had archaeological potential for the presence of both Pre-Contact Aboriginal and Historic Euro-Canadian archaeological resources. The Stage 1 recommended that a Stage 2 property survey of the Project Location be completed prior to construction.

A Stage 2 archaeological assessment was completed on all portions of the project Location. The Stage 2 was completed over a period of 24 days between October 5th, 2016 and June 19th, 2017. The Stage 2 archaeological assessment involved a combination of the pedestrian and test pit survey methods across those portions of the study area that are proposed to be impacted by the project, including turbine locations, access roads, substations, collector lines, operations and maintenance buildings, meteorological and microwave towers, and temporary staging areas. The total areas assessed cumulatively to date represented approximately 456 hectares.

The Stage 2 archaeological assessment resulted in the identification of 20 find locations producing cultural material and one find location that produced a natural geological sample (21 find locations in total). Historic Euro-Canadian artifacts were found at 20 locations: NRWF-01, 02, 03, 04, 05, 06, 07, 08, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, and 21, and one natural geological sample, NRWF-09, which was initially thought in the field to be a Pre-Contact Indigenous artifact. Ten of the 21 archaeological locations (NRWF - 01, 04, 05, 06, 07, 10, 12, 14, 17, and 21) identified within the larger study area were determined to exhibit Cultural Heritage Value or Interest and, as such, are recommended for Stage 3 site specific archaeological assessment. Details on the recommendations for each archaeological site, as well as the rationale for the recommendation pertaining to each site, is contained in the body of the report in Section 5.0.



Copies of the Stage 1 and Stage 2 archaeological assessments, which have been accepted into the Ontario Public Register of Archaeological reports by the MTCS, are provided in Appendix C of this report.

Heritage Features

A Heritage Impact Assessment for the Project was conducted in December 2016 [7] by Golder Associates Ltd. The results of the assessment concluded that there are no protected cultural heritage resources and eighteen newly identified properties of cultural heritage value of interest (CHVIs) within the Project study area. It was determined that the Project poses no risk of direct or indirect adverse impacts to any heritage attributes of seventeen of these CHVIs. The heritage attributes of the remaining CHVI, 14114 Concession 10-11 Road, was determined to be at minimal risk of direct impact from vibration. A pre-construction condition survey was recommended to be conducted prior to access road construction. A cemetery and monument in Berwick were identified to be within the Project study area, but will not be impacted by the Project.

A copy of the Heritage Impact Assessment Report is provided in Appendix D.

3.3.2 Natural Heritage

A Natural Heritage Assessment (NHA), as per the requirements in the NHA Guide for Renewable Energy Projects [8] was prepared in four separate reports (Records Review, Site Investigation, Evaluation of Significance and Environmental Impact Study) that can all be found in Appendix E of this report. Following review of these reports, the MNRF provided confirmation and sign-off on July 11, 2017. The MNRF also reviewed the Environmental Effects Monitoring Plan (EEMP) that was prepared for the Project and provided confirmation and sign-off of this report on July 13, 2017.

The NHA suggests that the Project effects on natural heritage features will be limited and generally avoided, provided that the Project design follows REA setback regulations (Table 3-1) and that proper mitigation measures are applied. The majority of the habitat in the Project study area is composed of deciduous, mixed, and coniferous forests and treed wetlands, with some regenerating habitats.

The NHA indicates that there are no known Provincially Significant Wetlands (PSWs) or Provincially Significant Life Science or Earth Science Areas of Natural and Scientific Interest (ANSIs) within the Project study area.

To date, a detailed evaluation of significance of a portion of the candidate significant natural features and wildlife habitats within 120 m of the Project Location was completed. Of those habitats evaluated to date, two Significant Wildlife Habitats (SWHs) were confirmed, both of which required detailed consideration as part of the EIS: amphibian breeding habitat (woodland) and waterfowl stopover and staging area (aquatic).

In addition to wildlife habitats that have been confirmed to be significant through the completion of the evaluation of significance, several other wildlife habitats that could be considered to be significant have been identified. For the purposes of the NHA EIS submission, these habitats have been treated as significant. The NHA EIS also documents which of these wildlife habitats require pre-construction surveys to confirm significance. Wildlife habitats that have been treated as significant for the purposes of the EIS and that require pre-construction surveys include the following:

- Two (2) candidate bat maternity colonies;
- One (1) candidate turtle wintering area;
- Two (2) candidate alvar communities;
- One (1) candidate savannah community;
- Two (2) candidate tallgrass prairie communities;
- Eighteen (18) candidate amphibian breeding habitats (woodland);
- One (1) open country bird breeding habitat;
- Nine (9) common nighthawk (*Chordeiles minor*) habitats;
- Seventeen (17) eastern wood-pewee (*Contopus virens*) habitats;
- Four (4) wood thrush (*Hylocichla mustelina*) habitats;
- Eight (8) Mühlenberg's weissia (*Weissia muhlenbergiana*) habitats; and
- Six (6) monarch (*Danaus plexippus*) habitats.

Assuming the implementation of the planned mitigation measures, monitoring programs, and contingency plans (if necessary), there are unlikely to be any significant impacts to natural heritage features, including wetlands, or SWHs [10].

3.3.3 Water Bodies

The Water Body [11] and Water Assessment [12] Reports, which characterize the aquatic natural features and habitats in the Project area, are included in Appendix F of this report, as part of the complete REA application package.

Comprehensive site investigations for the Project were undertaken by NRSI biologists between 2 June 2016 to 27 February 2017. These site investigations included site-specific habitat assessments of water bodies throughout the Project area.

Through the completion of these studies, NRSI has confirmed the presence of 61 water bodies within the Project area, all of which have been identified as intermittent/permanent watercourses. A total of 39 of the identified water bodies intersect project infrastructure. The remaining 22 water bodies are present within 120 m of the Project Location but do not overlap project infrastructure. One seepage area was also identified within 120 m of the Project Location. No lakes or Lake Trout lakes were identified within the Project study area.


Water takings, if required, will be conducted as outlined in the Water Body and Water Assessment Reports.

No significant impacts are anticipated on the identified water body features as a result of the development of the Project following the implementation of proposed mitigation measures.

3.3.4 Noise Receptors

The Project study area is considered to be Class 3 (rural), defined as a rural area with an ambient noise dominated by natural sounds, with little or no road traffic. Class 3 areas often take one of the following forms:

- A small community with a population of less than 1,000;
- An agricultural area;

- 
- A rural recreational area such as a cottage or a resort area; or
 - A wilderness area.

As such, ambient sound levels within the Project study area and on adjacent lands are typical of rural areas of Ontario, with sounds originating from nature, residential activities, agricultural activities (tractors and other machinery), vehicle traffic, and ambient noise induced by wind.

Buildings within 2 km of the Project Location are identified in the site plans, and for the purposes of preparing the Noise Impact Assessment (NIA), Points of Reception (PoRs) within 1.5 km of the Project Location were identified by way of mapping, aerial imagery and a site validation. A total of 899 PoRs, including participants, were identified for this Project, including dwellings, Vacant Lot Receptors (VLRs) and other buildings considered to be PoRs under the MOECC's noise guidelines.

Wind energy projects have the potential to generate noise which may be observed under certain circumstances in the general vicinity of the study area, as well as at specific receptor locations (i.e., residents, hospitals, schools, daycares, places of worship, etc.). A NIA was conducted to evaluate these effects. The results from the NIA show that the Project complies with the applicable MOECC noise guidelines [13].

The NIA has been provided within Appendix G of this report.

4 FACILITY DESIGN PLAN

The present section provides a detailed summary of the Project components.

4.1 Name Plate Capacity and Facility Classification

The wind turbine generators of the Project will convert the wind's energy into electricity to feed into the Ontario IESO transmission system. This Project, with a total nameplate capacity of approximately 100 MW, is considered to be a Class 4 wind facility. A total of 33 wind turbine locations are being permitted and the Proponent is currently evaluating different wind turbine technologies for the Project. It is likely to be a 3.0 to 3.6 MW turbine and for the purpose of reference, the Vestas V136-3.45 MW turbine model has been considered in the Project REA application, although an acoustically equivalent wind turbine may be chosen.

4.2 Turbine Specifications

The currently proposed wind turbine technology for the Project is the Vestas V136 (3.45 MW) turbine model, although an acoustically equivalent wind turbine may be chosen. The Vestas V136 turbine is a three-bladed, upwind, horizontal-axis turbine.

The total rotor diameter of the V136 is 136 m, with a corresponding swept area of 14,526 m². The turbine rotors and nacelles will be mounted on 132 m tubular towers consisting of up to seven steel sections, although other heights are being evaluated. Depending on the turbine technology selected, a pad mounted transformer will be installed adjacent to the tower or alternatively, an up-tower transformer may be used.

The complete technical specifications for the selected technology are provided in the Wind Turbine Specification Report, which is included in Appendix B of this report.

The acoustic emissions data, including the sound power level and frequency, is provided in detail within the NIA that is provided within Appendix G of this report. All turbines for the Project will meet Transport Canada requirements for lighting and aviation safety.

Table 4-1 below provides a summary of the Turbine Technical Specifications.

Table 4-1: Summary of Turbine Technical Specifications

Specification	Details
Model	Vestas V136 STE
Design	Steel, tubular; up to 7 sections
Rated Power	3.45 MW
Hub height	132 m
Rotor diameter	136 m
Number of blades	3
Rotational Speed (rpm)	5.6-15.3
Cut-in wind speed	3 m/s
Cut-out wind speed	22.5 m/s

Specification	Details
Nominal wind speed	11.5 m/s
Maximum sound power level	105.5 dBA (Noise Mode 0)

4.3 Permanent Meteorological Tower(s)

Wind speed, wind direction, temperature and humidity will be measured by up to three (3) meteorological towers that will be constructed on small concrete pad(s) and extend to a maximum of up to 140 m in height. The tower type selected will either be lattice or monopole and the tower(s) may be supported by guy wires (monopole only).

While only up to three (3) meteorological towers will be installed, six (6) potential locations are being permitted for the Project; the exact locations will be determined prior to construction. The tower(s) will remain on site for the duration of the Project for wind turbine performance testing.

4.4 Access Roads

Transportation of machinery, turbine components and other equipment will use existing municipal roads and private access roads. New access roads will be constructed on private lands to provide access for components and equipment to the private properties during the construction phase and for maintenance activities during operation. Typically access roads will be constructed to be up to 20 m wide during construction. Areas adjacent to the access road within the larger disturbance area may be utilized during the construction phase in order to accommodate cranes, transportation equipment and other construction activities. After construction, these roads may be reduced in size to approximately 5-6 m in width, to allow access to turbines and associated infrastructure for maintenance and repairs. During operations, it is possible that additional turning radii/road widenings may be required to accommodate crane access.

4.5 Electrical Collector Lines, Substation and Switchyard

Energy generated by the Project will be collected via underground cabling and overhead lines and directed to a substation.

4.5.1 Electrical Collector Lines

The power generated at each of the wind turbine generators will be transported through 34.5 kV underground or overhead cables to the Project substation. Electrical collector lines will generally be located on private property as well as some sections along public road allowances to reach the Project substation. Moreover, fiber optic lines will run with the collection system to the Project substation.

Junction boxes will also be installed below or above ground where needed along the collection circuit.

4.5.2 Substation and Switchyard

Measuring a total footprint of approximately 4-7 ha, the electrical substation and switchyard for the Project will be adjacent to each other and located on privately owned property. The substation and switchyard may be comprised of, but not limited to the following components:

- Isolation switch(es);
- Circuit breaker(s);
- Step-up power transformer(s);
- Reactive compensation equipment with harmonics filter if required;
- Instrument transformers;
- Grounding (consistent with Ontario Electrical Safety Code standards);
- Containment system;
- Oil/water separator;
- Revenue metering;
- Communication tower and associated equipment;
- Control building;
- Grounding transformer;
- Neutral grounding reactor;
- Support steel;
- Busbar;
- Sound barrier; and
- Fence.

A secondary containment system will be included to prevent soil contamination in the event of a leak from the main transformer.

Power will be stepped up to a transmission voltage of 230 kV at the substation and will be fed into the existing Hydro One Network Inc. (HONI) transmission system adjacent to the Project substation.

4.6 Construction Staging and Laydown Areas

It is anticipated that up to three temporary construction staging areas will be constructed on privately owned lands for the purposes of staging and storing equipment during the construction phase. Activities and facilities within these staging areas will include material storage, equipment refuelling, construction offices, a parking lot, temporary toilet facilities, rinsing and water facilities, and communications equipment. Each temporary staging area will have a footprint of approximately 2-7 ha.

In addition to this, a temporary area of approximately 3 ha around each wind turbine will be established for the laydown and assembly of the wind turbine components. These temporary areas will be restored following the construction phase to agricultural uses.

5 FACILITY OPERATIONS PLAN

5.1 General

The operations phase for the Project is not resource intensive, with typical activities pertaining to computer-controlled operation of turbines and maintenance.

Each turbine is connected to a Supervisory Control and Data Acquisition System (SCADA), which monitors a large number of meteorological and mechanical parameters in real time. If this system detects any condition that falls outside of the normal operating conditions of the turbine (i.e. high wind speeds, overheating of the generator, short circuits, etc.), the turbine will be stopped immediately.

The operations phase activities mainly relate to regular maintenance runs and verification of the Project infrastructure.

5.2 Use of Meteorological Data

The use of meteorological data is key to the safe and efficient operation of a wind energy centre. Some operational decisions made using meteorological data include:

- Cut-in wind speed;
- Cut-out wind speed;
- Turbine shut-down during icing conditions; and
- Turbine shut-down during extreme weather events.


5.3 Routine Turbine Maintenance

Routine preventative maintenance activities are scheduled on an annual basis with specific maintenance tasks scheduled for each year. Maintenance is done by removing the turbine from service and having two to three wind technicians climb the tower to spend the necessary time carrying out maintenance activities.

Consumables such as the various greases used to keep the mechanical components operating and oil filters for gearboxes and hydraulic systems are used for routine maintenance tasks. Following the maintenance work on the turbine, the area is cleaned up. All surplus lubricants and grease-soaked rags are removed and disposed of as required by applicable regulations. All maintenance activities will adhere to the same spill prevention industry best practices undertaken during the construction phase.

5.4 Unplanned Turbine Maintenance

Modern wind turbines are very reliable and the major components are designed to operate for approximately 30 years. However, wind turbines are large and complex electromechanical devices with rotating equipment and many components; therefore, component failures may occur despite the high reliability of the turbines fleet-wide. Most commonly, the failure of small components such as switches, fans, or sensors will take the turbine out of service until the faulty component is replaced.



Events involving the replacement of a major component such as a gearbox or rotor are rare. If they do occur, the use of large equipment, sometimes as large as that used to install the turbines, may be required. Typically only a small percentage of turbines would need to be accessed with large equipment during their operating life.

5.5 Electrical System Maintenance

The electrical collector lines, substation and switchyard equipment will require periodic maintenance activities. Routine maintenance will include condition assessment for above-ground infrastructure and protective relay maintenance of the substation, in addition to monitoring of the secondary containment system for traces of oil.

5.6 Waste Management

Waste generated during the operations phase will be removed by a licensed operator and disposed of at an approved facility. Any lubricants or oils resulting from turbine maintenance will be drummed on site and disposed of in accordance with applicable provincial regulations. All reasonable efforts will be made to minimize waste generated and to recycle materials including returning packaging material to suppliers for reuse/recycling. The spill prevention protocols followed during construction will continue to be observed throughout the facility operations and maintenance activities.

5.7 Water Takings

During the operations phase of the Project, no water taking in excess of 50,000 L/day is anticipated during the operation of the Project. No Operations and Maintenance (O&M) building is planned for the Project and therefore no long-term water takings are anticipated.



6 ENVIRONMENTAL EFFECTS MONITORING PLAN

This section presents a summary of potential effects, mitigation measures and residual effects associated with project-environment interactions during the construction, decommissioning and operations phase of the Project. For the sake of completeness, construction and decommissioning phase effects are discussed and presented here, but can also be found within the Construction and Decommissioning Plan Reports.

More detailed discussions relating to natural heritage impacts, archaeological and heritage impacts, noise impacts, land use impacts and water body impacts are found in the NHA reports, Archaeological Assessment Reports, Heritage Report, NIA and Water Body Reports, as part of the complete REA application package.

As requested under REA, potential effects from the construction, installation, decommissioning and operation and of the wind farm must be assessed while considering applicable mitigation and compensation measures. The Project *residual effects* (i.e. after considering mitigation/compensation measures) will be determined and their significance will be based on the level of concern and likelihood of each effect.

Depending on the outcome of the effects assessment, follow-up and/or monitoring programs could be proposed in order to further investigate the potential effects, or verify the significance of the effect following commissioning.

6.1.1 Construction and Decommissioning

Table 6-1: Potential Negative Effects and Mitigation Measures – Construction and Decommissioning

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Cultural Heritage (Protected Properties, Archaeological and Heritage Resources)				
Disturbance or displacement of archaeological resources by any ground disturbance activity.	Avoid disturbance/loss of archaeological sites.	<p>Conduct Archaeological Assessment and apply recommended avoidance measures and other measures from licensed archaeologist or MTCS to project design.</p> <p>Details of the Archaeological Assessment can be found in the reports on this subject as part of the complete REA application package.</p>	<p>The Archaeological Assessment was undertaken as per MTCS guidelines and it is anticipated that the Project will receive confirmation from the MTCS.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: Immediate notification of the Archaeologist and the MTCS in the event archaeological resources are found.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Construction vibrations to sensitive cultural heritage buildings	Minimize direct impacts from vibrations.	<p>Apply avoidance and minimization measures recommended in the Cultural Heritage Assessment.</p> <p>Details of the Cultural Heritage Assessment can be found in the reports on this subject as part of the complete REA application package.</p>	<p>The Cultural Heritage Assessment was undertaken as per MTCS guidelines and it is anticipated that the Project will receive confirmation from the MTCS.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: No monitoring required.</p> <p>Contingency: If the avoidance and minimization measures cannot be implemented, a more detailed vibration analysis will be undertaken by a qualified engineer.</p>
Natural Heritage				
Disturbance of local wildlife (Amphibian)	Avoid disturbance and displacement of breeding	Avoid construction and decommissioning activities in amphibian breeding habitat within	The NHA was undertaken per	Monitoring: Environmental supervision will be

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Breeding Habitat)	amphibians.	the peak amphibian breeding season (April 15 – June 15), in areas identified as being vulnerable to direct impact.	MNRF guidelines and this Project is anticipated to receive approval from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	implemented during construction as part of a routine inspection program to ensure adherence to the mitigation measures. Contingency: Schedule construction or decommissioning activities during daylight hours, wherever practicable, to limit potential impacts from light, noise, or vehicle interactions.
Disturbance of local wildlife (Bat Maternity Colony)	Avoid disturbance, displacement and mortality of roosting bats.	Avoid construction and decommissioning activities during the critical roosting period (June 1 – June 30) within designated areas that have been identified as being vulnerable to direct impact.	The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Environmental supervision will be implemented during construction as part of a routine inspection program to ensure adherence to the mitigation measures. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Disturbance of local wildlife (Butterfly Species of Conservation Concern Habitats)	Avoid disturbance and displacement of butterflies within significant butterfly species of conservation concern habitats.	Avoid construction and decommissioning activities during the flight season (May 1 – September 30) within significant butterfly species of conservation concern habitats that have been identified as being vulnerable to direct impact. Schedule construction and decommissioning activities to occur during daylight hours, wherever practicable, to avoid excessive noise and/or light disturbances to butterflies. If construction and decommissioning activities must occur outside of daylight hours, spotlights will be directed downward and/or away from the features.	The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Environmental supervision will be implemented during construction as part of a routine inspection program to ensure adherence to the mitigation measures. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Disturbance of local wildlife (Bird Species	Avoid disturbance, displacement and	Avoid construction and decommissioning activities (including rock blasting, trenching,	The NHA was undertaken as per	Monitoring:

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
of Conservation Concern Habitats – Crepuscular Species)	mortality to birds that might be breeding within these habitats and that are active at night.	<p>sawing, or hammering) during the breeding bird period (May 1 – July 31), within designated areas that have been identified as being vulnerable to direct impact.</p> <p>Where possible, schedule construction and decommissioning activities to occur during daylight hours to increase visibility and to avoid light pollution effects during the night.</p> <p>If an active bird nest is identified in the location where natural vegetation clearing is proposed, the area will be protected and no construction activities will occur until the young have fledged or until the nest is no longer active, as confirmed by a qualified biologist.</p> <p>If confirmed significant, where regular Project maintenance activities within 30 m of significant habitats must occur outside of daylight hours, spotlights will be directed downwards and/or away from the identified habitats.</p>	<p>MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>If construction or decommissioning vegetation removal activities must occur during the breeding bird period (May 1 – July 31), nest searches will be conducted in affected areas.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Disturbance of local wildlife (Bird Species of Conservation Concern Habitats – Diurnal Species)	Avoid disturbance, displacement and mortality to birds that might be breeding within these habitats and that are inactive at night.	<p>Avoid construction and decommissioning activities (including rock blasting, trenching, sawing, or hammering) during the breeding bird period (May 1 – July 31) within designated areas that have been identified as being vulnerable to direct impact</p> <p>Schedule construction and decommissioning activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, wherever practicable.</p> <p>If an active bird nest is identified in the location where natural vegetation clearing is proposed, the area will be protected and no construction activities will occur until the young have fledged or until the nest is no longer active, as confirmed by a qualified biologist.</p> <p>If construction or decommissioning activities must occur outside of daylight hours, spotlights will be directed downward and/or away from the features.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>If construction or decommissioning vegetation removal activities must occur during the breeding bird period (May 1 – July 31), a biologist will conduct nest searches in affected areas.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Disturbance of local wildlife (Generalized significant wildlife habitats (SWHs))	Avoid disturbance, displacement or mortality to species that might be breeding within these habitats and that are not accustomed to nighttime disturbances.	<p>Avoid construction and decommissioning activities (including Rock blasting, trenching, sawing, or hammering) during the breeding bird period (May 1 – July 31) within designated areas that have been identified as being vulnerable to direct impact.</p> <p>Schedule construction and decommissioning activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, wherever practicable.</p> <p>If an active bird nest is identified in the location where natural vegetation clearing is proposed, the area will be protected and no construction activities will occur until the young have fledged or until the nest is no longer active, as confirmed by a qualified biologist.</p> <p>If construction or decommissioning activities must occur outside of daylight hours, spotlights will be directed downward and/or away from the features.</p>	<p>The NHA was undertaken as per MNR guidelines and this Project is anticipated to receive approval from the MNR.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: If construction or decommissioning vegetation removal activities must occur during the breeding bird period (May 1 – July 31), a biologist will conduct nest searches in affected areas.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Disturbance of local wildlife (Open Country Bird Breeding Habitat)	Avoid disturbance, displacement, and mortality to birds that might be breeding within these habitats, and that are relatively inactive at night and not accustomed to nighttime disturbances.	<p>Avoid construction and decommissioning activities (including Rock blasting, trenching, sawing, or hammering) during the breeding bird period (May 1– July 31) within designated areas that have been identified as being vulnerable to direct impact.</p> <p>Schedule construction and decommissioning activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, wherever practicable.</p> <p>If an active bird nest is identified in the location where natural vegetation clearing is proposed, the area will be protected and no construction activities will occur until the young have fledged or until the nest is no longer active, as confirmed by a qualified biologist.</p> <p>If construction or decommissioning activities must occur outside of daylight hours, spotlights will be directed downward and/or away from the</p>	<p>The NHA was undertaken as per MNR guidelines and this Project is anticipated to receive approval from the MNR.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: If construction or decommissioning vegetation removal activities must occur during the breeding bird period (May 1 – July 31), a biologist will conduct nest searches in affected areas.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		features.		
Disturbance of local wildlife (Reptile Hibernacula)	Avoid disturbance to hibernating snakes.	<p>Schedule construction and decommissioning activities (including rock blasting, trenching, sawing, or hammering) to occur outside of the snake hibernation period (September 15 – May 15) within designated areas that have been identified as being vulnerable to direct impact.</p> <p>If construction and decommissioning activities must occur during the snake hibernation period (September 15 – May 15), install exclusionary fencing around the perimeter of the construction disturbance area within areas identified as being vulnerable to direct impact.</p> <p>If a snake is identified where construction or decommissioning activities are proposed, including during habitat removal, the area will be protected and no construction activities will occur until the snake can be relocated by a qualified biologist.</p> <p>If a snake is identified outside of the snake hibernation period (September 15 – May 15) where rock blasting, trenching, sawing, or hammering is proposed, including during habitat removal, the area will be protected and no construction activities will occur until the snake can be relocated by a qualified biologist.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>If construction or decommissioning activities must occur during the snake hibernation season (September 15 – May 15), a biologist will search the area of disturbance immediately prior to habitat removal.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Disturbance of local wildlife (Turtle Wintering Area)	Avoid disturbance to overwintering turtles.	<p>Schedule construction and decommissioning activities to occur outside of the turtle overwintering period (October 15 – April 15) within designated areas that have been identified as being vulnerable to direct impact.</p> <p>If construction and decommissioning activities must occur during the turtle overwintering season (October 15 – April 15, exclusionary fencing will be installed around the perimeter of the construction disturbance area to avoid directly impacting turtles within designated areas that have been identified as being vulnerable to direct impact.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>If construction or decommissioning activities must occur during the turtle overwintering season (October 15th – April 15th), a biologist will search the area of disturbance immediately prior to activities occurring.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		If a turtle is identified where construction or decommissioning activities are proposed, the area will be protected and no construction activities will occur until the turtle can be relocated by a qualified biologist.		best management practices are applied.
Disturbance of local wildlife (Waterfowl Stopover and Staging Area)	Avoid disturbance, displacement, and mortality to staging waterfowl.	<p>Schedule construction and decommissioning activities in Waterfowl Stopover and Staging Areas to occur outside of the most important period for staging waterfowl (March 1 – April 30) within designated areas that have been identified as being vulnerable to direct impact.</p> <p>Schedule construction or decommissioning activities during daylight hours, wherever practicable, to limit potential impacts from light, noise, or vehicle interactions.</p> <p>If construction or decommissioning activities must occur during the peak waterfowl staging season, a biologist will confirm that birds are not impacted by construction or decommissioning activities.</p>	<p>The NHA was undertaken as per MNR guidelines and this Project is anticipated to receive approval from the MNR.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Regular biological monitoring of staging waterfowl will be conducted if construction or decommissioning activities will occur during the peak stopover and staging season.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Damage or removal of vegetation within significant woodlands, SWHs, and Generalized SWHs.	To avoid accidental damage or removal of vegetation within significant woodlands, SWHs, and Generalized SWHs.	<p>Clearly delineate work areas using erosion fencing or other suitable barrier to avoid accidental damage or removal of retained species.</p> <p>The on-site environmental monitor may also consider substituting other demarcating types for fencing, such as staking and flagging, where it is determined that there is no apparent risk to significant woodlands, SWHs, or Generalized SWHs. This could include instances where the significant features are at a higher elevation than the occurring construction activity.</p> <p>The on-site environmental monitor will be a contractor with experience providing environmental recommendations on a large-scale construction site.</p> <p>Erect erosion fencing, or other barrier, to correspond to the disturbance area limits.</p> <p>Place the erosion fencing, or other barrier, as far</p>	<p>The NHA was undertaken as per MNR guidelines and this Project is anticipated to receive approval from the MNR.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Undertake weekly monitoring of the dripline when construction or decommissioning activities are anticipated within 10m of a significant woodland, SWH, or Generalized SWH.</p> <p>Undertake regular monitoring of the dripline to ensure the work area is clearly delineated and dripline boundaries are respected when construction is anticipated to occur within 10-30m of significant woodlands, SWHs, or Generalized SWHs, at a minimum frequency of once per month.</p> <p>Contingency:</p> <p>Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>away as practicable from the feature or SWH, and no closer than the dripline.</p> <p>Locate all directional drill entry and exit pits a sufficient distance from the edge of significant natural features, SWHs, and Generalized SWHs, to maintain a vertical depth of at least 1.5 m at all times below the natural feature to protect the critical root zone.</p>		<p>techniques.</p> <p>Accidental damage to trees, or unexpected vegetation removal, may require replanting of similar, native species, depending on the extent of damage incurred.</p>
Damage to significant woodlands/wetlands, SWHs, and Generalized SWHs.	Avoid impacts to natural vegetation species in significant woodlands/wetlands, SWHs, and Generalized SWHs.	Avoid the use of herbicides (Project related activities only).	<p>The NHA was undertaken as per MNRG guidelines and this Project is anticipated to receive approval from the MNRG.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: No monitoring required.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measure is applied.</p>
Damage to retained trees within significant woodlands and wildlife habitats.	Avoid impacts to retained trees within significant woodlands and wildlife habitats.	Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques.	<p>The NHA was undertaken as per MNRG guidelines and this Project is anticipated to receive approval from the MNRG.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: Depending on the amount of vegetation removal proposed and proximity to trees to be retained outside of public road allowances, the on-site environmental monitor may recommend monitoring by a Certified Arborist during tree removal or pruning.</p> <p>Contingency: Accidental damage to trees, or unexpected vegetation removal, may require replanting of similar, native species, depending on the extent of damage incurred.</p>
Erosion and sedimentation in significant natural features, SWHs, and	Avoid impacts associated with erosion and sedimentation in significant natural	<p>The general contractor will develop and implement an erosion and sediment control (ESC) plan.</p> <p>Install, monitor, and maintain ESC measures</p>	The NHA was undertaken as per MNRG guidelines and this Project is	<p>Monitoring: Undertake regular monitoring and routine inspections to ensure proper installation of erosion control measures</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Generalized SWHs.	features, SWHs, and Generalized SWHs.	<p>(i.e. erosion fencing) around the Project Location for the duration of the construction or decommissioning activities, as identified within the ESC plan.</p> <p>Erect erosion fencing, or other barrier, to correspond to the construction disturbance area limits.</p> <p>Place the erosion fencing, or other barrier, as far away as practicable from the identified feature(s), and no closer than the dripline.</p> <p>Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the on-site environmental monitor may consider substituting other styles of fencing, when appropriate.</p> <p>Utilize erosion blankets, silt fencing, straw bales, etc. for construction.</p> <p>Store any stockpiled material more than 30m from significant natural features, SWHs, and Generalized SWHs throughout the construction and decommissioning phases.</p> <p>Schedule grading to avoid times of high run-off volumes, wherever practicable. Re-vegetate areas adjacent to the feature(s) as soon as practicable after construction activities are complete.</p> <p>Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal.</p> <p>Restore and revegetate directional drill entry/exit pits to pre-construction conditions as soon as practicable after construction.</p>	<p>anticipated to receive approval from the MNR.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>are in place.</p> <p>Monitor sediment and erosion control measures, such as erosion fencing, and check dams daily in areas where work is taking place and prior to and after any storm events.</p> <p>Monitor sediment and erosion control measures weekly in areas where active construction is not occurring until the construction phase is complete.</p> <p>Contingency:</p> <p>If deficiencies in sediment and erosion control measures are noted, the on-site environmental monitor will notify the general contractor and the Proponent and recommend remedial actions.</p> <p>Silt fencing, or other applicable sediment and erosion control measures, that is not working properly will be corrected.</p> <p>If sedimentation and erosion control measures fail or/and degradation of the natural feature occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas, depending on the extent of degradation incurred.</p>
Fugitive dust within significant natural features, SWHs, and Generalized SWHs.	Avoid fugitive dust within significant natural features, SWHs, and Generalized SWHs.	<p>On-site speed limits will be clearly posted, applied, and followed by construction staff.</p> <p>Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the on-site environmental monitor and the general contractor. Application frequency will</p>	<p>The NHA was undertaken as per MNR guidelines and this Project is anticipated to receive approval</p>	<p>Monitoring:</p> <p>Undertake regular monitoring and routine inspections to ensure proper fugitive dust control measures are in place.</p> <p>Monitor dust control measures at least</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>vary, but will be determined by site specific weather conditions, including recent precipitation, temperatures, and wind speeds.</p> <p>Re-vegetate cleared areas as soon as reasonably practicable after construction activities are complete. Install wind fences where determined to be necessary by the on-site environmental monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks.</p>	<p>from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>once per week in areas where work is taking place.</p> <p>Monitor dust control measures at least once per month in areas where active construction is not occurring until the construction phase is complete.</p> <p>Contingency:</p> <p>If fugitive dust is noted, the on-site environmental monitor will notify the general contractor and the Proponent and recommend remedial actions, if necessary.</p> <p>If fugitive dust control measures fail and degradation of the natural feature occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas depending on the extent of degradation incurred.</p>
<p>Fugitive dust and debris from blasting within significant natural features and SWHs.</p>	<p>Avoid fugitive dust and debris within significant natural features and SWHs.</p>	<p>Use blasting mats to contain debris and spray the surface of the blast site with water to reduce the amount of dust emitted.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Monitor to ensure proper fugitive dust and debris control measures for blasting are in place and functioning as intended for all blasting activities.</p> <p>Contingency:</p> <p>If fugitive dust or debris is noted, the on-site environmental monitor will notify the general contractor and the Proponent and recommend remedial actions, if necessary.</p> <p>If fugitive dust and debris control measures fail and degradation of the natural feature occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
				permanently damaged areas depending on the extent of degradation incurred.
Loss of vegetation communities and significant wetlands.	<p>Avoid direct impacts on vegetation communities and protect significant wetlands.</p> <p>Avoid impacts to hydrological connectivity of significant wetlands.</p>	<p>Clearly delineate work areas using erosion fencing, or other barrier, to minimize potential impacts to hydrological connectivity from loss of riparian vegetation.</p> <p>Depending on site-specific conditions, such as steep topography and the presence of direct, or regular, surface water flow, the on-site environmental monitor may consider substituting other styles of fencing for erosion fencing, when appropriate.</p> <p>Where the temporary construction area is proposed to be within 5m of, but not overlapping by a method other than directional drilling, a wetland (excluding along existing municipal roads), design any permanent infrastructure (i.e., access roads) to be 5m from the wetland edge and plant native vegetation in the 5m buffer between the infrastructure and wetland edge as soon as reasonably practicable after construction.</p> <p>Re-vegetate cleared areas as soon as reasonably practicable after construction activities are complete.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Undertake regular monitoring of the identified features to ensure the work area is clearly delineated for the duration of the construction and decommissioning phases of the Project. Undertake monitoring at least once per week when activities are occurring within 10m of a feature.</p> <p>Undertake regular monitoring of the feature to ensure the work area is clearly delineated and respected when construction is anticipated to occur within 10-30m of the features, at a minimum frequency of once per month. Depending on the season and site-specific conditions, such as topography, surface water flow patterns, and the presence or absence of vegetative buffers, monitoring frequency will be increased at the discretion of the on-site environmental monitor.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Change in groundwater discharge affecting significant wetlands and Generalized SWHs.	To minimize direct impacts on significant wetlands and Generalized SWHs.	<p>Monitor rate of water pumping and timing to meet the requirement of less than 50,000 L per day, or otherwise obtain an appropriate permit from the Ministry of the Environment and Climate Change (MOECC) that addresses increased water taking, if more than 50,000 L per day is required.</p> <p>Restrict taking of groundwater and surface water during extreme low flow time periods.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this</p>	<p>Monitoring:</p> <p>Undertake regular monitoring of significant wetlands and Generalized SWHs to ensure the work area is clearly delineated within 10m of construction activities for the duration of the construction and decommissioning phases of the Project. This monitoring will be conducted at least once per week</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		Control quantity and quality of stormwater discharge using best management practices, and avoid direct discharge into wetlands, SWHs, and Generalized SWHs.	residual effect is considered non-significant.	<p>when construction is anticipated within 10m of a significant wetland or Generalized SWH.</p> <p>Undertake regular monitoring of significant wetlands and Generalized SWHs to ensure the work area is clearly delineated and respected when construction is anticipated to occur within 10-30m of the features, at least once per month. Depending on the season and site-specific conditions, such as topography, surface water flow patterns, and the presence or absence of vegetative buffers, monitoring frequency will be increased at the discretion of the on-site environmental monitor.</p> <p>Contingency:</p> <p>If impacts to groundwater discharge occur as a result of construction activities, the MNRF will be notified of appropriate contingency measures that will be implemented.</p>
Changes on infiltration affecting significant wetlands and Generalized SWHs.	To minimize impacts to infiltration within significant wetlands and Generalized SWHs.	Minimize the use of impervious surfaces where practicable, such as utilizing and contouring permeable surface material (e.g. aggregate) to increase infiltration, and reduce surface water run-off.	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Environmental supervision will be implemented during construction as part of a routine inspection program to ensure adherence to the prescribed mitigation measures.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Changes in soil moisture regime affecting vegetation species composition	Avoid changes in soil moisture regime and vegetation species composition within	Minimize the use of impervious surfaces where practicable, such as utilizing and contouring permeable surface material (e.g. aggregate) to increase infiltration, and reduce surface water	The NHA was undertaken as per MNRF guidelines and this Project is	<p>Monitoring:</p> <p>Environmental supervision will be implemented during construction as part</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
within significant natural features, SWHs, and Generalized SWHs.	significant natural features, SWHs, and Generalized SWHs.	run-off. Minimize paved surfaces and design roads to promote infiltration.	anticipated to receive approval from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	of a routine inspection program to ensure adherence to the prescribed mitigation measures. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Change in water quality affecting significant wetlands	Avoid changes to water quality (i.e. associated with increased turbidity) within significant wetlands.	Clearly delineate work areas using erosion fencing, or other barrier, to minimize potential impacts to water quality which may result from accidental loss of riparian vegetation. Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the on-site environmental monitor and general contractor. Application frequency will vary, but will be determined by site specific weather conditions, including recent precipitation, temperatures, and wind speeds. On-site speed limits will be clearly posted, applied, and followed by construction staff. Re-vegetate areas adjacent to significant wetlands as soon as practicable after construction activities are complete. Install wind fences where determined to be necessary by the on-site environmental monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks. No use of herbicides (Project related activities only) within significant wetlands.	The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Undertake regular monitoring of significant wetlands to ensure the work area is clearly delineated within 10m of construction activities for the duration of the construction and decommissioning phases of the Project. This monitoring will be conducted at a minimum frequency of once per week when construction is anticipated within 10m of a significant wetland. Undertake regular monitoring of significant wetlands to ensure the work area is clearly delineated and respected when construction is anticipated to occur within 10-30m of significant wetlands, at a minimum frequency of once per month. Depending on the season and site-specific conditions, such as topography, surface water flow patterns, and the presence or absence of vegetative buffers, monitoring frequency will be increased at the discretion of the on-site environmental monitor. Contingency: If reduced water quality (i.e. increased turbidity) as a result of construction activities is observed, the MNRF will be notified of appropriate contingency

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
				measures that will be implemented.
Invasive Seed Transfer	Avoid impacts to sensitive habitats and maintain vegetated buffers, including riparian zones.	Clearly delineate work areas using erosion fencing, or other barrier, to minimize seed transfer into suitable habitat. Regularly clean vehicles and equipment. Vehicle use will occur primarily on access roads and in agricultural habitats, where invasive and non-native vegetation species are less likely to be concentrated.	The NHA was undertaken as per MNRf guidelines and this Project is anticipated to receive approval from the MNRf. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Environmental supervision will be implemented during construction as part of a routine inspection program to ensure adherence to the prescribed mitigation measures. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Soil compaction within significant natural features, SHWs, and Generalized SWHs.	Avoid soil compaction within significant natural features, SHWs, and Generalized SWHs.	Minimize vehicle traffic on exposed soils during site clearing, grubbing, grading and topsoil removal. Clearly delineate the dripline and root zone of all trees within 10m of construction activities with erosion fencing or other barrier.	The NHA was undertaken as per MNRf guidelines and this Project is anticipated to receive approval from the MNRf. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Environmental supervision will be implemented during construction as part of a routine inspection program to ensure adherence to the prescribed mitigation measures. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Contamination of significant natural features, SHWs, and Generalized SWHs.	Avoid spills within 30m of significant natural features, SHWs, and Generalized SWHs.	The general contractor will develop and implement a spill response plan and train staff on appropriate procedures. The general contractor will develop a "frac-out" contingency plan and train staff on appropriate procedures during the construction phase. Keep emergency spill kits on site. Keep contact information for the MOECC Spills Action Centre in a designated area on-site. Dispose of waste material by authorized and	The NHA was undertaken as per MNRf guidelines and this Project is anticipated to receive approval from the MNRf. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Regular environmental monitoring will occur at least once every two weeks during the construction and decommissioning phase to ensure vehicle refuelling and storage of chemicals is occurring more than 30m from the applicable features. An on-site environmental monitor will be present when active directional drilling is occurring within 30m of significant natural features, SHWs, and Generalized

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>approved off-site vendors.</p> <p>Store hazardous materials in designated areas.</p> <p>Locate all vehicle refuelling or washing, as well as the storage of chemical and construction equipment more than 30m from applicable features.</p>		<p>SWHs.</p> <p>Contingency:</p> <p>If "frac-out" occurs, immediately implement "frac-out" contingency plan.</p> <p>In the event of a spill notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events.</p> <p>If a spill occurs within a significant natural feature, SWH, or Generalized SWH, the on-site environmental monitor will be notified and a follow-up site inspection will be conducted to document extent of degradation of the features, if any.</p> <p>If degradation of significant natural features, SWHs, or Generalized SWHs occurs as a result of the spill, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of permanently damaged areas depending on the extent of degradation incurred.</p>
Disturbance, displacement or mortality of wildlife.	Avoid disturbance, displacement, and mortality to wildlife.	<p>On-site speed limits will be clearly posted, applied, and followed by construction staff throughout the construction and decommissioning phases.</p> <p>Re-vegetate disturbed areas of significant wildlife habitats as soon as practicable after construction activities are complete using an appropriate plant species composition for the habitat type.</p>	<p>The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Environmental supervision will be implemented during construction as part of a routine inspection program to ensure adherence to the prescribed mitigation measures.</p> <p>Contingency:</p> <p>Wildlife fatalities due to construction and decommissioning activities will be documented and may be used to determine if any additional mitigation measures should be implemented.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Water bodies				
Damage to water body banks or removal of riparian vegetation adjacent to water bodies	Avoid accidental damage to water body banks or removal of riparian vegetation adjacent to water bodies.	<p>Clearly delineate work area using erosion fencing or other suitable barrier to avoid accidental damage to water body banks, including damage to or removal of riparian vegetation.</p> <p>Place the erosion fencing, or other barrier, as far away as practical from the water body, and where possible from the average annual high-water mark of the water body (e.g. bankfull level or top of bank).</p> <p>The on-site environmental monitor may also consider substituting other demarcating types for fencing, such as staking and flagging, where it is determined that there is no apparent risk to water bodies.</p> <p>Locate directional drilling entry/exit shafts, if applicable, beyond the top of bank at a distance that allows the minimum depth, as established by geotechnical studies, to be reached while below the water body. This distance should be agreed upon with regulatory agencies.</p> <p>Operate construction equipment (i.e., cranes, back hoes, etc.) in a manner that minimizes disturbance to the water body banks and stays outside of the water body and bank area.</p> <p>Implement riparian planting after construction, as soon as weather permits, to stabilize water body banks and encourage rapid revegetation of disturbed soils. This will aid in preventing bank collapse and erosion, which, in turn, will minimize sedimentation and protect sensitive ecological functions that occur in water bodies.</p> <p>If insufficient time is available in the growing season to establish vegetative cover, overwintering treatments should be applied, such as erosion control blankets, fibre matting, rock (i.e. large, clean angular rocks) reinforcement/armouring or equivalent to contain the site over the winter period. Plant vegetative</p>	<p>The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.</p> <p>Contingency:</p> <p>Accidental damage to riparian vegetation may require replanting of similar, native species, depending on the extent of damage incurred.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		cover as soon as is feasible in the next growing season, followed by maintenance and inspection.		
Contamination of water bodies.	Avoid spills and contamination of water bodies.	<p>Clearly delineate the work area and place the fencing/barriers, as far away as practical from the average annual high-water mark of the water body (e.g. bankfull level or top of bank).</p> <p>Locate directional drilling entry/exit shafts, if applicable, beyond the top of bank, at a distance that allows the minimum depth, as established by geotechnical studies, to be reached while below the water body. This distance should be agreed upon with regulatory agencies.</p> <p>Develop a Spill Response Plan (SRP) prior to commencement of construction and train staff on appropriate procedures.</p> <p>Keep emergency spill kits on site at all times.</p> <p>Keep contact information for the MOECC (Ministry of the Environment and Climate Change) Spills Action Centre in a designated area on-site.</p> <p>Dispose of waste material by authorized and approved off-site vendors.</p> <p>Store fuel, hazardous materials, and other construction related materials securely away from any drainage features.</p> <p>Locate all vehicle refuelling or washing stations a minimum of 30m from any water body.</p> <p>Develop and implement an emergency "frac-out" response plan including steps to contain, monitor and clean-up in response to the event.</p>	<p>The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Environmental monitoring will occur at least once every two weeks during the construction and decommissioning phase to ensure vehicle refuelling and storage of chemicals is occurring more than 30m from any water body.</p> <p>An on-site environmental monitor will be present when active directional drilling is occurring within 30m of a water body to identify "frac-out", if it occurs.</p> <p>Contingency:</p> <p>In the event of a spill, notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events.</p> <p>If a spill occurs within a water body, the on-site environmental monitor will be notified and a follow-up site inspection will be conducted to document extent of degradation of the features, if any.</p> <p>If degradation of a water body occurs because of the spill, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of banks and/or riparian areas in permanently damaged areas, depending on the extent of degradation incurred.</p> <p>If "frac-out" occurs, immediately implement "frac-out" contingency plan, identified</p>
Changes in infiltration and	Avoid changes to infiltration and changes in	Minimize the use of impervious surfaces, where practical, such as utilizing and contouring	The Water Body Assessment was	Monitoring: Undertake regular monitoring of the

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
surface drainage patterns and run-off.	surface drainage patterns and run-off.	<p>permeable surface material (e.g. aggregate) to increase infiltration, and reduce surface water run-off.</p> <p>Minimize vehicle traffic on exposed soils during site clearing, grubbing, grading and topsoil removal.</p> <p>Confine construction equipment to designated areas, controlled vehicle access routes to minimize the potential for soil compaction.</p> <p>Clearly delineate work areas using erosion fencing or other suitable barrier to avoid accidental damage to water body banks or removal of riparian vegetation.</p> <p>Place the erosion fencing, or other barrier, as far away as practical from the water body from the average annual high-water mark of the water body (e.g. bankfull level or top of bank).</p> <p>Avoid construction during high volume rain events and substantial snow melt/thaw events, where possible, to avoid risk of soil compaction.</p>	<p>undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Erosion and sedimentation of waterbodies.	Avoid erosion and sedimentation of water bodies.	<p>Develop and implement an erosion and sediment control (ESC) plan.</p> <p>Install, monitor, and maintain ESC measures (e.g. erosion fencing, blankets, straw bales, etc.) around the Project Location for the duration of the construction or decommissioning activities, as identified within the ESC plan.</p> <p>Clearly delineate work areas using erosion fencing or other suitable barrier to avoid accidental damage or removal of retained species.</p> <p>Erect erosion fencing, or other barrier, to correspond to the construction disturbance area limits and as far away as practical from the average annual high-water mark of the water body (e.g. bankfull level or top of bank).</p> <p>Depending on site-specific conditions, such as steep topography and the presence of direct, or</p>	<p>The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Undertake regular monitoring and routine inspections to ensure proper installation of erosion control measures are in place.</p> <p>Monitor sediment and erosion control measures, such as erosion fencing, and check dams daily in areas where work is taking place, and prior to, during, and after any storm events or significant snowmelt events.</p> <p>During extended rain or snowmelt periods, monitor erosion control measures daily.</p> <p>Monitor sediment and erosion control measures monthly in areas where active construction is not occurring until the construction phase is complete.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>regular, surface water flow, the on-site environmental monitor may consider substituting other styles of fencing, when appropriate.</p> <p>Utilize erosion blankets, silt fencing, straw bales, etc., for construction.</p> <p>Store any stockpiled material more than 30m from the average annual high-water mark of water bodies (e.g. bankfull level for intermittent/permanent watercourses).</p> <p>Schedule grading to avoid times of high run-off volumes, wherever possible.</p> <p>Where possible, time clearing, grubbing, and grading activities to avoid seasonally wet periods (i.e., spring and fall).</p> <p>Collect directional drill cuttings as they are generated and placed in a soil bin or bag for off-site disposal.</p> <p>Re-vegetate areas adjacent to water bodies, and directional drill entry/exit pits, to pre-construction conditions as soon as practical after construction activities are complete.</p> <p>Schedule construction activities within 30m of a water body to occur within the low flow period of the late summer months, where possible, to avoid or minimize impacts.</p> <p>Remove construction debris from the site and stabilize stockpiles, where practical, to prevent debris from entering the nearby water bodies.</p> <p>Develop a Flood Response Plan (FRP) to deal with on-site flooding in order to mitigate any possible effects to the aquatic environment.</p>		<p>Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.</p> <p>Contingency:</p> <p>If deficiencies in sediment and erosion control measures are noted, the on-site environmental monitor will notify the general contractor and the Proponent and recommend remedial actions.</p> <p>Silt fencing, or other applicable sediment and erosion control measures, that is not working properly will be corrected.</p> <p>If sedimentation and erosion control measures fail and/or degradation of a water body occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, water body clean out and/or bank stabilization, depending on the extent of degradation incurred.</p> <p>Repair or replace any damaged fencing immediately</p>
Groundwater discharge	Avoid direct impacts to water quantity/quality in water bodies.	<p>Monitor rate of water pumping and timing to meet the requirement of less than 50,000 L per day per turbine location, and contact the local Ministry of the Environment and Climate Change (MOECC) if a total of more than 400,000 L per day situation arises.</p> <p>Restrict taking of groundwater and surface water</p>	The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from	<p>Monitoring:</p> <p>Monitor water levels of adjacent water body during groundwater dewatering activities to determine if activities are resulting in alteration of water levels within the water body.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>during extreme low flow time periods.</p> <p>Control quantity and quality of stormwater discharge using best management practices, and avoid direct discharge into wetlands, SWHs, and Generalized SWHs.</p> <p>When discharging to a water body follow the ESC Plan and implement best management practices to avoid degradation of the water body. Adhere to MOECC water quality Policy 1 and 2 Standards for discharging to water bodies.</p> <p>If discharging to a municipal storm sewer system, ensure that water quality meets the objectives of the municipal storm sewer by-law prior to discharge.</p> <p>Obtain water quality and turbidity samples prior to discharge to ensure the quality is suitable for discharge and will not result in an impact to the receiving water body. If the water quality is not suitable for discharge, identify alternate disposal locations or undertake all practical measures to upgrade water quality prior to discharge.</p>	<p>the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitor endpoint of dewatering discharge for water quality and erosion (if dewatering).</p> <p>Conduct daily erosion checks during discharge of water.</p> <p>Monitor water quality (turbidity) prior to discharge, once a week thereafter or as described by agencies.</p> <p>Contingency:</p> <p>If impacts to groundwater discharge occur because of construction activities, the MNRFF will be notified of appropriate contingency measures that will be implemented.</p>
Water Quality Impairment	Avoid degradation of surface water quality and changes in water quantity related to construction activities.	<p>Clearly delineate the work area using erosion fencing, or other barrier, to minimize potential impacts to water quality which may result from loss of riparian vegetation.</p> <p>Place erosion fencing as far as practical from the average annual high-water mark of the water body (e.g. bankfull level or top of bank).</p> <p>Erect erosion fencing, or other barrier, to correspond to the disturbance area limits.</p> <p>Place the erosion fencing, or other barrier, as far away as practical from the average annual high-water mark of the water body (e.g. bankfull level or top of bank).</p> <p>Locate directional drilling entry/exit shafts, if applicable, beyond the top of bank, at a distance that allows the minimum depth, as established by geotechnical studies, to be reached while below the water body. This distance should be</p>	<p>The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Follow the ESC Plan monitoring commitments.</p> <p>Monitor surface water quality for turbidity prior to conducting in-water work or surface water dewatering.</p> <p>Conduct pre-construction sampling immediately prior to beginning work and during the same season in which work will be conducted, where possible.</p> <p>Locate pre-construction monitoring stations upstream of construction area to provide baseline conditions.</p> <p>Monitor surface water turbidity during the construction activity at a frequency relative to the proximity to the water body, duration of the construction</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>agreed upon with regulatory agencies.</p> <p>On site speed limits will be clearly posted, applied, and followed by construction staff to reduce fugitive dust.</p> <p>Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the on-site environmental monitor and general contractor. Application frequency will vary, but will be determined by site-specific weather conditions, including recent precipitation, temperatures, and wind speeds.</p> <p>Install wind fences, where determined to be necessary by the on-site environmental monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent of surrounding natural wind breaks.</p> <p>Restrict taking of groundwater and surface water during extreme low flow time periods.</p> <p>If in-water work is required (e.g. for culvert installation and/or electrical collector line installation), adhere to required timing windows confirmed through consultation with regulatory agencies, including the MNR.</p> <p>If required, perform in-water work in dry conditions, where possible.</p> <p>Where work in dry conditions is not possible, short-term, isolated surface water dewatering is required.</p> <p>Prior to dewatering, isolate the work area with the installation of a temporary water containment structure. The structure should form an impermeable enclosure that will prevent debris and sediment from escaping into the surrounding water body.</p> <p>Construct a bypass channel to maintain flow through the water body and prevent back flooding, which could ultimately overtop the water containment structure.</p>		<p>activity, and type of construction activity, as determined by the Environmental Construction Monitor.</p> <p>Obtain water quality and turbidity samples prior to discharge to ensure the quality is suitable for discharge and will not result in an impact to the receiving water body.</p> <p>When discharging to a different drainage feature, monitor general water quality parameters as required to meet MOECC Policy 1 and 2 standards for discharging to a water body. In addition, measure turbidity levels of water to be discharged. If the water quality is not suitable for discharge, identify alternate disposal locations or undertake all practical measures to upgrade water quality prior to discharge.</p> <p>Monitor water levels immediately before and during dewatering activities, to determine if dewatering activities are resulting in alteration of water levels within the water body.</p> <p>Monitor the discharge location for dewatering activities to ensure erosion and sedimentation of the receiving water body is not occurring.</p> <p>Monitor erosion and sediment control systems frequently for effectiveness at a minimum of once daily during discharge activities. Repair deficient controls in a timely manner and using an adaptive management approach when deemed appropriate.</p> <p>Monitor bypass channel (if applicable) daily to ensure it is functioning appropriately and water is flowing through as designed.</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>Obtain applicable permits, where required, for surface water dewatering.</p> <p>Prior to surface water dewatering, obtain a Fish Salvage Plan, prepared by a qualified fisheries biologist and relocate fish to a suitable location, preferably downstream and away from the construction area, as detailed in the plan.</p> <p>Install an in-stream sediment filter (e.g. Siltsoxx or Filtersoxx) downstream of water containment structure. Dewatering discharge should be dissipated (i.e. splash pads, sand bags, hay bales, etc.) and may require splitting discharge to more than one location.</p> <p>Dewatering discharge rates should be evaluated to ensure they do not result in erosion and sedimentation to the receiving water body.</p> <p>If discharging to a municipal storm sewer system, ensure that water quality meets the objectives of the municipal storm sewer by-law prior to discharge.</p> <p>Re-vegetate disturbed area adjacent to water bodies as soon as practical after construction activities are complete.</p>		<p>Undertake regular monitoring of the work delineation fencing at a minimum frequency of once per month to ensure damage has not occurred to the fencing, and boundaries are clearly delineated and respected when construction is occurring within 30m of a water body.</p> <p>Contingency:</p> <p>If reduced water quality (i.e. increased turbidity) because of construction activities is observed, the MNRFP will be notified of appropriate contingency measures that will be implemented.</p> <p>Repair or replace any damaged fencing immediately upon discovering an issue.</p>
Alterations to water bodies.	To minimize fugitive dust deposits within water bodies.	<p>On-site speed limits will be clearly posted, applied, and followed by construction staff.</p> <p>Apply dust suppressants to unpaved areas when necessary to suppress dust, as determined by the on-site environmental monitor and the general contractor. Application frequency will vary, but will be determined by site specific weather conditions, including recent precipitation, temperatures, and wind speeds.</p> <p>Re-vegetate cleared areas as soon as reasonably practical after construction activities are complete. Install wind fences where determined to be necessary by the on-site environmental monitor. Installation of these fences will depend on site-specific conditions, including wind speeds, topography, land cover, and the extent</p>	<p>The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>Undertake regular monitoring and routine inspections to ensure proper fugitive dust control measures are in place.</p> <p>Monitor dust control measures at a minimum weekly frequency in areas where work is taking place.</p> <p>Monitor dust control measures at a minimum monthly frequency in areas where active construction is not occurring until the construction phase is complete.</p> <p>Contingency:</p> <p>If fugitive dust is noted, the on-site</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		of surrounding natural wind breaks.		<p>environmental monitor will notify the general contractor and the Proponent and recommend remedial actions, if necessary.</p> <p>If fugitive dust control measures fail and degradation of water bodies occurs, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, and/or seeding of permanently damaged areas depending on the extent of degradation incurred.</p>
Emissions to Air, including Odour and Dust				
Reduction in air quality due to CAC emissions and dust.	Minimize deterioration of air quality.	<p>Ensure proper operation and maintenance of vehicles and machinery to limit noise, CAC emissions and leaks.</p> <p>Use water or water-based dust suppressant to control dust on unpaved roads.</p> <p>Implement speed limits on unpaved roads.</p> <p>Minimize vehicular traffic on exposed soils and stabilize high traffic areas with clean gravel surface layer or other suitable cover material.</p> <p>Minimize mud tracking by construction vehicles along access routes and areas outside of the immediate work site, and ensuring timely clean-up of any tracked mud, dirt and debris.</p> <p>Cover or otherwise contain loose construction materials that have potential to release airborne particulates during transport, installation or removal.</p> <p>Restore temporary construction road areas as soon as possible to minimize the duration of soil exposure.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in emergency Response and Communications Plan Section 7 of the Design and Operations Report (DOR))</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation/compensation measures and best management practices are applied.</p>
Noise				

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Increase in noise levels in Project study area.	Minimize noise increases for inhabited areas.	<p>Ensure proper operation and maintenance of vehicles and machinery to limit noise, CAC emissions and leaks.</p> <p>Implement speed limits on unpaved roads.</p> <p>Construction equipment will be kept in good condition and will not exceed the noise emissions as specified in MOECC publication NPC-115 and any applicable municipal by-laws.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in emergency Response and Communications Plan Section 7 of the DOR)</p> <p>Contingency:</p> <p>Faulty equipment resulting in increased noise levels are to be repaired in a timely fashion.</p>
Local and Provincial Interests, Land, Use and Infrastructure				
Increased congestion due to increase in truck traffic and short-term lane closures on local roads during delivery of Project components.	Minimize disturbance to local community and achieve zero human safety incident.	<p>Notify the community in advance of construction delivery schedules and installing signage to notify road users of construction activity.</p> <p>If required by municipal authorities develop a traffic management plan for the construction phase and submit to the Municipalities prior to construction and communicate truck routes.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan Section 7 of the DOR)</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation/compensation measures and best management practices are applied.</p>
Damage to local infrastructure.	Minimize damage to local infrastructure.	<p>Adhere to the best practices regarding the operation of construction equipment and delivery of construction materials.</p> <p>If required by municipal authorities, undertake roads condition surveys prior to construction and post-construction.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>Track all complaints and conduct follow-up monitoring (see Complaints Resolution Process in Emergency Response and Communications Plan Section 7 of the DOR)</p> <p>Contingency:</p> <p>If required by local authorities, return damaged infrastructure to original condition (or better) where appropriate.</p>



Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Areas Protected under Provincial Plans and Policies				
N/A	-	-	-	-
Public Health and Safety				
Effects on public health and safety during construction have been described above under Emissions to air, including Odour and Dust, Noise and Local and Provincial Interests Land Use and Infrastructure.	-	-	-	-
Other Resources				
Potential impacts to petroleum wells or facilities (APRD)	No negative effects on petroleum resources or the renewable energy project	As part of the APRD and as per the MNR "Template for Renewable Energy Projects: Setbacks from Petroleum Operations" a search was conducted using the OGSR database to identify any petroleum wells or facilities within 75 m of project infrastructure. The search concluded that there are no active petroleum wells or facilities existing within 75 m of the Project Location. Notice of the findings was reported to the local District MNR office.	The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation measures and best management practices are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.

6.1.2 Operations

Table 6-2: Potential Negative Effects and Mitigation Measures – Operations

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Cultural Heritage				
Alteration of the visual character of a cultural heritage sites.	Minimize visual impact of recognized heritage sites.	<p>Conduct a Heritage Assessment and apply measures recommended by the heritage specialist or by MTCS.</p> <p>Details of the Heritage Assessment can be found in the reports on this subject as part of the complete REA application package.</p>	<p>The Heritage Assessment was undertaken as per MTCS guidelines and no cultural heritage sites were identified.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation measures and best management practices are applied.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Natural Heritage				
Disturbance of local wildlife (Amphibian Breeding Habitat)	Avoid disturbance and displacement of breeding amphibians.	<p>If regular (non-critical) Project maintenance activities occur within 30 m of significant amphibian habitats during the peak amphibian breeding season (April 15 – June 15), activities will be scheduled to occur during daylight hours to avoid excessive noise and/or light disturbances, within designated areas that have been identified as being vulnerable to direct impact.</p> <p>If regular Project maintenance activities within 30 m of significant amphibian breeding habitats must occur outside of daylight hours, spotlights will be directed downwards and/or away from the woodland.</p> <p>Details of the NHA can be found in the reports on this subject as part of the complete REA application package.</p>	<p>The NHA was undertaken per MNRF guidelines and this Project is anticipated to receive approval from the MNRF.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: Environmental supervision will be implemented during operations as part of a routine inspection program to ensure adherence to the mitigation measures.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Damage to	Protection of native	Avoid herbicides (Project activities only) within	The NHA was	Monitoring:

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Significant natural features and SWHs.	vegetation species and local wildlife and their habitats.	30 m of significant natural features or SWHs. Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	undertaken as per MNRF guidelines and this Project is anticipated to receive confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Environmental supervision will be implemented during operations as part of a routine inspection program to ensure adherence to the mitigation measures. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Direct disturbance or mortality of birds and/or bats due to operational wind turbines.	Avoid direct mortalities and disturbance to birds and/or bats.	Develop and implement a Bird and Bat EEMP in accordance with MNRF's Birds and Bird Habitats (OMNR 2011a) and Bats and Bat Habitats (OMNR 2011b). Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: Post-construction monitoring will be conducted following the Birds and Bird Habitats (OMNR 2011a) and Bats and Bat Habitats (OMNR 2011b) provincial guidelines for a minimum of three years after the Project has become operational. Contingency: Annual reports which document the results of disturbance and mortality monitoring, will be prepared following each year that monitoring occurs. The reports will be submitted to the MNRF and the results presented in these annual reports will be used to determine if any additional mitigation measures should be implemented during the operational phase of this Project. Details of the post-construction monitoring program are found in the NHA documents.
Disturbance of local wildlife (Bird Species of Conservation Concern Habitats - Crepuscular	Avoid disturbance, displacement, and mortality to birds that might be breeding within these habitats and that are	If confirmed significant, schedule regular (non-critical) Project maintenance activities within 30 m of bird SCC habitats occur during the breeding bird period (May 1 – July 31), schedule these activities to occur during daylight hours to increase visibility and to avoid light pollution	The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive confirmation	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
Species).	active at night.	effects during the night. If increase visibility and to avoid light pollution effects during the night. Project maintenance activities within 30 m of significant wildlife habitats must occur outside of daylight hours, spotlights will be directed downward and/or away from the features. Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	measures are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Disturbance of local wildlife (Bird Species of Conservation Concern Habitats– Diurnal Species).	Avoid disturbance and displacement of breeding birds within significant natural features and significant bird species of conservation concern habitats. Minimize impacts on species that are relatively inactive at night and not accustomed to nighttime disturbances.	If regular (non-critical) Project maintenance activities within 30 m of significant bird SCC habitats occur during the breeding bird period (May 1 – July 31), schedule these activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife within designated areas that have been identified as being vulnerable to direct impact there is possibility of direct impact. If Project maintenance activities within 30m of significant wildlife habitats must occur outside of daylight hours, spotlights will be directed downward and/or away from the features. Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	The NHA was undertaken as per MNRF guidelines and this Project is anticipated to receive confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Disturbance of local wildlife (Open Country Bird Breeding Habitat).	Avoid disturbance and displacement of breeding birds within significant natural features and significant open country bird breeding habitats. Minimize impacts on species that are relatively inactive at night and not accustomed to nighttime disturbances.	If regular (non-critical) Project maintenance activities within 30 m of significant open country bird breeding habitat occur during the breeding bird period (May 1 – July 31), schedule these activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, within designated areas that have been identified as being vulnerable to direct impact. If Project maintenance activities within 30m of significant wildlife habitats must occur outside of daylight hours, spotlights will be directed downward and/or away from the features. Details of the NHA can be found in the reports on	The NHA was undertaken as per MNRF guidelines and this Project has received confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		this subject as part of the complete REA application package.	significant.	
Disturbance of local wildlife (Waterfowl Stopover and Staging Area).	Avoid disturbance and displacement of staging waterfowl.	<p>If regular (non-critical) Project maintenance activities occur within 30 m of waterfowl stopover and staging habitats during the most important period for staging waterfowl (March 1st – April 30th), all reasonable attempts to be made to schedule these activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, within designated areas that have been identified as being vulnerable to direct impact.</p> <p>If Project maintenance activities within 30 m of significant wildlife habitats must occur outside of daylight hours, spotlights will be directed downward and/or away from the features.</p> <p>Details of the NHA can be found in the reports on this subject as part of the complete REA application package.</p>	<p>The NHA was undertaken as per MNRG guidelines and this Project has received confirmation from the MNRG.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Disturbance of local wildlife (Butterfly Species of Conservation Concern Habitats).	<p>Avoid disturbance, displacement and mortality of butterflies within significant butterfly species of conservation concern habitats.</p> <p>Minimize impacts on species that are relatively inactive at night and not accustomed to nighttime disturbances.</p>	<p>If regular (non-critical) Project maintenance activities occur within 30m of significant butterfly habitats during the flight season (May 1– September 30), schedule these activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, within designated areas that have been identified as being vulnerable to direct impact.</p> <p>If Project maintenance activities within 30 m of significant wildlife habitats must occur outside of daylight hours, spotlights will be directed downward and/or away from the features.</p> <p>Details of the NHA can be found in the reports on this subject as part of the complete REA application package.</p>	<p>The NHA was undertaken as per MNRG guidelines and this Project has received confirmation from the MNRG.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring: Incidental mortalities of butterfly species of conservation concern mortalities will be documented concurrently with the post-construction mortality monitoring occurring for birds and bats.</p> <p>Contingency: If any mortality of a butterfly species of conservation concern is observed during the first 3 years of post-construction mortality monitoring, MNRG will be informed of the occurrence.</p>
Disturbance, displacement and mortality of waterfowl.	Avoid disturbance, displacement and mortality of waterfowl.	Install high visibility markers on overhead lines installed within significant waterfowl stopover and staging area (aquatic) habitats, where applicable.	The NHA was undertaken as per MNRG guidelines and this Project has received	<p>Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	recommended mitigation/compensation measures are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Avoid disturbance and displacement of roosting bats.	Avoid disturbance and displacement of roosting bats.	If regular (non-critical) Project maintenance activities occur within 30 m of significant bat habitats during the critical roosting period (June 1 – June 30), schedule these activities to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife, within designated areas that have been identified as being vulnerable to direct impact. If Project maintenance activities within 30m of significant wildlife habitats must occur outside of daylight hours, spotlights will be directed downward and/or away from the features. Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	The NHA was undertaken as per MNRF guidelines and this Project has received confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Disturbance or loss of alvar habitats.	Avoid disturbance and loss of alvar habitats.	Develop an alvar Compensation Plan in consultation with the MNRF. Details of the NHA can be found in the reports on this subject as part of the complete REA application package.	The NHA was undertaken as per MNRF guidelines and this Project has received confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The Alvar Compensation Plan will detail any specific monitoring requirements in relation to the compensation area(s). Contingency: Any required contingency plan will be detailed in the Alvar Compensation Plan.
Disturbance or loss of tallgrass prairie habitats.	Avoid disturbance and loss of tallgrass prairie habitats.	Develop a Tallgrass Prairie Compensation Plan in consultation with the MNRF. Details of the NHA can be found in the reports on	The NHA was undertaken as per MNRF guidelines	Monitoring: The Tallgrass Prairie Compensation Plan will detail any specific monitoring

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		this subject as part of the complete REA application package.	and this Project has received confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	requirements in relation to the compensation area(s). Contingency: Any required contingency plan will be detailed in the Tallgrass Prairie Compensation Plan.
Disturbance and displacement of reptiles.	To minimize the potential disturbance and displacement of reptiles.	Develop a Reptile Hibernacula Compensation Plan in consultation with the MNRF.	The NHA was undertaken as per MNRF guidelines and this Project has received confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The Reptile Hibernacula Compensation Plan will detail any specific monitoring requirements in relation to the compensation area(s). Contingency: Any required contingency plan will be detailed in the Reptile Hibernacula Compensation Plan.
Contamination significant natural features and SWHs.	Avoid contamination of significant natural features and SWHs.	Develop a spill response plan and train staff on appropriate procedures. Keep emergency spill kits on site. Keep contact information for the MOECC Spills Action Centre in a designated area on-site. Dispose of waste material by authorized and approved off-site vendors. Store hazardous materials in designated areas. Locate all maintenance activities, vehicle refuelling or washing, as well as the storage of chemicals and heavy equipment more than 30m from significant natural features and SWHs.	The NHA was undertaken as per MNRF guidelines and this Project has received confirmation from the MNRF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied. Contingency: In the event of a spill notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events. If degradation of a significant natural feature or SWH occurs as a result of the spill, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
				permanently damaged areas depending on the extent of degradation incurred.
Damage to retained trees within significant woodlands and wildlife habitats.	Avoid impacts to retained trees within significant woodlands and wildlife habitats.	Prune any tree limbs or roots that are accidentally damaged by construction activities using proper arboricultural techniques.	The NHA was undertaken as per MNRFF guidelines and this Project has received confirmation from the MNRFF. The likelihood and magnitude of this residual effect is considered non-significant.	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied. Contingency: Accidental damage to trees, or unexpected vegetation removal, may require replanting of similar, native species, depending on the extent of damage incurred.
Disturbance, displacement and/or mortality of wildlife.	Avoid disturbance, displacement, and/or mortality of wildlife.	On-site speed limits will be clearly posted, applied, and followed by all staff throughout the operational phase.	NA	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied. Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.
Water Bodies				
Water quality impairment	Avoid erosion and sedimentation of water bodies.	Schedule grading to avoid times of high runoff volumes, wherever possible and instances identified as being vulnerable to direct impact. Where possible, time vegetation clearing or maintenance activities to avoid seasonally wet periods (i.e., spring and fall) and to avoid times of high runoff volumes, wherever practical.	The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC. The likelihood and	Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation measures are applied. Contingency: Accidental damage to riparian

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
			magnitude of this residual effect is considered non-significant.	vegetation may require replanting of similar, native species, depending on the extent of damage incurred.
Reduction in water quality	Prevent contamination of water bodies	<p>Develop and Implement a Spill Response Plan and train staff on appropriate procedures.</p> <p>Dispose of waste material by authorized and approved off-site vendors.</p> <p>Store hazardous materials in designated areas.</p> <p>Locate all maintenance activities, vehicle refuelling or washing, as well as the storage of chemicals and heavy equipment a minimum of 30m away from water bodies.</p>	<p>The Water Body Assessment was undertaken as per MOECC guidelines and this Project is expected to receive confirmation from the MOECC.</p> <p>The likelihood and magnitude of this residual effect is considered non-significant.</p>	<p>Monitoring:</p> <p>The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation measures are applied.</p> <p>Contingency:</p> <p>In the event of a spill notify the MOECC Spills Action Centre, immediately stop work, and ensure all efforts are made to completely remediate affected areas, especially prior to rain events.</p> <p>If degradation of a water body occurs as a result of the spill, appropriate contingency measures will be implemented, which may include re-establishing mitigation measures, habitat remediation, and/or seeding of banks and/or riparian areas in permanently damaged areas depending on the extent of degradation incurred.</p>
Emissions to Air, including Odour and Dust				
Emissions of contaminants from maintenance vehicles.	Limit impact of maintenance vehicles on local air quality.	Ensure proper maintenance and operations of vehicles and machinery to limit noise, CAC emissions and leaks.	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>Track all complaints and conduct follow-up monitoring if required by regulation (see Complaints Resolution Process in Emergency Response and Communications Plan Section 7 of the DOR).</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the</p>

Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
				recommended mitigation measures and best management practices are applied.
Noise				
Increase in noise levels	<p>Minimize noise level increases in the Project area.</p> <p>Comply with MOECC's permissible sound limits at all identified Points of Reception.</p>	<p>Apply the minimum REA setback distance of 550 m from non-participating PoRs.</p> <p>For all turbines, calculate noise levels at PoRs and design project to comply with MOE noise guidelines.</p> <p>Details of the NIA can be found in the reports on this subject as part of the complete REA application package.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>Implement the communications plan and address noise complaints during operations (see Complaints Resolution Process in Emergency Response and Communications Plan Section 7 of the DOR).</p> <p>Contingency:</p> <p>Faulty equipment resulting in increased noise levels are to be repaired in a timely fashion.</p>
Local and Provincial Interest, Land Use and Infrastructure				
Reduction of forested areas.	Minimize reduction of forested areas.	<p>Design project to minimize loss of forested areas.</p> <p>Implement Reclamation Strategy at the end of construction, namely to reinstate initial conditions on temporary areas used during construction.</p> <p>Compensate landowners on Project Location as per land lease agreement.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring:</p> <p>The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation measures and best management practices are applied.</p> <p>Contingency:</p> <p>The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Areas Protected under Provincials Plans and Policies				
N/A	-	-	-	-
Public Health and Safety				
Incidents resulting from ice drop.	No public health and safety incidents.	Design turbine layout to respect a 20m setback from blade tip of any building.	The likelihood and magnitude of this residual effect is	Monitoring: Track all complaints and conduct follow-



Potential Effect	Performance Objective	Mitigation/Compensation Measures	Residual Effect	Monitoring / Contingency
		<p>Implement Communications Plan namely to inform local communities of icing events and place signs in areas with safety concern, when applicable.</p> <p>In most cases, turbines automatically shutdown during icing events. Operation of turbines is resumed only after appropriate confirmation of safety.</p>	considered non-significant.	<p>up monitoring if required by regulation (see Complaints Resolution Process in Emergency Response and Communications Plan Section 7 of the DOR).</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>
Radio communication and Radar Systems				
Interference to systems from turbines.	Avoid interference to all identified and registered systems.	<p>Design turbine layout to avoid radio communication systems (towers and microwave links) as per best practice setbacks.</p> <p>Notify and receive clearance from NAV CANADA, RCMP, GMCO, EC, CCG and DND.</p>	The likelihood and magnitude of this residual effect is considered non-significant.	<p>Monitoring: The magnitude of the residual effect is considered non-significant therefore no monitoring is required provided the recommended mitigation/compensation measures are applied.</p> <p>Contingency: The magnitude of the residual effect is considered non-significant therefore no contingency is required provided the recommended mitigation measures and best management practices are applied.</p>



7 EMERGENCY RESPONSE PLAN

7.1 Emergency Response

The Project Emergency Response Plan (ERP) will be implemented throughout all phases of the Project. The following sections focus on the implementation of the plan during the operations phase of the Project.

The purpose of the plan is to establish and maintain emergency procedures required for effectively responding to accidents and other emergency situations, and for minimizing losses. Potential emergency scenarios which could occur during the operations phase include fire, personal injury and spills. In the rare instance that the wind generating facility exceeds operational parameters or there is an emergency, the appropriate regulatory agencies, Township of North Stormont, and Aboriginal communities will be notified using the procedures outlined in Section 7.5.

If there is an emergency, the operator will contact the following representative at Nation Rise Wind Farm Limited Partnership:

Tod Nash

Regional Operations Manager
Nation Rise Wind Farm Limited Partnership
110 Spadina Ave., Suite 609
Toronto, ON M5V 2K4
(315) 874-4200

The general contractor will be responsible for establishing and maintaining specific construction and decommissioning related emergency response procedures to be implemented during these phases.

7.2 Fire Response

Fire extinguishers will be in compliance with applicable Ontario regulations and strategically located throughout the Project area in appropriately designated places such as Project vehicles and the substation electrical building. If a fire occurs, Project personnel will attempt to extinguish it, but only if and when it is safe to do so. All Project personnel on-site during the life of the Project will be trained in fire response safety procedures including how to use an extinguisher. If there is any risk of personal injury, extinguishing the fire will not be attempted and the local fire department (and ambulance if necessary) will be called immediately. Project personnel will also notify the occupants at all adjacent properties immediately if the fire appears to be spreading beyond the Project site.

During operations, appropriate signage will be in place that includes instructions to call 911 and the phone number of the operator or owner representative of the Project, should an emergency arise. In the event of an emergency, Project personnel on site will contact 911 and the Project Proponent. All incidents will be documented and kept on file. Documentation will include: date of incident, date of reporting, name of reporter, description of the incident, cause of the incident, actions taken, communications to outside groups and internal personnel, and follow-up, as required.

7.3 Personal Injury Response

The Proponent will be responsible for work during the operations phase to establish their own Health and Safety programs in accordance with the *Ontario Occupational Health and Safety Act* (OHSA). If a personal injury was to occur that did not require immediate ambulatory assistance, the injured worker would be taken to the local hospital. The Project field office will house first aid supplies as well as maps to the local hospital. An up-to-date list of all personnel with first aid and cardiopulmonary resuscitation (CPR) training will also be kept on display in the Project field office. Should a personal injury which requires an ambulance occur, Project personnel will call 911 and Project personnel trained in first aid and/or CPR will provide immediate assistance until the ambulance arrives. In all cases of personal injury, the Proponent and Contractor, if applicable, will be notified immediately and the injury will be properly documented (as stated in the OHSA). Documentation will include: date of incident, date of reporting, name of reporter, name of the injured, description of the incident, cause of the accident, actions taken, communications to outside groups, and internal personnel, and follow-up, as required.

7.4 Spills Response

The following spills procedures are based on the procedures outlined in the MOE's "Spills Reporting – A Guide to Reporting Spills and Discharges" [9]. Spills and the types of spills that require reporting are defined in the *Ontario Environmental Protection Act* and *Ontario Regulation 675/98* "Classification and Exemption of Spills and Reporting of Discharges".

To mitigate the potential for spills during operations, the Applicant will be responsible for ensuring that the Project follows the guidelines as set out by the MOECC.

- A designated Site Environmental Inspector will be appointed. This person will be responsible for ensuring that a spill clean-up procedure/emergency response plan will be prepared, have the appropriate equipment, and have all staff trained in proper implementation in the event of a spill;
- Emergency contacts will be posted. The list will include the Site Project Manager, Site Health and Safety Manager, Site Environmental Inspector, 911, Police, Fire Department, MOECC Spills Action Centre, and other contacts as required;
- Potentially hazardous materials, fuels and lubricants will be stored in the laydown area, in an impervious, protected, bermed area that is at least 30 m from any watercourses. All refuelling and equipment maintenance activities will be conducted at specified locations;
- Equipment will be monitored to ensure it is well maintained and free of leaks;
- Any spill will be cleaned-up immediately and reported accordingly; and
- In the event of a spill, the MOECC Spills Action Centre will be contacted immediately, as required by provincial regulations.

The use of the aforementioned best management measures will prevent negative effects to soils, groundwater, surface water, vegetation and terrestrial or aquatic biota. However, spills that could potentially occur during operations that may need to be reported to the MOECC include:

- Non-approved releases/discharges (including those to land, air and water);
- Discharge of fluids greater than 100 L from a vehicle;
- Mineral oil releases greater than 100 L from an electrical transformer or gearbox; and

- Discharges (including sediment) to water bodies.

The MOECC Spills Action Centre phone number (1-800-268-6060) will be posted at the Project field office.

Any incidents of spills will be immediately documented, kept on file and sent to the MOECC, as required. The documentation will include: date of incident, date of reporting, name of reporter, description of the incident, cause of the incident, type and amount of material spilled, actions taken, method(s) of disposal taken, communications to outside groups and internal personnel, and follow up as required.

7.5 Communications Plan

During all phases of the Project, including operations, a sign will be erected within the vicinity of the Project location which will include a Project phone number (toll free) and website, should the public have any questions, inquiries or complaints. Inquiries will be directed to the Proponent who will respond to the inquiry accordingly. Each question, inquiry and complaint will be logged electronically with the following information: date of question, inquiry or complaint, name, phone number, e-mail address of the individual, response, date of response, and any follow-up, as required.

The following agencies will be contacted by the Proponent's representative by phone within four hours of the occurrence of an operational exceedance/emergency:

- The MOECC (including the Spills Action Centre, if applicable); and
- The Township of North Stormont.

A hard copy incident response report will be provided within 24 hours of phone or e-mail contact. This report will include the following information:

- The parameter exceeded;
- The magnitude of the exceedance; and
- The mitigation measures implemented, including details of first responders (e.g., fire department, emergency medical services), if required.


The following individuals will be contacted, as applicable, within four to eight hours of an operational exceedance or emergency:

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

Local community members will be notified through direct mailing and posting in the local weekly newspaper and media, as deemed necessary. The Aboriginal communities will be asked to assign a key contact for emergency purposes. Information will also be sent to the local band office for distribution to their members.

Prior to commencing construction, the Proponent will distribute copies of the detailed ERP to the Township of North Stormont, local residents, and Aboriginal communities. The Proponent will have a standard ERP that includes information on the:

- Designation of facility emergency coordinators;

- 
- Emergency services orientation and coordination;
 - Process description;
 - Objectives;
 - Administration;
 - Regulatory references;
 - Training;
 - Facility location information;
 - Informational signage;
 - Facility emergency procedure;
 - Immediate site evacuation procedure;
 - Delayed site evacuation procedure;
 - Personnel injuries/serious health conditions;
 - Fire response plan;
 - Chemical/oil spills and releases; and
 - Weather-related emergencies.

The ERP is comprehensive enough to include procedures applicable to the construction, operations and decommissioning phases of the Project. Methods and paths for communication to regulatory agencies and the public will not change throughout the different Project phases.



8 REFERENCES

- [1] Ontario Regulation 359/09, made under the Environmental Protection Act, Renewable Energy Approvals under Part 1.0 of the Act.
- [2] Technical Guide to Renewable Energy Approvals, Ontario Ministry of the Environment and Climate Change, 2017.
- [3] Golder Associates Ltd., Revised Stage 1 Archaeological Assessment Nation Rise Wind Project, 27 October 2016.
- [4] Golder Associates Ltd., Stage 1 Archaeological Assessment Nation Rise Wind Project, 17 March 2017.
- [5] Golder Associates Ltd., Stage 2 Archaeological Assessment Nation Rise Wind Project, July 2017.
- [6] Standards and Guidelines for Consultant Archaeologists, Ontario Ministry of Tourism, Culture and Sport, January 2011.
- [7] Golder Associates Ltd., Heritage Impact Assessment Nation Rise Wind Project, 29 March 2017.
- [8] NHA Guide for Renewable Energy Projects, Ministry of Natural Resources, December 2010.
- [9] Ontario Ministry of Environment, Spills Reporting – A Guide to Reporting Spills and Discharge, May 2007.
- [10] Natural Resource Solutions Inc., Nation Rise Wind Project Natural Heritage Environmental Impact Study Report, July 2017.
- [11] Natural Resource Solutions Inc., Nation Rise Wind Project Water Body Report, August 2017.
- [12] Natural Resource Solutions Inc., Nation Rise Wind Project Water Body Assessment Report, August 2017.
- [13] DNV GL, Nation Rise Wind Farm - Noise Impact Assessment, 13 July 2017.



ABOUT DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter, and greener.