September 2011

NORTHLAND POWER

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McLean's Mountain Wind Farm

Construction Plan Report - Final

Submitted by:

DILLON CONSULTING

McLean's Mountain Wind Farm - Renewable Energy Approval (REA) Application Submission

Final Construction Plan Report

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09-1983

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Executive Summary

Northland Power Inc. (NPI) and Mnidoo Mnising Power (MMP), together form the McLean's Mountain Wind Limited Partnership (MMWLP). MMWLP proposes to develop the McLean's Mountain Wind Farm (MMWF), located south of the community of Little Current, in the Municipality of Northeastern Manitoulin and the Islands (NEMI); geographic Township of Howland, and the geographic Township of Bidwell in the District of Manitoulin, Ontario and falls within the traditional lands of the Anishnabee of Mnidoo Mnising. The selection of the project's location was based primarily on the wind resource, access to the Provincial transmission system, environmental constraints and local landowner support.

The proposed wind farm (the "project") will consist of 24, 2.5 MW wind turbines with a nameplate capacity of 60 MW. The electricity generated from the wind turbines will be collected through a network of collection grid lines to the on-site transformer. The transformer will step-up the voltage to 115 kV. A 10.3 kilometre transmission line will be installed to connect the project to the Provincial Grid on Goat Island. A section of the transmission line will involve a submarine cable to cross the North Channel to access Goat Island. Each wind turbine will be accessed by a short access road.

The proposed project will require approval under Ontario Regulation 359/09 – Renewable Energy Approval (REA) under the *Green Energy Act*. Based on the REA Regulations, this project is a "Class 4" wind facility. The *Construction Plan Report* is one component of the REA Application for the Project, and has been written in accordance with Ontario Regulation 359/09, the Ontario Ministry of Natural Resources' (MNR) Approval and Permitting Requirements Document for Renewable Energy Projects (September 2009) and MOE's draft Technical Bulletin Three: Guidance for preparing the Construction Plan Report (March 2010).

This *Construction Plan Report* provides a description of all construction and installation activities for the wind farm and all associated infrastructure. The report describes any impacts to the environment and nuisances created by the construction of the project. The turbines and associated infrastructure have been located to minimize effects of the projects. Extensive consultations have been conducted with various ministries including the Ministry of Natural Resources and the Ministry of Environment to ensure that project effects will be minimized. Potential impacts of the construction activities include:

- Removal of some agricultural land;
- The removal of vegetation and the loss/fragmentation of some wildlife habitat;
- Temporary disturbance of wildlife from construction activity;
- Temporary increase in erosion sedimentation and turbidity, increase nutrients and contaminants in watercourses and wetlands;
- Minor alteration to drainage patterns;

- Potential for minor fuel spills;
- Localized increase in dust levels from ground excavation and machinery operation;
- Localized increase in noise levels from construction equipment that could disturb adjacent land users; and
- Potential for traffic disruption/delays on local roads and potential for local road damage.

A variety of mitigation measures to avoid or reduce the above listed impacts are described in this *Construction Plan Report* and in other REA reports as noted. Also presented are the monitoring activities that will be undertaken to ensure that effects are minimized.

It is the conclusion of the *Construction Plan Report* that provided the mitigation measures are followed by the construction contractor; the Project is anticipated to have few net adverse effects on the social and natural environment. Mitigation measures are provided in this report, in the *Natural Heritage Assessment Report* and in the *Water Assessment Report*. In addition an *Environmental Management and Protection Plan* (EMPP) in Appendix C of the *Design and Operations Report* has been prepared; and construction and monitoring procedures will be implemented in a manner that is consistent with the EMPP and with local, provincial and federal standards and guidelines. The EMPP covers all critical construction and environmental management tasks including the mitigation measures identified in this report. The monitoring plans include terrestrial and aquatic habitats, roads, air quality, noise, and public and stakeholder relations.

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1. INTRODUCTION

Northland Power Inc. (NPI) and Mnidoo Mnising Power (MMP) together form the McLean's Mountain Wind Limited Partnership (MMWLP). MMWLP proposes to develop the McLean's Mountain Wind Farm (MMWF). The wind farm consists of 24, 2.5 megawatt (MW) wind turbines that will generate 60 MW of electricity. Twenty-nine (29) potential turbines sites have been identified but, upon approval, only 24 turbines will be constructed. The additional 5 turbine sites will only be implemented, should any of the preferred 24 sites become unsuitable for development. Permit approvals are being sought for all 29 potential sites.

The proposed project will require approval under Ontario Regulation 359/09 – Renewable Energy Approval (REA) under the Ontario *Green Energy Act*. Based on the REA Regulations this project is a "Class 4" wind facility. This *Construction Plan Report* is written in accordance with Ontario Regulation 359/09.

Prior to the preparation of the REA application, the *McLean's Mountain Wind Farm Environmental Study Report* (ESR) document was released in July 2009 for a 30–day public review, as part of the Environmental Assessment process (that was formerly required for wind farms prior to the introduction of the Ontario *Green Energy Act*). The ESR document is consistent with the Environmental Screening provisions of Ontario Regulation 116/01 for a Category B project and with the requirements of the *Canadian Environmental Assessment Act*. The ESR document was developed to assist in the determination of potential environmental effects, including both the social and natural environment, which could result from the proposed project. The ESR document contains additional information that is not required under the REA legislation and can provide further reference as required.

The REA replaces several approvals formerly required under the Environmental Assessment Act, Planning Act, and Environmental Protection Act. The project is being developed under the Ontario *Green Energy Act* Feed-In-Tariff (FIT) program.

The following table outlines the requirements of this report as specified under O.Reg 359/09.

Table 1-1: Adherence to Construction Plan Report Requirements (O.Reg 359/09)

Requirements	*Section of Report*
Details of any construction or installation activities	4
The location and timing of any construction or installation activities for the duration of the construction or installation	4
Any negative environmental effects that may result from construction or installation activities within a 300 metre radius of the activities	5
Mitigation measures in respect of any negative environmental effectives mentioned in paragraph 3	5

The MNR has outlined further requirements for the *Construction Plan Report*, which are summarized in the following table.

Table 1-2: Construction Plan Report Requirements
(from MNR's Approval and Permitting Requirements Document for Renewable Energy Projects)

Requirements	*Section of Report*
A diagram showing the location(s) of any ancillary or associated temporary infrastructure, including staging and lay-down areas in relation to the project location	Appendix A
Where water crossing, bridge, culvert and/or causeway is part of the project, a completed work permit application, which includes information about: • The specifications of the structure, including materials to be used and the size; • Watershed calculation for flow/flood estimation; and • Proposed erosion and sedimentation control.	Water Assessment Report MNR work permit is required for the North Channel submarine crossing. Application has been submitted to the MNR

This *Construction Plan Report* provides information on the installation of the project components, potential negative environmental effects within 300 metres of the project location and mitigation measures for the identified negative effects.

Technical studies associated with the REA requirements have been completed. In addition to this report the REA submission package includes:

- Project Description Report;
- Design and Operations Report;
- Noise Study Report;
- Natural Heritage Assessment Reports (Records Review, Site Investigation, Evaluation of Significance, and Environmental Impact Statement (EIS));
- Water Bodies Assessment Summary Report;
- Archaeological Assessment Reports (Stage 1 and 2) ;
- Cultural Heritage Self-Assessment Report;
- Decommissioning Report;
- Consultation Report;

- Property Line Setback Report;
- Wind Turbine Specification Report;
- Environmental Management and Protection Plan (EMPP);
- Post-Construction Monitoring Plan (PCMP); and
- Supporting Documents.

2. THE PROPONENT

Northland Power Inc. (NPI) is a developer, owner and operator of power generation facilities and the proponent of the "McLean's Mountain Wind Farm Project". In February 2011, Mnidoo Mnising Power (MMP), a company formed by the United Chiefs and Councils of Mnidoo Mnising First Nations (UCCMM), entered into a 50/50 partnership with Northland Power Inc. to form the McLean's Mountain Wind Limited Partnership, to develop the McLean's Mountain 60 MW Wind Farm project.

NPI's development activities include building, owning and operating wind energy facilities. In the course of developing its wind energy projects, NPI satisfies various environmental approval requirements and obtains regulatory approvals that vary depending on the jurisdiction, project capacity and site location.

The MMP Company was formed to lead renewable energy projects on Manitoulin Island in order to protect First Nations' rights and heritage and to ensure the future for First Nations' youth.

MMWLP is the primary contact for this project. The MMWLP contact information is as follows:

Full Name of Company:	*McLean's Mountain Wind Limited Partnership*
Address:	*30 St. Clair Avenue West, 17th Floor* *Toronto, Ontario M4V 3A1* *Canada*
Telephone:	*Local Office: (705)-368-0303* *Mobile: (705)-271-5358*
Prime Contact:	*Rick Martin, Project Manager*
Email:	*rickmartin@northlandpower.ca*

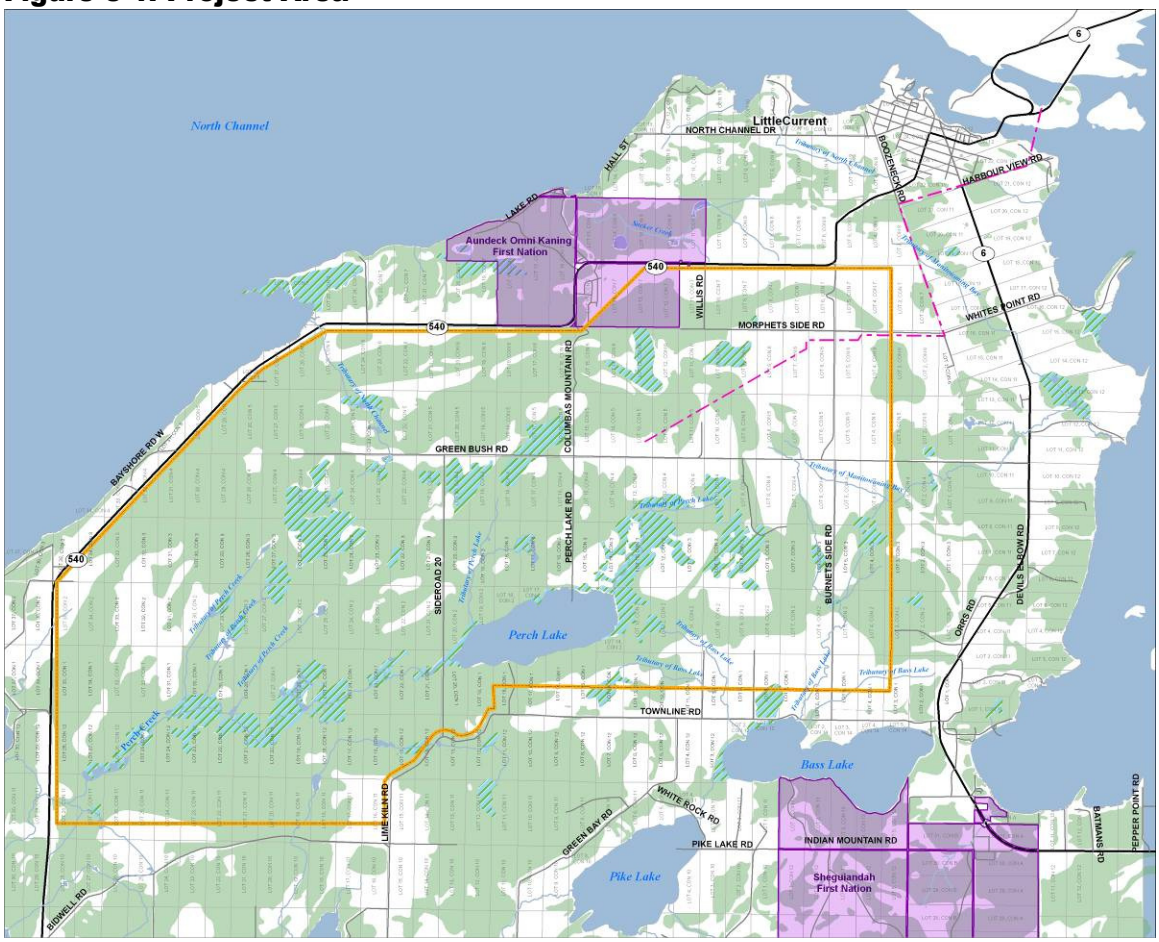
Dillon Consulting Limited is the prime consultant for the preparation of this *Construction Plan Report*. The Dillon contact is:

Full Name of Company:	*Dillon Consulting Limited*
Address:	*235 Yorkland Boulevard, Suite 800, Toronto, ON M2J 4Y8*
Telephone:	*Office: (416)-229-4646 ext 2335*
Prime Contact:	*Don McKinnon, Associate and REA Project Manager*
Email:	*dpmckinnon@dillon.ca*

3. PROJECT LOCATION

The Project Study Area is located entirely in the Municipality of Northeastern Manitoulin and the Islands; geographic Township of Howland and the geographic Township of Bidwell, in the District of Manitoulin and falls within the traditional lands of the Anishnabee of Mnidoo Mnising. The project location is about 5 kilometers from the Town of Little Current. Within this broader Project Study Area is the project location, where the wind turbines and associated wind farm infrastructure will largely be located (excluding a portion of the transmission line and the connection yard at the Hydro One grid, which is located on the adjacent Goat Island). **Figure 3-1** presents the location of the Project Study Area. Please refer to **Appendix A** for the Project Site Plan with wind turbine locations and all associated infrastructure.

Figure 3-1: Project Area



The selection of the project's location was based primarily on the wind resource, access to the local electrical transmission system, environmental constraints and local landowner support.

4. DESCRIPTION OF CONSTRUCTION AND INSTALLATION ACTIVITIES

The construction phase of any project has the potential to adversely affect the environment. A construction program is being designed by MMWLP, and its construction contractor, to minimize the potential for adverse environmental effects, while enhancing the project's benefits. As part of the construction program, good site practices and procedures will be implemented to reduce the environmental effects as outlined in the ESR. This report (along with the *Environmental Management and Protection Plan (EMPP)* which is Appendix C of the *Design and Operation Report*) provides information with respect to construction activities and Best Management Practices (BMP) that will be used to construct and install the project.

The owners and contractors will be made aware of the environmental commitments contained in the ESR, in the REA reports and in the EMPP.

4.1 Project Timing

Subject to the receipt of the necessary permits and approvals, site work for the McLean's Mountain Wind Farm is expected to begin in Spring 2012 and last for 12-15 months. No special housing, healthcare or food facilities will be required during the construction period.

Table 4-1 presents the anticipated construction schedule for the Proposed McLean's Mountain Wind Farm project.

Table 4-1: Construction Schedule

Activity	*Date of Commencement*	*Duration*
Site Preparation and Clearing	April 2012	4 weeks
Access Road Construction	May 2012	8 weeks
Foundation Construction	June 2012	12 weeks
Collector Line Installation	May 2012	8 weeks
Transmission Line Construction	June 2012	12 weeks
Installation of Transformer Substation Station	July 2012	4 weeks
Turbine Transportation and Lay Down	July 2012	4 weeks
Crane Erection	June 2012	4 weeks
Tower, Generator and Rotator Assembly	July –August 2012	8 weeks
Operations Building Construction	August-September 2012	8 weeks
Electrical Interconnection	May 2012	20 weeks
Wind Farm Commissioning	September 2012	8 weeks
Site Rehabilitation	Spring 2013	4 weeks

4.2 Overview of Materials and Equipment Brought On-Site

In general, the raw materials for construction include standard building materials, concrete, wood, and aggregate. To the extent possible, these materials will be procured from local and/or regional sources where they are available in sufficient quality and quantity, through a competitive process. Beyond the materials required for construction of the facility, resource requirements for ongoing operation of the Project include only wind power and the land base required for the facility location, access road maintenance, facility maintenance and electrical line maintenance.

Excavation and fill requirements for the Project are minimal. Any excavated materials that cannot be reused on the construction site will be offered to the landowner for reuse. Where reuse is not possible these materials will be disposed of at a licensed disposal facility.

All work crews will generally drive light trucks to reach the Project site. Provincial and local roads will be used for transportation of components and equipment to and from the construction sites, onto existing and new collection system routes and constructed access roads. Clearing of land for the temporary storage and equipment lay own areas will require tracked bulldozers, and excavators to strip topsoil and subsoil. Compactors and graders will be used to create an even travel surface where gravel is laid down for access roads. Flat-bed trucks will be used to transport tracked bulldozers, excavators, loaders, dump trucks, compactors and graders to the Project site for site preparation activities.

Construction equipment and vehicles, including those that transport materials, will access the site via existing or constructed roads. It is expected that dump trucks and flat bed transport trucks will transport all materials and equipment to the site. The weight and size of these vehicles will vary but the maximum weight will not exceed 140 tonnes, as per the *GE Specification Report on Site Roads and Crane Pads*. The Specification Report is presented in **Appendix B.** All construction activities that result in noise will be conducted in accordance with the municipality's noise by-law.

Hazardous materials used during construction are limited to fuels, lubricants and coolants that are associated with machinery, vehicles and equipment. Only fuel will be stored on-site for use by construction equipment. These materials will be managed according to BMP and the EMPP as outlined in Appendix C of the *Design and Operations Report*.

4.3 Temporary Use of Land

A temporary construction laydown area will be created. It will be used for construction trailers; vehicle parking and equipment lay-down. Temporary construction fencing will be installed around the perimeter of the temporary construction support area and any open excavations or restricted areas. The temporary construction lay-down areas will be 92 metres by 183 metres and located on Lot 6, Concession 5, Township of Howland. There are special directives to be followed at the staging area located at Lot 6, Concession 5,

Township of Howland as per the option agreement with this property owner. At each wind turbine location a lay-down area will be provided adjacent to the access road of sufficient area to permit any turbine equipment being delivered to the crane pad to be offloaded and stored pending erecting and installation of the same. Vegetation from this area will be cut short and a graded working area will be provided with a 50 metres radius from centre of each turbine foundation with berms removed. All wind turbines will be assembled in the temporary work area around each turbine area. Post-installation the land will be returned to pre-construction conditions. **Table 4-2** below summarizes the construction phase project activities.

Table 4-2: Summary of the Construction Phase Project Activities

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
Surveying & Geotechnical Investigations	The land survey activities included staking the boundaries of the construction areas, temporary workspace, access roads, distribution line routes, transmission line route, as well as marking the location of existing underground pipelines and cables. Geotechnical work involved taking bore samples in all proposed turbine locations. Required materials and equipment were transported to and removed from the site in light trucks. No materials were stored on site. Surveying and geotechnical investigations were conducted from March 29 to May 10, 2011.	• 2- 10 tonne truck mounted drill rigs • Light trucks for transportation	• Exclusion fencing • Survey stakes
Site Preparation and Clearing	To create a safe and level work area for storing and assembling the wind turbine generators and towers, a suitable sized area may have to be stripped and leveled, depending on the local conditions. Bush, trees, and other vegetation will be cleared from the construction areas as required. An area of 0.3 hectares will be required for each turbine location for assembly of the turbine. There will also be some minor disturbance to the vegetation outside of the 0.3 hectares lay-down area as the wind turbine blades extend beyond this area. The clearing of a right-of-way will be required for some sections of the turbine access roads (15 metres) and sections of the 115 kV transmission line (8-10 metres) (details below). Graders, bulldozers, and backhoes will be used to strip any soil that could be present at the turbine foundation locations. All soil will be stored on-site for use in remediation. Following soil stripping, grading will be conducted on irregular ground surfaces, if any, to provide a safe and clean work surface. Grading will be done in such a manner so as to not alter drainage patterns in the area.	• 15-20 deliveries with flatbed trucks • 5-6 light trucks • 2 tracked bulldozers • 5 dump trucks • 2 compactors • 2 graders • 2 water trucks • Excavator	• 200-400 mm of pit run gravel • 50 mm of ¾ inch gravel • Geotextile material • Fuel and lubricating grease for construction equipment

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
	All materials will be transported to site in the dump trucks, flatbed and light trucks. Gravel will be delivered directly to site from a local supplier/pit, as needed for construction activities. The geotextiles will be stored at the construction lay-down area until required for access road and turbine foundation construction. All debris will be collected and disposed of at approved facilities. There is potential for noise and dust emissions and mitigation measures are discussed in the following section.		
Local Roads Improvements	Green Bush Road will have to be improved in at least two locations. Additional stone base may be added for strengthening as required. The width may be increased to 5.5 metres in some places and up to 8 metres in other places. Improvements may be required to 2 existing crossings along Greenbush Road of the Tributary of Manitowaning Bay) The intersection at Hwy 6 would be temporarily widened and the road grade and vertical curves would be adjusted. Townline Road may have to be widened in at least 1 location to accommodate the turbine deliveries. There is the potential that the intersection of Green Bush Road and McLean's Mountain Road will require widening of the turning radius. A 38.1 metre turning radius is required for the delivery of the wind turbine components. Widening of the turning radius would involve the placement of granular material to create a widened roadbed. The widened intersections would be removed after component delivery but the entrances and any culverts would remain.	• Similar equipment will be used as Site Preparation and Clearing activity.	• 200-400 mm of pit run gravel • 50 mm of ¾ inch gravel • Geotextile material • Fuel and lubricating grease for construction equipment
Access Road Construction	Turbine access roads will be installed to accommodate construction and maintenance vehicles and heavy equipment for larger repairs/replacements. Access roads will be 5 metres wide during both the construction and operations phases. For areas of crane walks, there will also	• Similar equipment will be used as Site Preparation and Clearing activity.	• 200-400 mm of pit run gravel • 50 mm of ¾ inch gravel

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
	be the need for a 6 metre compacted shoulder of native material. The excavation of earth and some blasting of rock are expected to be required for the construction of the turbine access roads. One new water crossings will be installed in order to develop the access roads (Tributary of Bass Lake). Access road culvert, of various diameters, will be constructed across the watercourses at the project location in order to accommodate vehicular access and construction traffic while maintaining unimpeded flow within the watercourse. The type of crossings and the mitigation measures will be developed in consultation with the appropriate governing bodies (Department of Fisheries and Oceans (DFO), Ontario Ministry of Natural Resources (OMNR)). All materials brought to site will be stored at the construction lay-down area until required for construction. Construction debris will be collected and disposed of at approved facilities. There is potential for noise and dust emissions and mitigation measures are discussed in the following section.		• Geotextile material • Fuel and lubricating grease for construction equipment • Culverts of various sizes
Foundation Construction	Depending on soil conditions, the size of the excavation for the turbine tower will be 2.5 metres to 3 metres deep and 20 metres wide. There is the potential to encounter groundwater seepage. The amount of seepage will depend on seasonal conditions at the time of construction, the degree and continuity of bedrock fracturing and the depth of the excavation relative to the groundwater table. It is not anticipated that a Permit to Take Water (removal/pumping of more than 50,000 L/day) will be required as significant excavations into the bedrock are not anticipated. If it is found that 50,000L/day or more water is required to be pumped out of the bedrock a Category 2 Permit to Take Water will be obtained if pumping does not exceed 30 days. Otherwise, a Category 3 Permit and a Hydrogeological Impact Study will be required. Excavation will proceed until bedrock is exposed; in most cases this will be	• Tracked excavator • Tracked bulldozer • Concrete Pump Truck • Rough terrain mobile crane • Approximately 45 deliveries using 8-9 m^3 concrete trucks • Truck-mounted crane or rough terrain forklift	• The same equipment and materials land clearing activities • Approximately 365 m^3 of concrete • Approximately 32 metric tonnes of rebar plus formwork, anchor bolts, and embed rings

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
	shallower than 12 inches. Any top soil would be stockpiled on site for future use. A spread base foundation will be used. Depending on rock strength, blasting may be required for excavation in the bedrock. Blasting would be undertaken as per MNR and local municipal requirements. Suitable excavation material will be utilized in the foundation backfill and unsuitable excavated materials will be disposed of off-site at a licensed facility. The concrete will be sourced from a local supplier. The amount of concrete required will depend on ground/soil characteristics. The forms for the foundations will be removed and the excavated area back-filled compressed such that only the tower base portion of the foundation will be above ground. There is potential for noise and dust emissions and mitigation measures are discussed in the following section.		
Collector Line Installation	Each turbine will be connected to the on-site transformer substation through a collector line system. The lines will primarily run along the turbine access roads and then along municipal roads RoW. The feeder lines will be buried. The underground lines will be installed using a combination of trenching and ploughing to a depth of 1-1.5 m and a width of 1 m. In an effort to minimize impacts to environmentally sensitive areas four locations will be directionally drilled in order to avoid impact to wetland features. Four wetlands will be crossed with feeder lines using "Horizontal Directional Drilling" (HDD) to avoid impacts to the wetlands. HDD will be required: 1. On Greenbush Road, lots 17 and 18 between Concession 4 and 5 (Approximately 600 m). 2. Sideroad 20 to T21, south end of Lot 20 Concession 4 (under wooded area, approximately 400 m). 3. Lot 27 between Concession 2 and 3, Guida's Sideroad (Approximately 600 m). 4. North side of Perch Lake lots 13 and 14 between Concession 2 and 3	• The same equipment as land clearing activities will be used • 1 – 2 Trenching machines • 1 Boom trucks • 1 - 2 Cable reels trailers	• Up to 35 km of 34.5 kV utility cable

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
	(Approximately 600 m). A directional boring machine (Vermeer machine) is to be used. HDD requires the use of a drilling fluid or "mud" consisting of silica and bentonite. HDD requires the excavation of pits at the desired inverts of the conduit at each end; the machine may or may not be in the pit. The bore will be approximately 20 cm in size. Once bored, a HDPE casing is then advanced, then the three conductors (one per phase), fiber optic duct, and separate ground cable (if used), are pulled through the casing. Where the underground line will cross a watercourse, the appropriate Department of Fisheries and Oceans (DFO) Operational Statements will be followed or a letter of authorization will be obtained. Construction debris will be collected and disposed of at approved facilities.		
Transmission Line Installation	A 115 kV line will be constructed to transmit the power to the Hydro One Transmission line on Goat Island. A connection station will be installed at the point of connection to the provincial grid. Transmission line routing to the grid will require submarine crossing of the North Channel (see below). The 115 kV transmission line will require a right-of-way of 8-10 metres. Some sections of the right-of-way will require clearing. The tower structures of the transmission line would be composed of single poles and be spaced about 125 metres apart and installed to a typical depth of approximately 2.5 metres. The line has been routed to minimize its length and avoid sensitive environmental features. The transmission line will be above ground. Some minor variations to the alignment are possible dependant on public input and engineering considerations. Construction debris associated with the transmission will be collected and disposed of at approved facilities.	• The same equipment as land clearing activities will be used • 2 - 4 Auger trucks • 2 - 4 Boom/Bucket trucks • Approximately 2 Cable reels trucks and trailers	• Wood poles • Circuits (electrical wires) • Switching station • Submarine cable • Terminal structure at South side of Channel crossing
North Chanel Submarine Cable Crossing	It is proposed that the electrical transmission cables (115 kV) will cross the North Channel at the eastern end of Manitoulin Island in a north-south orientation. A total of three (3) electrical cables are to be installed across the channel, in addition to one fiber optic cable.	• The same equipment as land clearing activities will be used • 1 – 2 trenching	• Armored 115 kV marine cable • Fiber optic cable

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
		machines	
	The marine cables crossing portion of the project extends between the north and south shores of the channel. At each shore, the marine cables will terminate at a concrete manhole installed on the respective banks back from the shoreline. On the south shore, the manhole is set back approximately 18 metres from water's edge. On the north shore where the ground slopes more gradually, the manhole is positioned approximately 40 metres beyond water's edge. Accordingly, the total length of the channel crossing of the marine cables between manholes on the north and south shores measures 490 metres. The armored cables are to be laid on the bottom of the channel. The cable will be placed underground at both shoreline locations. Conventional open cut trenching methods will be used for the near-shore and bank sections of the proposed channel crossing, the marine transmission cables will be buried in an excavated marine trench to provide the necessary protection and security with a minimum cover of 865 mm (34") over the top of the cables after backfilling. Some rock blasting could be required. Details regarding the cable design and method of construction is provided in Appendix C to this Construction Plan Report. Note that instead of trenching it is possible that the constructor may choose to directional drill the cable for the channel crossing. Once on Goat Island, the cable would remain underground to the point of interconnect with the provincial grid. The cable would be installed through conventional trenching construction methods. The property which the alignment passes through is owned by Canadian Pacific Railway, for which MMWFLP has obtained an easement to pass through this property.	• 1 Boom trucks • 1 - 2 Cable reels trailers • Barge to install the marine cable	
Installation of Transformer Substation	The transformer substation will be constructed on Company owned land, Lot 13, Concession 5, Township of Howland. The substation site will be graded and graveled as per code The substation will comply with the requirements of O.Reg 359/09 by	• Tracked bulldozers, crane and excavators for installation	• Circuit breakers • Step-up power transformer • Isolation switch • Distribution switch-

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
	meeting the 40 dB noise limit at the nearest receptor. It will be located at least 500 metres from the nearest noise receptor. Substation grounding will follow the Canadian Electrical Code (CEC) Construction debris will be collected and disposed of at approved facilities.		gear • Instrument transformers • Grounding • Revenue metering • Substation control and communication building • Oil containment system
Turbine Transportation and Lay Down	Each of the disassembled turbines and generators will be trucked to the site on a flat-deck trailer for assembly within a temporary construction area. Thirteen flat-bed trucks are required for each complete wind turbine unit. It will be necessary to undertake some local road intersection improvements to allow the trucks to make turns to access the project location. It may also be necessary to reinforce some of the bridges leading up to the site. The nature of these improvements will be confirmed in consultation with the municipality and all appropriate permitting and approvals will be obtained.	• 14 – 16 heavy haul trucks per WTG delivery including 9-10 specialized 34-60 meter transport trucks • Will be concurrent with and will use the same equipment and materials as land clearing activities	• about 6–8 trailers to be located in laydown area including EPC Contractor, WTG Supplier, Specialty Subcontractor(s) and Owner
Crane Erection	A crane pad will be installed at each turbine site to accommodate cranes to erect the turbine. The crane pads will be constructed at-grade with a maximum slope of 1%. An area of approximately 200 m^2 will be leveled and stoned to a 300-600 mm depth to accommodate each crane pad. An area 50 metres of each crane pad will be used for assembly of the wind turbine rotor and storage of the turbine components. Construction debris will be collected and disposed of at approved facilities.	• Approximately 15 heavy duty trucks to transport crane equipment • Will use the same equipment and materials as land clearing activities	
Tower, Generator, and Rotor Assembly	The tower comes in four sections that are assembled at the turbine sites one section at a time. The nacelle, which houses the generator, is lifted by a crane and attached to the top of the top tower section. The rotor will be lifted by crane and attached to the nacelle.	• 1-Crane (600-800 tonnes crane with two assist crane) • Crane (200-300Ton)	Turbine towers, delivered in 5 sections: • nacelles • blades

Construction: Physical Works/Activities	Description of Activity	Equipment Required	Materials Required
	Construction debris will be collected and disposed of at approved facilities.	Rough terrain mobile cranes • 2 rough terrain fork lifts	• rotors and hubs • pad-mounted transformers
Operations Building Construction	An operations building will be constructed on-site next to the sub-station location. The operations building will be approximately 15 metres by 30 metres (450 m^2) in size. It will provide office and storage space and a workspace for maintenance of equipment. A well will be required to provide a potable source of water for the Operations and Maintenance building. Domestic waste water will be managed by the construction of a small septic tank and field bed.	• deliveries with flatbed trucks • light trucks • tracked bulldozers • dump trucks • compactors • graders • Excavator	Typical building materials (wood, brick, metal, concrete, etc.)
Wind Farm Commissioning	Turbine commissioning can occur once the wind turbines have been fully installed and the electrical connections are completed. The commissioning involves testing and inspection of electrical, mechanical, and communications operability. A detailed set of operating instructions must be followed in order to connect with the local electrical system.	• Same equipment as site clearing activity • 4000 L Sewage tank • piping	• Sand • Stone • Weeping Tile
Site Rehabilitation	Garbage and debris will be removed and disposed of at an approved location. Slash trees will be set aside and piled. All equipment and vehicles will be removed from the construction area. The proponent will prepare a Generator Waste Registration Report for each waste that will be generated on site as per O.Reg. 347 of the EPA. If spills occurred during the construction phase, spill affected areas will be remediated. Emergency oil spill kits will be maintained on site during the construction and operation of the project. All waste fluids and oils will be removed from the site and recycled, where possible, or disposed of according to provincial guidelines. The temporary lay-down areas and disturbed areas around the foundation of each turbine and at the substation will be replaced with the stockpiled topsoil. The disturbed areas (including trenches/plough seams) will be allowed to re-naturalize or be re-seeded and maintained at the discretion of the landowner.	• Graders • Dump Trucks • Loaders • Excavators • Tracked bulldozers • Light Trucks	• Fuel and grease for equipment

5. ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

O. Reg 359/09 requires compilation of baseline information for a number of environmental components including:

- Archaeological and Cultural Heritage Resources;
- Noise Receptors (such as non-participating landowners);
- Water Bodies; and
- Natural Heritage Features.

Based on the REA *Technical Bulletin Three: Guidance for Preparing the Construction Plan Report* (MOE, 2010), the following sections provide a summary of all potential negative environmental effects that could arise from the construction of the Project, including the following:

- The potential negative effects of all construction activities within 300 m of the project area;
- The nature and magnitude of each effect;
- Any proposed mitigation measures; and
- Where appropriate, environmental effects monitoring plans.

Project environmental effects and mitigation measures are also described in Section 6 of the *McLean's Mountain Wind Farm Project ESR (July, 2009).* While the project layout has been modified since the ESR was completed, the description of environmental effects presented in the ESR is still considered to be valid and representative of the project. We note that the ESR includes considerable documentation related to bird and bat activity in the project area that is not required to be documented in the REA package. The *Environmental Management and Protection Plan* (EMPP), which is appended to the *Design and Operation Report* and included as part of the REA documentation, provides an update to the mitigation plan presented in the ESR and provides further details on the mitigation measures to be implemented.

This section describes the negative environmental effects associated with construction and installation activities including natural features within 120 metres of the project components. Where other REA reports provide further details on potential environmental effects and proposed mitigation, these reports are noted.

Environmental effects have been reduced by meeting the applicable REA setback requirements. **Table 5-1** summarizes the project setback requirements outlined in O.Reg 359/09.

Table 5-1 Adherence to O.Reg 359/09 Setback Requirements

Setback Requirements	*Section of Application where Additional Assessment is Undertaken (if required)*
Minimum setback of 550 metres from Points of Reception (non-participating landowners)	Noise Study Report
30 metres plus turbine blade length (80.5 metres total) or 120 metres from the average annual high water mark of lakes, permanent or intermittent streams and seepage areas	Natural Heritage Report Water Assessment Report
Blade length plus 10 metres from non-participating property owner	Property Line Setback Assessment Report
Outside of provincially significant wetlands	Natural Heritage Report
50 metres from provincially significant areas of natural and scientific interest (earth science)	None required
120 metres from provincially significant wetlands	Natural Heritage Report
120 metres from significant valleylands	None required
120 metres from provincial parks	None required
120 metres from conservation reserves	None required
120 metres from provincially significant areas of natural and scientific interest (life science)	None required

5.1 Natural Heritage Resources

Through the records review and site investigation work it was confirmed that each of the following natural features do not occur in the project location of relevant adjacent lands:

- Provincial Parks and Conservation Reserves;
- ANSI, Life Science;
- ANSI, Earth Science;
- Valleylands; and
- Provincial Plan Areas.

The development of this wind farm has been ongoing since 2004 and numerous field visits have been conducted during this time to identify constraints to development. Based on natural environment information collected, the location of the project components has been revised and several turbines have been relocated or removed. Optimization of the project location was completed to future reduce effects to natural features in the project area as recently as January 2011. The number and extent of woodland and wetland features and their related wildlife habitat in the area prevent further reduction of natural features within 120 metres of project components. To the extent possible, the setback of project components to natural features has been maximized. Routing of project components (i.e. access roads and feeder lines) around wetlands use existing roads and municipal road RoW, where access and disturbance already occur.

Much of the land within the project area is used for agricultural purposes, and most notably cattle grazing. Although woodlands were identified as a common natural feature throughout the project location and adjacent areas, an Environmental Impact Study on woodland areas is not required as the project location is within the Canadian Shield; (as per Figure 1 in the *Provincial Policy Statement, 2005).* However, certain wildlife habitat functions of woodlands (e.g. Area Sensitive Forest Breeding Bird Habitat, etc.) are evaluated as part of significant wildlife habitat.

5.1.1 Potential Impacts

Minimal tree removal will be required for access road and cable and transmission line construction, and some removal of riparian vegetation may occur for access road water crossings. MMWLP is proposing narrow road beds to reduce the amount of site clearing necessary for the access roads. There is the potential for rare, threatened, or endangered species or their habitats to exist within the Project Area. The clearing of vegetation has the potential to result in loss of this habitat or fragmentation of habitat, which may affect wildlife movement or corridors.

Temporary equipment lay down and storage areas will result in soil compaction and will have to undergo remediation after the construction phase is complete. Excavation and trenching activities for the installation of underground cables may result in changes to soil properties. By limiting the width of the trenches (1 metre) the amount of land that will be affected has been minimized.

5.1.2 Proposed Mitigation and/or Monitoring Plan

Significance of natural features was determined based on provincial guidelines and based on the composition, function and attributes of the features recognized. In combination with the noise receptor and property boundary setback requirements, a project layout was developed maintaining a 120 metres setback from sensitive natural features wherever possible. Where project components could not meet the 120 metres prescribed setback from natural features, environmental impact studies (EIS) were prepared to document the predicted net effects to significant natural features. Based on this evaluation, significant wildlife habitat identified as occurring within 120 metres of the project location that require an Environmental Impact Study includes:

- Seasonal Concentration Areas
  - Raptor Wintering, Feeding and Roosting Areas.
- Rare Vegetation Communities
  - Common Juniper Shrub Alvar (A5 and A6);
- Specialised Habitat for Wildlife
  - Mink and Otter Feeding/Denning Sites;
  - Amphibian Breeding Habitat; and,
  - Turtle Nesting and Over-wintering Area;

  - Area-sensitive Forest Birds; and
  - Open Country Breeding Birds
- Habitat of Species of Conservation Concern
- Species of Conservation Concern (Cooper's Milkvetch & Northern Long-eared Bat).

The results of significant natural feature and wildlife surveys, along with the EISs, are included in the *Natural Heritage EIS Report*.

Wherever possible, the access roads and temporary storage and equipment lay down area will use existing roads and infrastructure in order to avoid potential damage to agricultural land or vegetation, wetlands and woodlots. In areas where there is the potential for significant compaction of soil, the subsoil will be stripped to alleviate compaction and replaced along with topsoil. Construction activities that occur in close proximity to woodlots will use protection fencing to avoid disturbance or damage to the woodlot. In addition, any vegetation removal will be done outside of the identified breeding seasons.

The crane will travel along the access roads, wherever possible, to access each turbine sites to avoid further effects to agricultural land and natural features.

Construction related disturbance effects to natural features located adjacent to project components may also occur. Natural features and wildlife could be disturbed by noise and dust effects. These effects are expected to be short-term and spatially limited to the work areas in the immediate vicinity of the project components. The amount of woodland and other habitat to be removed represents a small proportion of the available habitat in the project area and construction activities are not anticipated to have a significant effect on the ecological functions these features support.

The *Natural Heritage EIS Report* should be referred to for more detailed information on the anticipated impacts and mitigation measures to natural heritage resources.

The combination of the above mitigation measures, plus those presented in the *Natural Heritage EIS Report* and the EMPP are considered adequate to address any potential negative effects from the construction of the project.

5.2 Water Bodies

The project location falls within Ecodistrict 6E-17 (Gore Bay) and the Manitoulin Islands Tertiary Watershed 2CG, which lies between the north end of Georgian Bay and Lake Huron and drains into Lake Huron (Henson and Brodribb 2005; Phair et al., 2005) . This watershed consists of Manitoulin Island and many smaller islands surrounding it. Characteristics of this watershed include coastal areas, stream systems, lakes and wetlands. A significant portion of the watershed is alvar, with mixed forests, sparse

deciduous and coniferous forest and dense deciduous forest found throughout the remainder of the watershed. Approximately 9% of the watershed is made up of stream systems; less than 8% is comprised of lake systems (Phair et al, 2005).

The project location is split between two quaternary watersheds (2CG-08 and 2CG-07; see Figure 3). Watercourse stations 1 – 4 fall within the western quaternary watershed of 2CG-08 with eastern watercourse stations 5 – 11 falling within quaternary watershed 2CG-07. In general, the majority of watercourses within the project location flow towards either Perch Lake or Strawberry Channel (Lake Huron).

Within the project location, a search and analysis of the records and resources outlined in the records review did not identify any lakes, Lake Trout lakes or seepage areas in the project location or within the surrounding 120 m. The results of the site investigation verified these determinations.

Within the project location, nine watercourse crossings have been identified across permanent and/or intermittent streams (see Figure 3 in the *Water Assessment Site Investigation Report*). Stations 1 to 3 indicate the location of feeder lines crossing the Perch Creek coldwater system which flows southwest to the North Channel (Wayne Selinger, MNR; personal communication). At these crossings, the feeder line will be installed using horizontal directional drilling. Access/exit pits for construction are located within 120 m of the creek system. In addition, Turbine 40 lies within 120 m of Perch Creek, but is greater than 30 m from the system.

Station 4 is the location of a feeder line crossing tributary (#2) that drains into Perch Lake.

Station 5 indicates the area where Turbine 34 is located greater than 30 m but within 120 m of a Tributary to Bass Lake #2. A feeder line and access road crossing is proposed across this tributary to connect and access this turbine.

Station 6 marks where a Tributary to Bass Lake #3 originates. An access road and feeder line are proposed within 30 m of this stream. Downstream of this location, Station 8 indicates where Turbine 19 lies within 120 m of the stream. This turbine is mapped outside of the 30 m setback.

Station 7 indicates the area where a portion of the Tributary to Manitowaning Bay #1 falls within 120 m of the project construction staging area.

Station 9 at the Tributary to Manitowaning Bay #2, Station 10 at an unnamed tributary and Station 11 at the North Channel all are within 120 m of the proposed transmission line route that terminates on Goat Island. The North Channel is a feature between Manitoulin Island and Goat Island and is located within Lake Huron.

5.2.1 Potential Impacts

Both desktop and field survey studies were undertaken within the project area to identify significant water features. This information was used to aid in the development of the project layout. Classification of water features was determined based on the composition, function and attributes of the features using current provincial guidelines.

Potential water feature effects include:

- Vegetation removal, grading and excavation activities could increase erosion sedimentation and turbidity, increase nutrients and contaminants in watercourses and wetlands;
- Removal of vegetation near water features (e.g. from stream crossings) could decrease shade cover and contribute to increased water temperatures; and
- Construction of the access roads could potentially reduce infiltration rates and. increase the volume of surface water runoff entering adjacent water courses.

Further, the installation of underground cables and water crossing culverts has the potential to disrupt fish habitat, cause soil erosion and sedimentation through disturbance to the shoreline and bed of water bodies and potentially destroy habitat through the removal of riparian vegetation that provides shade, food and cover.

There is also the potential for fuel and oil/lubricant spills, which could potentially contaminate nearby water bodies. Impacts related to spills are discussed in Section 5.4.

A more detailed discussion of the potential impacts to water bodies and mitigation measures can be found in the *Waterbodies Assessment Environmental Impact Statement.*

5.2.2 Proposed Mitigation and/or Monitoring Plan

A minimum setback of 30 metres from project components to water bodies and watercourses was considered during siting of the project components. One watercourse crossing will be required for the access roads (crossing of a tributary to Bass Lake). Four watercourses will have to be crossed by feeder lines (with the use of directional drilling under sensitive features) and another three crossings will be necessary for the transmission line (plus the marine cable crossing of the North Channel). Two culvert improvements along Greenbush Road are also anticipated. See **Appendix A** for mapping of the watercourse crossing locations and locations that will be directionally drilled.

For a comprehensive list of mitigation measures please see the *Water Assessment Environmental Impact Statement.*

In order to reduce the impacts to water bodies and wetlands vegetative buffers will be maintained and/or restored to the extent possible. There will be specific replacement planting and restoration adjacent to wetland units #3, 12, 13, 23 and 25. Fencing will also be placed between the area to be cleared of vegetation and the wetland. Vegetative buffers will be maintained and/or planted. Every attempt will be made to schedule grading to avoid times of high runoff volumes (spring and fall) where possible. Access roads will be designed to promote infiltration of run-off water with the use of gravel materials.

It is anticipated that the mitigation measures will be effective and the resulting net effects to water bodies will be minimal. For details on the residual environmental effects and monitoring plans, refer to the *Waterbodies Environmental Impact Statement.*

5.3 Stormwater Run-off

5.3.1 Potential Impacts

Construction and installation activities for the project may result in negative impacts to the surrounding environment from stormwater run-off. Potential changes to surface drainage patterns (water flow paths and quantity) can negatively affect surface water quantity and quality, especially after storm events. These changes can result from excavation, vegetation removal, soil stockpiling, soil compaction from heavy equipment and grading and land contouring.

Run-off from gravel and soil stockpiles for access road and turbine foundation construction may result in sedimentation of lands and watercourses in close proximity and vegetation removal can facilitate the flow of sediment. Soil compaction from heavy equipment, especially in the storage and lay down areas, crane pads and access roads, can reduce water infiltration and result in greater overland flow of water, thereby increase run-off. Downstream erosion and sedimentation may result from increased surface runoff causing a higher downstream flow.

5.3.2 Proposed Mitigation and/or Monitoring Plan

Drainage patterns will be maintained as much as possible in the construction of the access roads and turbine foundations. Culverts will be installed under roadways as required to maintain the flow of watercourses. Stockpiles of topsoil and gravel will be protected as required by the EMPP and Best Management Practices to prevent erosion and run-off. Vegetation removal will be minimal and will be avoided wherever possible near water bodies. Silt fencing will also be used adjacent to wetlands and water bodies. Access roads and substation site will be contoured for effective surface drainage.

The total area that will be used for staging and construction is very small in proportion to the overall Project Area. It is therefore unlikely that there will be significant negative effects resulting from stormwater run-off. The above mitigation measures are considered to be sufficient to control and significant negative effects due to stormwater runoff. Please see the EMPP for details on the monitoring plan for stormwater run-off.

5.4 Fuel Spills

5.4.1 Potential Impacts

Hazardous materials such as oils, fuels and paints will be required. Fuel will be delivered to the site by tanker with temporary fuel storage at the project construction site. Although the quantity of materials to be used is of low volume, there is the potential for some spills during equipment refuelling, maintenance or operation. These substances have the potential to contaminate surface and ground water and soils.

5.4.2 Proposed Mitigation and/or Monitoring Plan

Spills will be managed in accordance with provincial legislation and guidelines (See *EMPP*). Implementation of Best Management Practices will be employed to reduce the risk of accidental spills of contaminants. The following BMPs will be followed:

- Regular inspection of vehicles and the construction site to ensure BMPs and other mitigation measures are been followed;
- Refuel vehicles and perform maintenance in designated areas;
- Ensure all vehicles and construction equipment are properly maintained;
- Maintain a supply of spill control materials (absorbent materials) in locations designated for refuelling and where maintenance operations occur;
- Regular review of the Spills response Plan;
- Proper training of workers and regular reviews of spill prevention and containment;
- Minimize construction during wet weather; and
- Removal of accumulated sediment from control measures at completion of Construction phase or after significant accumulation.

Please refer to the EMPP for further mitigation and protocols about fuel spills. No net effects are anticipated with use of the BMPs listed above and in the EMPP.

5.5 Air, Odour, Dust

Emissions associated with construction activities are dust and typical combustion emissions from construction equipment such as CO, NOx, SOx and VOCs. No odour is expected from construction activities with the exception of localized diesel fumes from construction equipment.

5.5.1 Potential Impacts

Project related air quality effects would largely occur during the construction phase. This would include emissions from construction equipment and increased dust levels during soil excavation and from road traffic. As the construction areas are generally well removed from receptors, air quality related effects are expected to be minimal and would be temporary.

5.5.2 Proposed Mitigation and/or Monitoring Plan

During the construction period, the contractor will implement standard practices to minimize air emissions including:

- Use new or well-maintained heavy equipment and machinery, preferably fitted with muffler/exhaust system baffles, engine covers;
- Motorized equipment should meet design specifications for emission controls and conform to provincial Drive Clean standards where appropriate;
- Comply with operating specifications for heavy equipment and machinery;
- Minimize operation and idling of gas-powered equipment and vehicles, in particular, during smog advisories – this is to be strictly monitored;
- Minimize vehicular traffic on exposed soils and stabilize high traffic areas with clean gravel surface layer or other suitable cover material;
- Minimize mud tracking by construction vehicles along access routes and areas outside of the immediate work site, and ensure timely cleanup of any tracked mud, dirt and debris.
- Avoid excavation and other construction activities with potential to release airborne particulates during windy and prolonged dry periods;
- Stabilize stockpiled excavated soils in areas that are upwind of sensitive receptors;
- Cover or otherwise contain loose construction materials that have potential to release airborne particulates during transport, installation or removal;
- Use of Spray water and environmentally friendly dust suppressants applied at an environmentally acceptable rate may be used to minimize the release of dust from gravel, paved areas and exposed soils only where necessary on problem areas;
- Implement a speed limit that will lead to reduced disturbance of dust on paved and unpaved roads; and
- Restore disturbed areas as soon as possible to minimize the duration of soil exposure.

Refer to the EMPP for measures to be used to monitor the effectiveness of the noise mitigation strategies for the duration of the construction and installation activities. Contingency measures are also defined in the unlikely case that performance objectives are not met.

5.6 Noise

During the construction phase, noise will be generated from heavy machinery and construction activities including excavation equipment, trucks transporting equipment to and from the site and contractor vehicles.

5.6.1 Potential Impacts

Activities during the construction period will cause a temporary and minor increase in noise levels at and in the vicinity of the proposed site. However, construction that requires extensive use of heavy machinery and other construction that will cause significant increases in noise will be limited to short time periods within the overall estimated construction timeframe.

The noise generated during the construction phase is not expected to affect the receptors in the area given their distance to the project site and hours of operation for construction during the construction phase.

5.6.2 Proposed Mitigation and/or Monitoring Plan

The amount of noise during construction is difficult to predict since activities may occur sporadically throughout the period with varying consistency. However, hours of construction activity will conform to NEMI Noise By-Law. Construction activities that generate significant noise will take place during daytime hours in order to minimize noise impact.

Generators for turbine commissioning activities will have sound barriers and/or the use of a generator within acoustically rated enclosures will minimize potential noise effects. Generators used to power temporary field offices will also have sound barriers erected and/or include enclosures to reduce noise effects at the nearest noise receptors. All construction equipment will be kept in good repair and will operate in accordance with local by-laws, manufacturer recommended guidelines and MOE's publication NPC 115. An environmental compliance monitor will oversee construction and commissioning to ensure that the construction contractor adheres to all environmental regulations.

Refer to the EMPP for measures to be used to monitor the effectiveness of the noise mitigation strategies for the duration of the construction and installation activities. Contingency measures are also defined in the unlikely case that performance objectives are not met.

5.7 Cultural Heritage and Archaeological Resources

Stage 1 and 2 Archaeological assessments have been completed (See **Appendix E**). The Ministry of Tourism and Culture has signed off on the Stage 1 and Stage 2 Reports. There are no known cultural sites (reported sites) on or within 250 metres of the McLean's Mountain Wind Farm and the proposed project turbine locations. The majority of the project area has low archaeological potential, is well removed above most permanent water, is mostly high plateau with near surface bedrock, has no evidence of eskers or similar features, and the vast majority of the area does not contain useable toolstone. The areas that were identified as having archaeological potential include the stream areas draining Perch Lake to Honora Bay, and the transmission line crossing east of Little Current. No cultural materials were located during the Stage 2 Assessment. Please see the *Cultural Heritage Assessment Report* that describes the potential for effects to natural heritage features.

5.7.1 Potential Impacts

A Stage 1 Archaeological Assessment was completed in 2009. A Stage 2 archaeological assessment was completed in 2010. No archaeological resources were located during the Stage 2 Assessment and Addendum that were submitted in July 2010 and January, 2011, respectively. The Ministry of Tourism and Culture accepted both reports and provided sign-off in February, 2011. Updates to the Stage 2 Assessment were completed in May, 2011. In June 2011, the Stage 2 Archaeological Assessments were submitted for properties that had previously not been included in the project. These reports are appended to this REA submission.

A Cultural Heritage Self-Assessment (See **Appendix F**) screening for potential impacts to the built heritage and cultural heritage landscapes was completed in April, 2011. The self-assessment concluded that there were no heritage concerns with the project and no impacts are expected. The self-assessment screening has been sent to the Ministry of Tourism and Culture.

5.7.2 Proposed Mitigation and/or Monitoring Plan

No mitigation measures are required. Should previously undocumented archaeological resources be discovered, appropriate mitigation measures will be identified and implemented, which, depending on the resource, could include:

- Preservation in-situ, requiring changes to the project layout;
- Removal and preservation; and
- Further assessment (i.e. a Stage 3 Archaeological Assessment and possible a Stage 4 Archaeological Assessment).

If archaeological resources are found the proponent will cease alteration to the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48(1) of the Ontario Heritage Act. If human remains are discovered the persons discovering them will notify the police or coroner and the Registrar of Cemeteries, Ministry of Small Business and Consumer Services.

5.8 Land Use and Resources

The McLean's Mountain Wind Farm consists of a land parcel of 8,200 hectares located immediately south of Highway 540, between North Channel and Georgian Bay. The entire proposed site lies in NEMI. The project properties (including all project components) include:

Township of Howland: Concession 1, Lots 15, 16,17, 31, 32, 33, south part of Lots 34 and 35 (25 acres of each lot); Concession 2, Lots 10, 11, 12 , 13, 14, and Lots 21-42; Concession 3, Lots 12, 13, 14, 15 and Lots 21-32; Concession 4, Lots 7, 8, 9, 14, 19, and 20; Concession 5, Lots 6, 7, 8, 10, 11, 12, 13, 14 ;Concession 6, Lots 5, 6, 7, 8, 9, 10, Part Lot 21 Concession 12 and Township of Bidwell: Concession 12, Lots 22 - 28.

Please see Appendix B of the Project Description Report for the legal descriptions of land parcels used for the project components.

The proposed wind farm on McLean's Mountain is to be located on lands zoned rural. Land use is primarily vacant land with some cattle grazing. Lands are all privately owned. There are few residences within the proposed study area which are located along existing roadways (Green Bush Road, Morphet's Sideroad and McLean's Mountain Road). The proposed wind farm's terrestrial habitat has been impacted by grazing cattle and general agricultural practices associated with beef cattle production. Forests size and shape in the study is general reduced, fragmented and confined to steep slopes or lowland areas. Cattle regularly graze in the forests, which has resulted in reduced regeneration and species diversity. There are no businesses in the vicinity of the study site.

In addition, the proposed power transmission line required to connect the wind farm to the provincial grid on Goat Island will extend along Morphets Side Road and then extend north along an unopened road allowance to connect with Harbour View Road along the southern edge of Little Current. Existing land use along this proposed route includes five residences along Morphets Side Road and four businesses along Harbour View Road.

5.8.1 Potential Impacts

There will be a temporary loss of agricultural land for field offices, equipment and materials storage and Project component construction and assembly for the duration of the construction period. These areas will be small relative to the size of agricultural land

within the Project Area and these lands used for the construction of the wind farm will be returned to agricultural use after construction and installation activities are concluded.

There is the possibility that the use of local waste management facilities for disposal of construction debris may cause disruption for these facilities and for local residents if the capacities of these facilities are exceeded.

5.8.2 Mitigation Measures

Prior to the start of construction MMWLP will estimate construction waste volumes and the capabilities of local disposal facilities to determine the quantities and materials that can be disposed of locally. For a description of licensed receiving waste management facilities see the *Decommissioning Plan Report*.

5.9 Provincial and Local Infrastructure

There will be an increase in traffic to the site during construction. Truck traffic will use both Hwy 540 route and Hwy 6 to access either ends of the project area. Green Bush Road will also be used for truck traffic to access the wind turbine lay down areas. Townline Road will be used to access turbines located to the east of Perch Lake. There will be a general increase in other traffic to the site as well during construction, although this traffic will decrease once the construction phase is complete.

To meet the wind turbine manufacturer, *GE's Site Roads and Crane Pad Specification Report* for the GE 2.5MW wind turbine generator, Green Bush Road will have to be improved in two locations. Additional stone base may be added for strengthening as required. The width may be increased (to 5.5 metres). The intersection at Hwy 6 would be temporarily widened and the road grade and vertical curves would be adjusted to comply with the specifications report. Extensions of existing culverts (2) are expected to be required. (See *Water Assessment Report*) Please see **Appendix D** for the Preliminary Road Design.

There is the potential that the intersection of Green Bush Road and McLean's Mountain Road will require widening of the turning radius. A 38.1 metre turning radius is required for the delivery of the wind turbine components. Widening of the turning radius would involve the placement of granular material to create a widened roadbed. The widened intersections would be removed after component delivery but the entrances and any culverts would remain.

Typical entrances and any culverts would remain in place after construction.

5.9.1 Potential Impacts

Use of the local roads by the public could be temporarily disrupted during the delivery of project components to the construction site.

Local and provincial roads may experience some additional wear and potential damage from heavy construction and equipment loads.

The project will ultimately connect to the Hydro One transmission system, circuit S2B on Goat Island. As there is sufficient capacity on this line no impact is expected to this infrastructure.

No other infrastructure impacts are anticipated. Currently no impact to local infrastructure or services is expected and the Township has confirmed this through their initial assessment via the municipal consultation form.

5.9.2 Proposed Mitigation and/or Monitoring Plans

The community will be notified in advance of construction delivery schedules and signage will be erected to notify road users of construction activity.

A local roads condition survey will be undertaken prior to construction initiation. Road condition will be surveyed once road construction is completed. Roads will be returned to a pre-construction condition or better once construction is completed. The results of the surveys will be shared with NEMI.

5.10 Areas Protected under Provincial Plans and Policies

There are no Provincial Plan or Protection areas in or adjacent to the project area.

5.11 Environmental Construction Monitoring

An environmental construction monitoring program will be carried out during the construction phase of the McLean's Mountain Wind Farm project to ensure that the committed mitigation measures (see the Environmental Management and Protection Plan (EMPP) in Appendix C of the *Design and Operations Report*) are carried out and are effective. The environmental monitoring program will be carried out by the project owner's "Environmental Monitor" who will be independent from the construction contractor. The Environmental Monitor will have the authority to halt construction if, in their opinion, the required mitigating measures are not being adhered to and which potentially could result in unacceptable environmental effects.

Daily written logs will be compiled to document the inspection work. Documentation will include any instructions given to the contractor regarding environmental effects and

the corrective actions taken. Upon completion of the work, a site inspection and rehabilitation report will be prepared.

5.12 Emergency Response Plan

The Emergency Response Plan (ERP) is described in the *Design Operations Report* (Section 8) and EMPP.

The ERP is to be used in the event of an emergency and includes contact information for regulators, landowners, and other stakeholders. All appropriate regulators will be notified should the emergency include any potential impact to the health and safety of local residents or the environment.

5.13 Health and Safety Plan

The project owner and its construction contractor shall institute a Health and Safety Plan during the construction period. A detailed plan will be developed and the construction workforce will be made aware of the plan. Measures to be implemented will include for example:

a) sanitary facilities shall be well equipped (e.g., protective creams and soaps);
b) personal protective equipment (PPE), including non-slip footwear, eye protection, clothing, and hardhats, will be worn by operations and maintenance personnel when on duty;
c) elevated platforms, walkways, and ladders will be equipped with handrails, toe boards, and nonslip surfaces; and
d) electrical equipment will be insulated and grounded in compliance with the appropriate electrical code.

The project owner and its construction contractor shall maintain a master Incident Report that documents illnesses and accidents. The Incident Report shall document all activities resulting in incapacity to work for at least one full workday beyond the day on which the illness or accident occurred. Records will also be maintained noting the total number of days of absence from work as a direct result of the illness or accident.

6. CONCLUSIONS

This *Construction Plan Report* has been completed to assist MMWLP in fulfilling regulatory requirements for the development of the McLean's Mountain Wind Farm project. This report is consistent with the provisions of Ontario Regulation 359/09 for a Class 4 Wind Farm facility, as set out by the *Green Energy Act*.

Sufficient fieldwork and data collection was performed to assist in the determination of potential effects to the various environmental and social features that may be affected by

this project during the construction phase. Various mitigation measures to manage these potential effects have been identified.

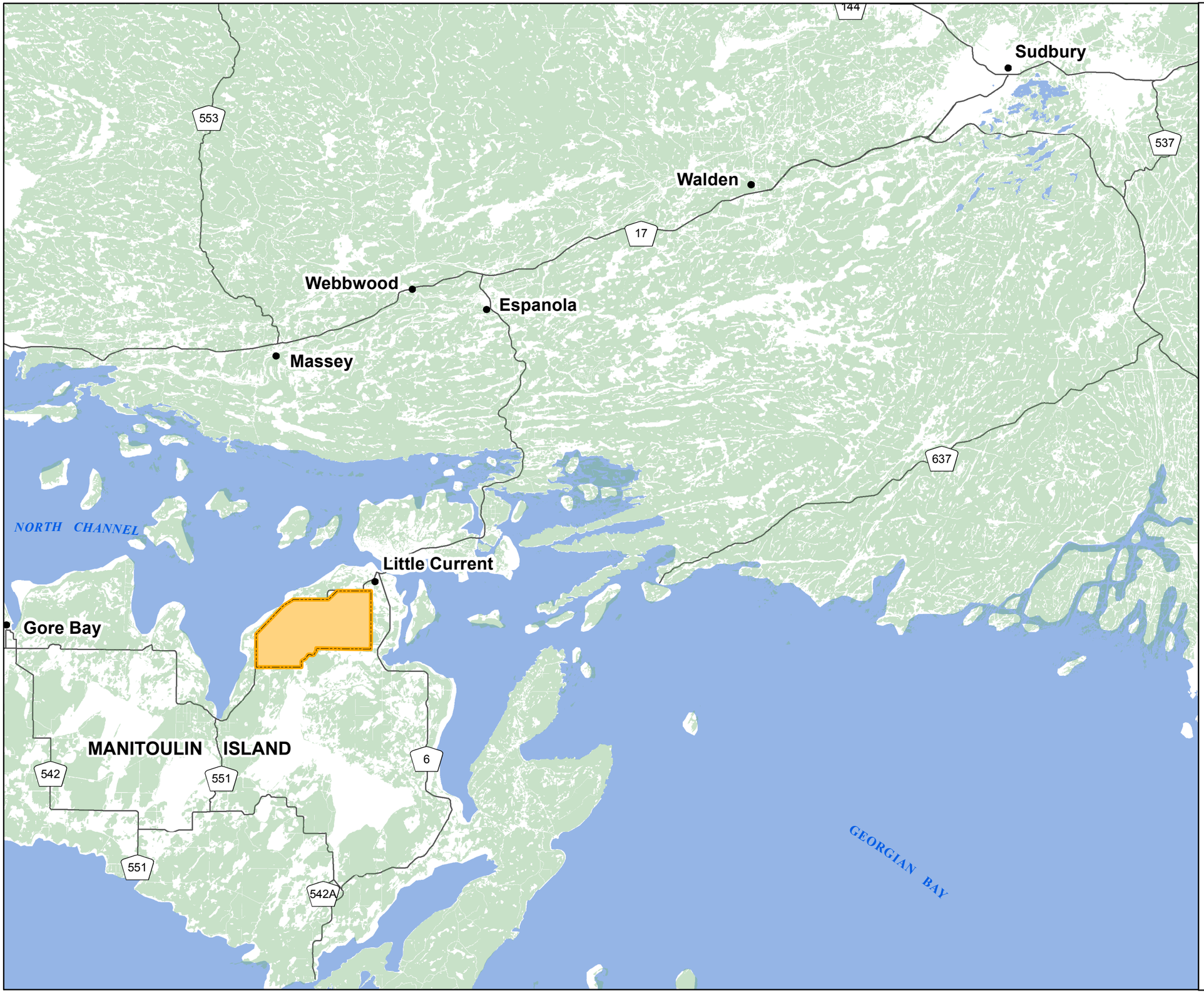
Significant adverse effects to the natural and social environment have been avoided through careful site selection, facility layout planning and strict adherence to all regulatory requirements. All wind turbines, access roads and ancillary facilities have been sited with public and landowner consultation to minimize the impact to current land uses. No significant adverse environmental effects are anticipated.

The overall conclusion of this Construction Plan Report is that this project can be constructed without any significant adverse residual effects to the natural or social environment.

There are net benefits of this project resulting from an increased municipal tax base for the NEMI, increased number of employment opportunities (especially during the construction stage) and the generation of clean, renewable electricity from wind power. The operation of the wind farm will also provide annual economic benefits through royalties to landowners and a continuing need for supplies and services in the local and regional northern Ontario economies.

APPENDIX A

Site Plan and Mapping



NORTHLAND POWER

Mclean's Mountain Wind Farm
Figure A-1: General Location of Project

Legend

- Communities
- Highway
- Project Area
- Waterbody
- Woodlots

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DILLON CONSULTING

Created By: SFG
Checked By:
Date Created: May 27, 2008
Date Modified: July 21, 2011
File Path: I:\GIS\Northland Power\Mapping\Figure 4-1 General Site Plan.mxd

NORTHLAND POWER

McLean's Mountain Wind Farm
Figure A-2: Project Components Site Plan

Legend

- Noise Receptor
- Local Roads
- Highway
- 120 m Project Component Setback
- Lots/Concessions
- Water Body
- Watercourse
- Woodland
- Unevaluated Wetland
- 550m Noise Receptor Setback

Project Components

- 24 Wind Turbine Locations
- Five Extra Permitted Sites
- Substation
- Operations Building
- Horizontal Directional Drilling Access/Exit Pit
- Access Road
- Feeder Lines
- Transmission Line
- Construction Staging Area

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Date Modified: July 25, 2011
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NORTHLAND POWER

McLean's Mountain Wind Farm
Figure 2: REA Setbacks Map

Legend

- Residence
- Local Roads
- Highway
- Lots/Concessions
- Water Body
- Watercourse
- First Nation Reserve
- Woodland
- Wetlands

Area of Natural and Scientific Interest, Life Science

- Sheguiandah Hill
- Sheguiandah Quartzite Quarry
- Bass Lake Marsh/Swamp

Project Components

- 24 Wind Turbine Locations
- Five Extra Permitted Sites
- Substation
- Operations Building
- Horizontal Directional Drilling Access/Exit Pit
- Access Road
- Feeder Lines
- Transmission Line
- Construction Staging Area

REA Constraints

- 30m Watercourse Setback
- 120m River/Stream Setback
- 61.5m Non Participating Lot Setback
- 61.5m Road Setback
- Perch Lake Setback
- 120m Wetlands Setback
- 120m Life Science Area of Natural and Scientific Interest (ANSI) Setback
- 550m Noise Receptor Setback

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NORTHLAND POWER

McLean's Mountain Wind Farm
Figure 3: Watercourse Crossings

Legend

- Watercourse Crossing
- Local Roads
- Highway
- 120 m Project Component Setback
- Lots/Concessions
- Water Body
- Watercourse
- Woodland
- Unevaluated Wetland

Project Components

- 24 Wind Turbine Locations
- Five Extra Permitted Sites
- Substation
- Operations Building
- Horizontal Directional Drilling Access/Exit Pit
- Access Road
- Feeder Lines
- Transmission Line
- Construction Staging Area

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Date Created: May 27, 2008
Date Modified: July 21, 2011
File Path: I:\GIS\091983 - Northland Power\Mapping\Construction Plan Report\Figure 3 Watercourse Crossings.mxd

DILLON CONSULTING

APPENDIX B
GE Specification Report on Site Roads and Crane Pads

GE Energy

Technical Documentation
Wind Turbine Generator Systems
2.5-2.75 Series

Specification

Site Roads and Crane Pad

imagination at work

GE Energy

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1 Requirements

This specification describes the major dimensions and weights of the vehicles required for transportation of the main components of the GE 2.5-2.75 Series Wind Turbine Generator System (WTGS). Furthermore, the minimum requirements (based on normal ground conditions) for access roads and crane pads described herein must be met to ensure the proper installation of the WTGS.

Please note that additional measures may be necessary in the event of deviant conditions!

2 Transport Vehicles (examples)

- 15 heavy-duty trucks for erecting and dismantling the crane
- 13 heavy-duty trucks with plant components consisting of:
  - 1 for tower base ring
  - 2 for PPM system
  - 4-5 for tower sections
  - 1 for nacelle
  - 1 for hub
  - 3 for rotor blades

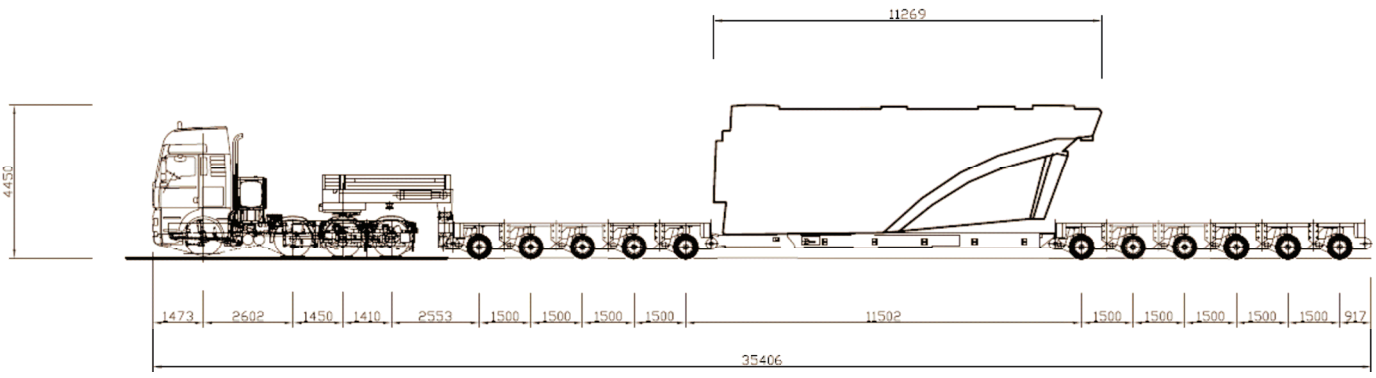


Figure 1: Example of transport vehicle for the nacelle

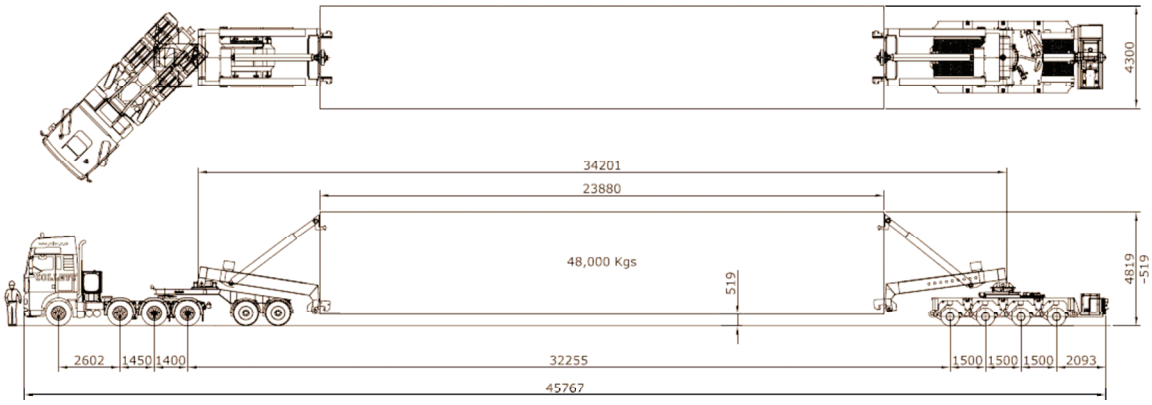


Figure 2: Example of transport vehicle for the tower sections

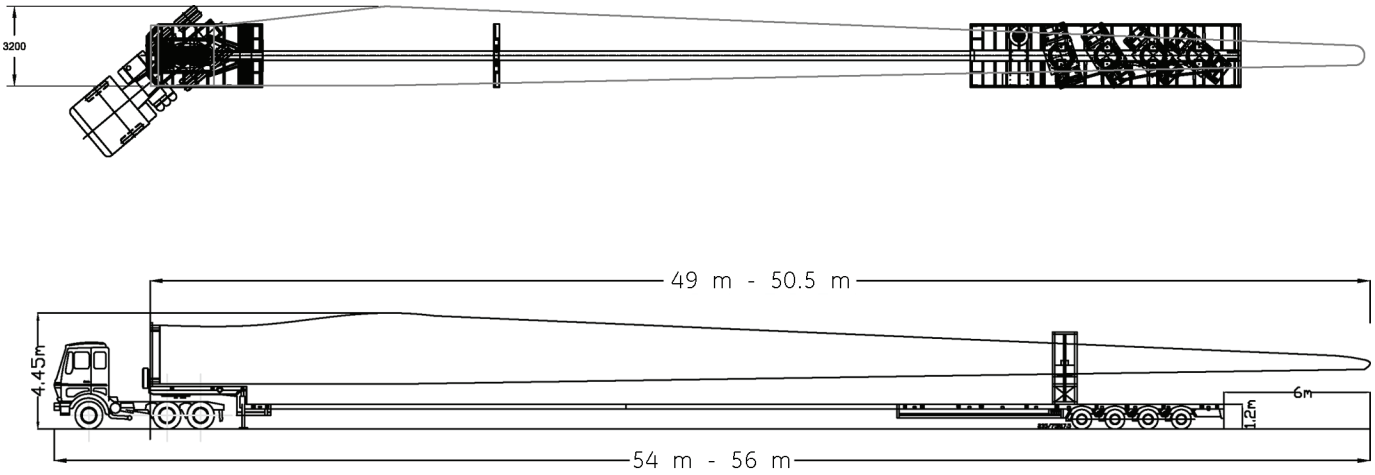


Figure 3: Example of transport vehicle for the blades

The equipment and dimensions may vary due to availability. The maximum vehicle length is 56 m when loaded with the rotor blade. The vehicle length is measured from the front of the transporter to the end of the load.

2.1 Vehicle Weights

- Maximum. axle load 12-16 t, onsite for cranes and transport vehicles
- Maximum individual weight approximately 140 t

3 Access and Site Roads/Entrances

3.1 Road Curves and Entrance Curves

The road curves and entrance curves must be constructed to the dimensions shown in the figures below. The dimensions are based on the rotor blade transport vehicle due to the fact that this vehicle requires the most compacted area to pass the curves.

All stored and excavated topsoil or any obstacles in the areas next to or near the road or entrance curves must be removed or leveled before turbine delivery can begin. All open cable trenches that run along the roads or crane pads must be refilled before any turbine delivery and construction can begin.

GE Energy will not take responsibility for any damage to the roads that has been caused by the transport vehicles or cranes when the access roads or site roads have not been properly constructed. This will apply also for damage caused to vehicles due to unsuitably constructed roads, waiting time, or recovery costs.

3.2 Turning Curves

The curve radii for transportation vehicles can be obtained from the following drawings:

- Figure 4: Truck with rear axle steering, outside radius 12.5m / turning angle 90° on page 8
- Figure 5: Truck with rear axle steering, outside radius 32.5m / turning angle 90° on page 9
- Figure 6: Truck with rear axle steering, outside radius 12.5m / turning angle 120° on page 10
- Figure 7: Truck with rear axle steering, outside radius 32.5m / turning angle 120° on page 11
- Figure 8: Truck with rear axle steering, outside radius 32.5m / turning angle 150° on page 12
- Figure 9: Truck with rear axle steering, outside radius 32.5m / turning angle 180° on page 13

Please note that additional measures may be necessary in the event of deviant conditions or equipment used!

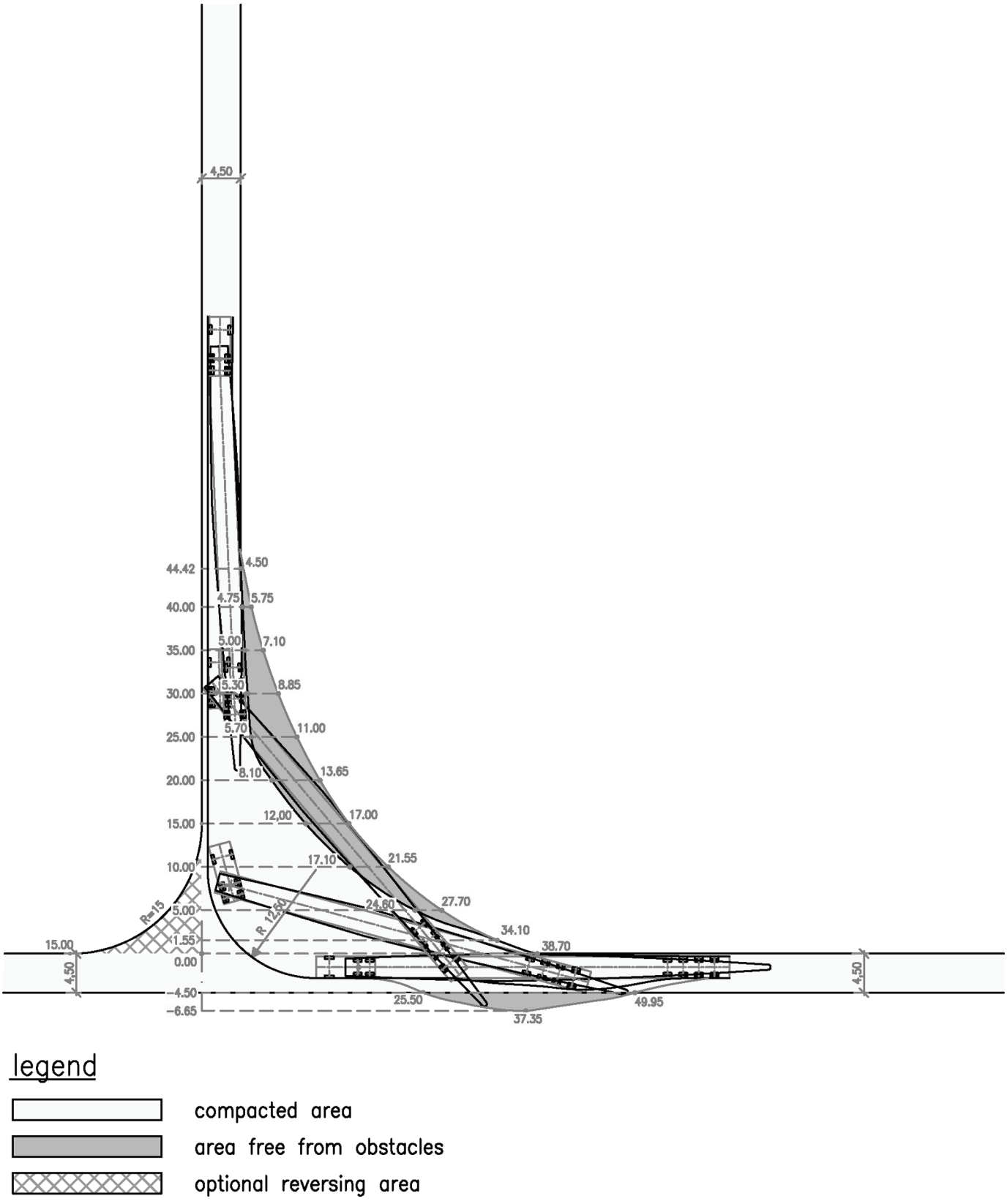


Figure 4: Truck with rear axle steering, outside radius 12.5m / turning angle 90°

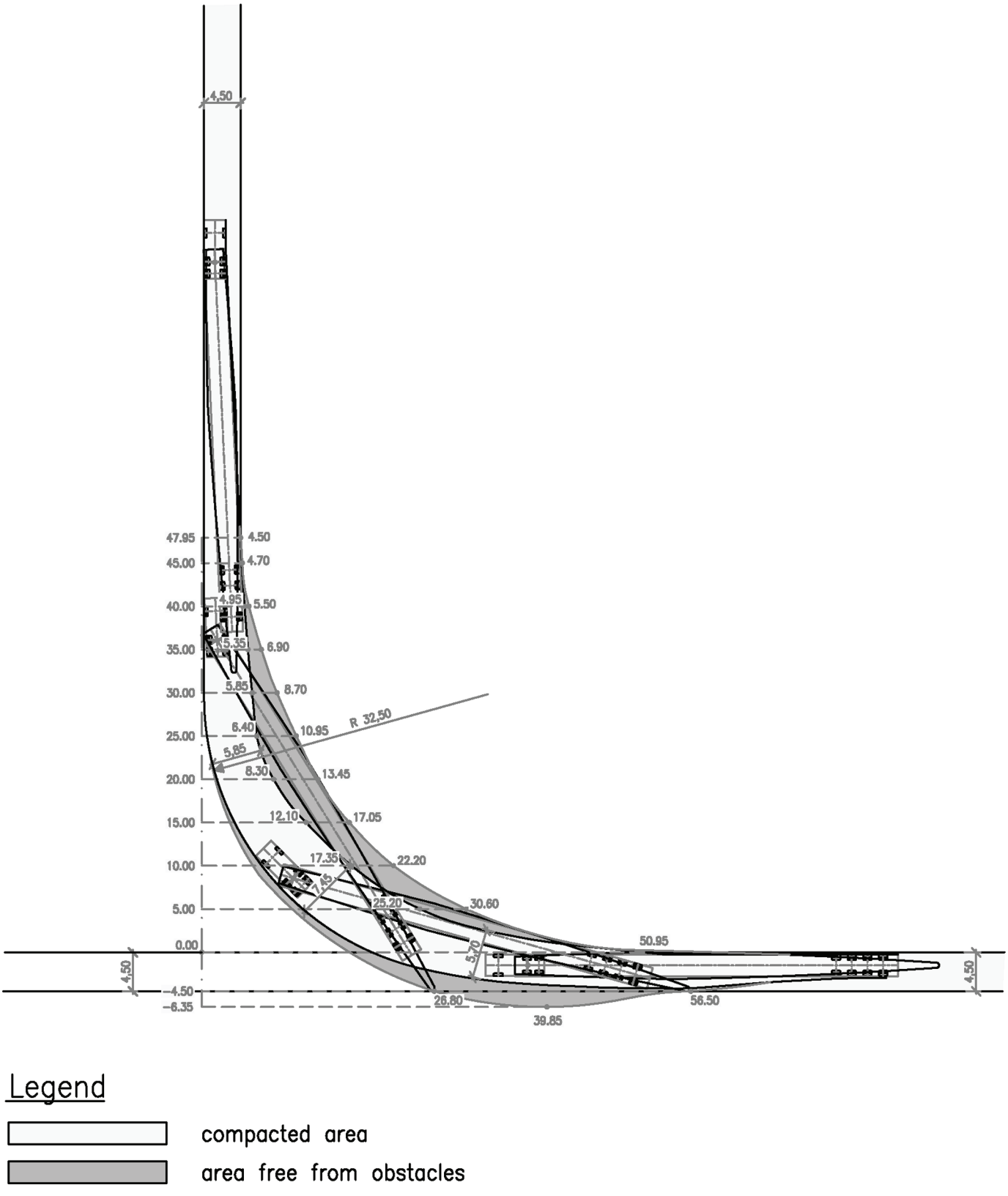


Figure 5: Truck with rear axle steering, outside radius 32.5m / turning angle 90°

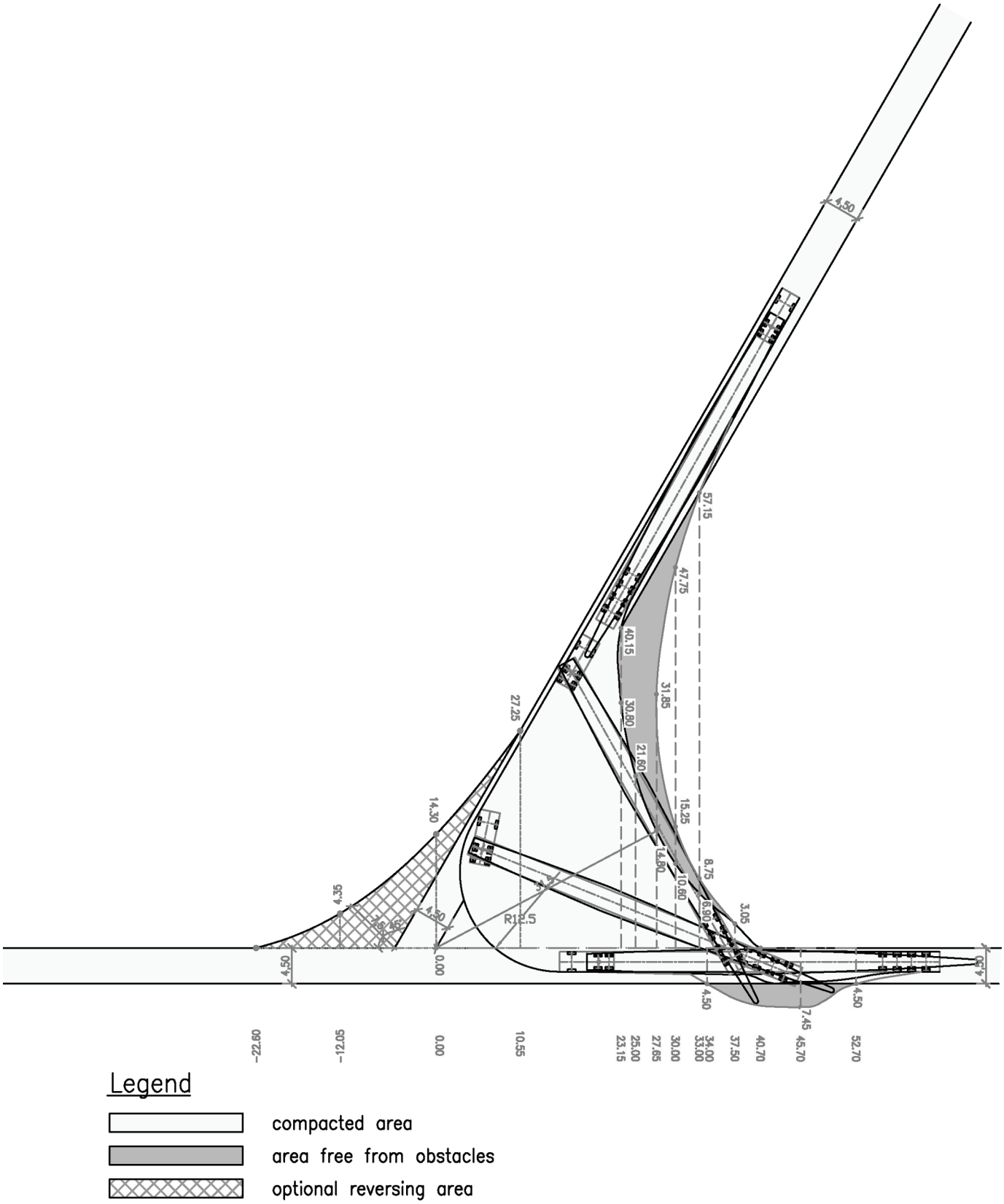


Figure 6: Truck with rear axle steering, outside radius 12.5m / turning angle 120°

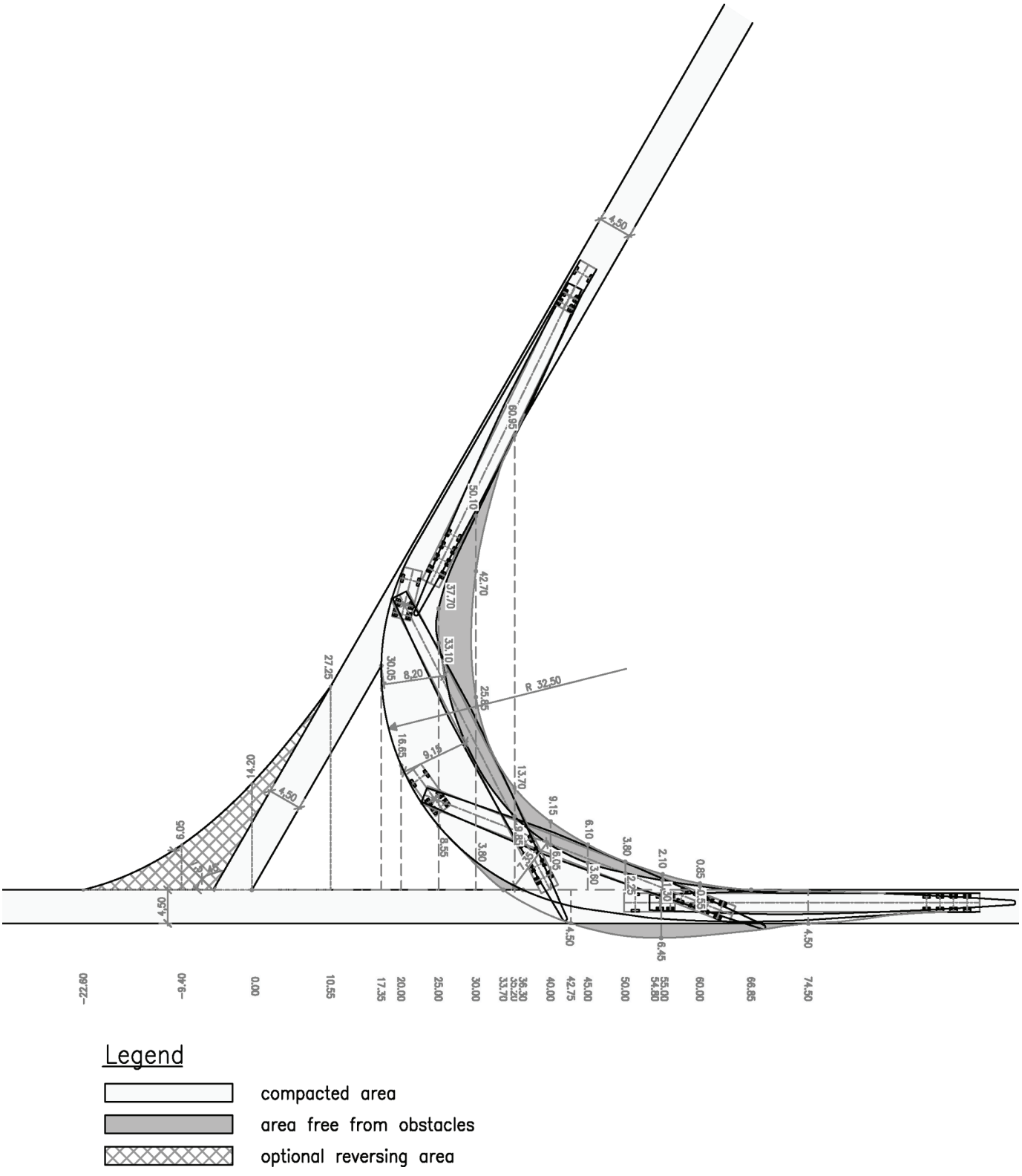


Figure 7: Truck with rear axle steering, outside radius 32.5m / turning angle 120°

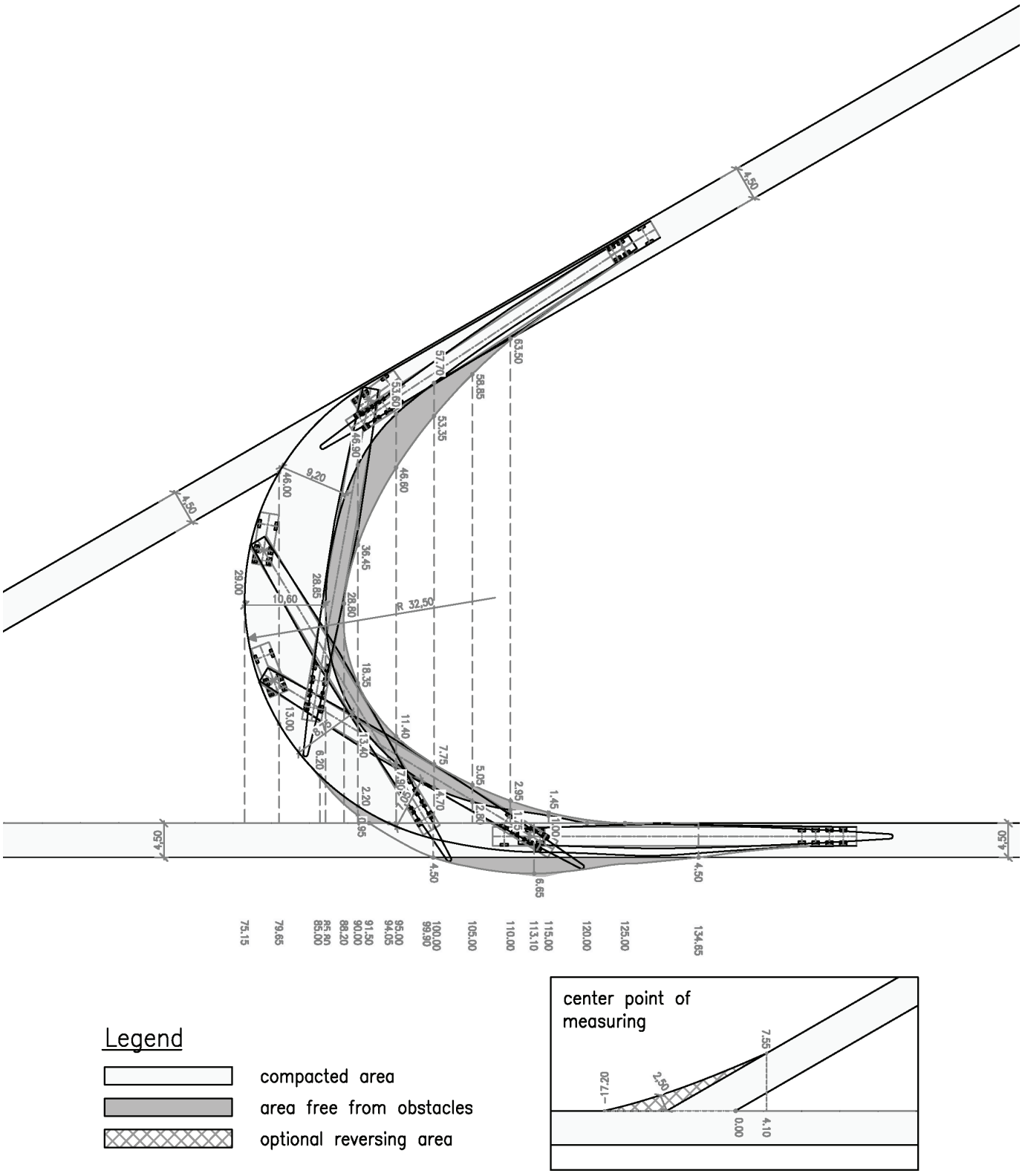
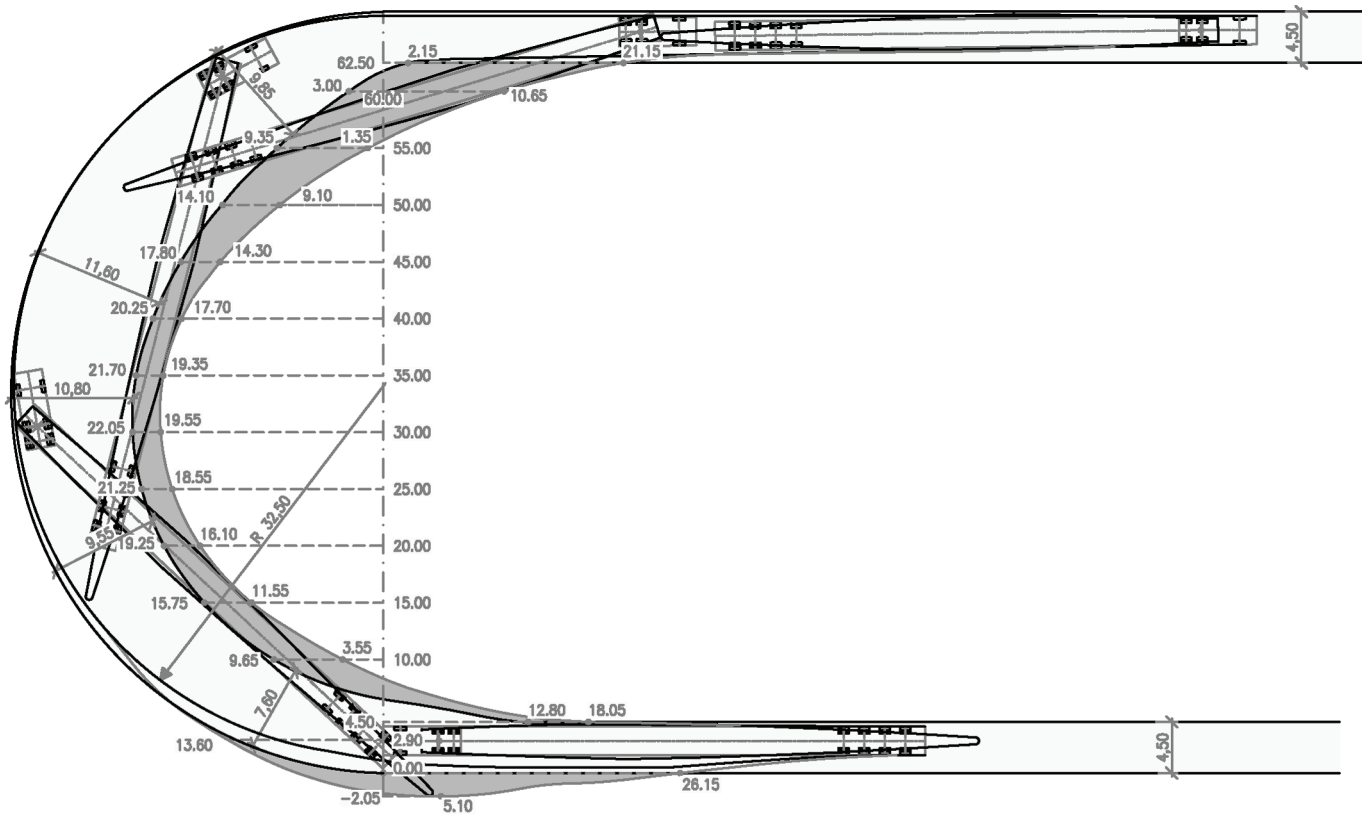


Figure 8: Truck with rear axle steering, outside radius 32.5m / turning angle 150°



Legend

compacted area

area free from obstacles

Figure 9: Truck with rear axle steering, outside radius 32.5m / turning angle 180°

3.3 Gradient

In general the transport vehicles will be able to access gradients up to 6 % on straight roads without narrow bends and under good weather and road surface conditions. It is possible to transport the turbine components on gradients over 6 %. In those cases there will be a necessity for one or more towing/pushing vehicles to be supplied.

If during project planning it is seen to be necessary that a towing vehicle is required for gradients over 6 %, GE Energy and the customer will decide on the type of towing/pushing vehicles and the suitable towing procedure with regard to the respective situation. All costs for ordering, delivery and use of the towing/ pushing vehicles are to be paid by the customer.

If during project planning it is seen to be necessary that a towing vehicle is required for gradients under 6 % it is to be supplied by the customer at short notice. Reasons for this may be, but are not limited to:

- bad weather conditions
- poorly constructed roads etc.

All costs resulting from the need for a towing/pushing vehicle during the project phase and those costs resulting to waiting time for GE Energy and its crane/transport vehicles will be passed on to the customer.

3.4 Road Camber

Access and site roads should have a maximum camber of 2 % for proper drainage.

3.5 Clearance, Height and Width

The customer has to ensure that on all access and site roads any overhanging tree branches, powerlines and telephone cables are removed to avoid damage to turbine components.
Minimum height = 6.0 m, minimum width = 5.0 m according to Figure 10.

The equipment may vary due to availability or transport strategy.

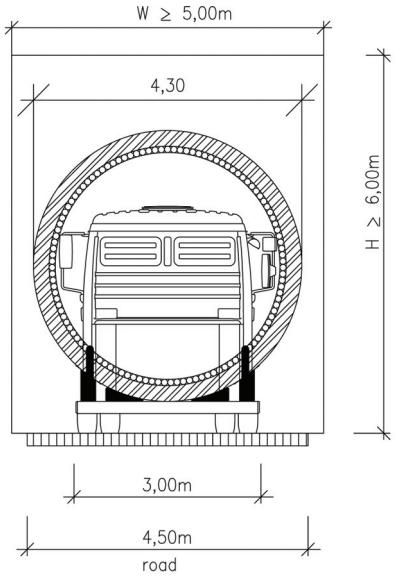


Figure 10: Clearance, onsite tower transport as example

3.6 New Site Roads

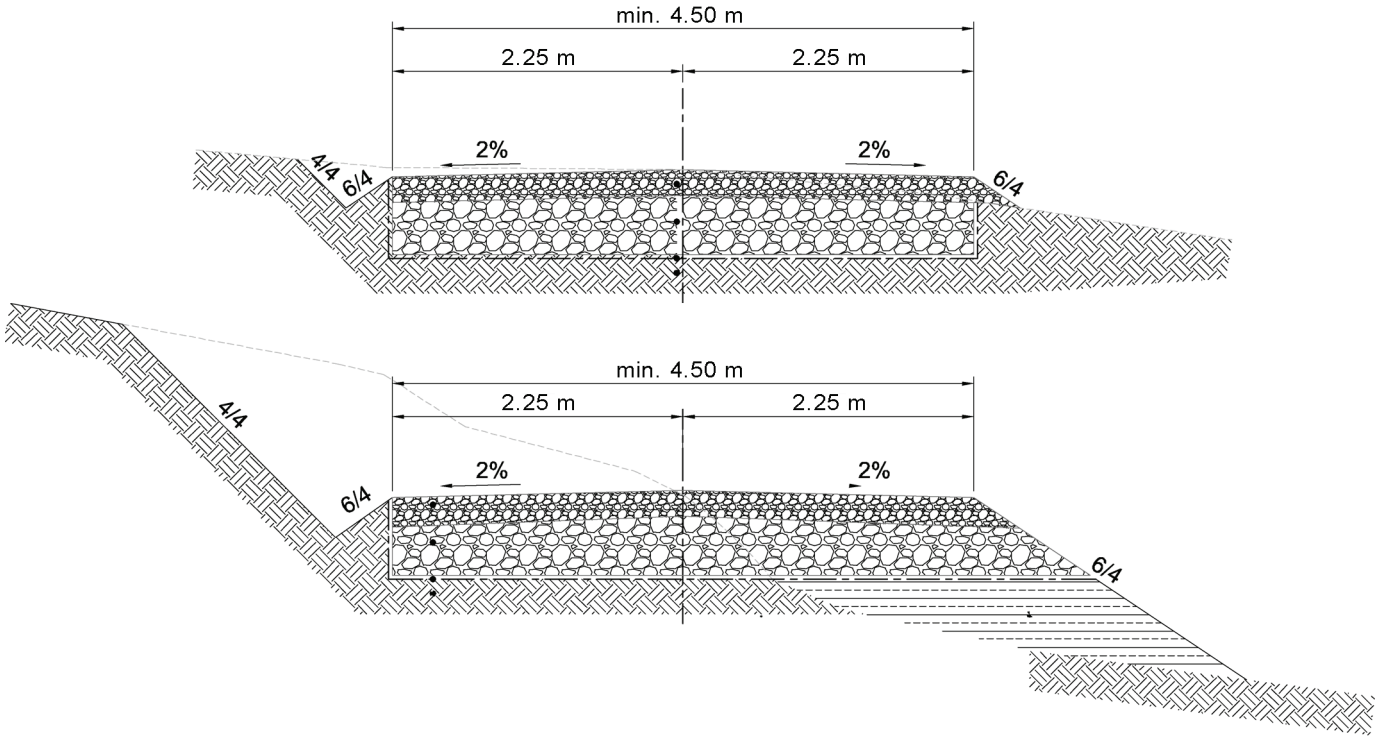


Figure 11: New site road (example)

All site roads must be constructed to the minimum drivable width of 4.5 m. The roads must be constructed with a camber of 2 % (maximum), so that rainwater can flow off and hence the risk of rutting/potholes is reduced.

It is important to note that the method of road construction and the gauge of the base layers is solely dependant on the local ground conditions.

The base layer can be a rock-gravel-sand mix 0/45. For the top surface a mixture of rock-gravel-sand 0/40 can be used. The thickness of the respective layers will depend on the required axle loading and the existing ground conditions. GE Energy suggest that the customer obtain an expert opinion or recommendation. All layers of material are to be mechanically compacted. A layer of geotextile has to be inserted in order to prevent silting or compression of the construction layers and the subsurface.

If impurities in recycled construction materials (sharp rocks or metal particles in re-cycled stone) lead to damages to transportation vehicles (tire damage etc.) the resulting costs will be passed on to the customer.

Due to the limited ground clearance of the transport vehicles special care needs to be taken during road construction that all sharp humps and bumps are removed (see section 3.8 on page 17).

GE Energy underlines the fact that especially under bad weather conditions the site roads have to be checked continuously. Upgrading measures and repair work on access roads have to be carried out during the project delivery phase and immediately if required.

3.7 Upgrading of Existing Roads

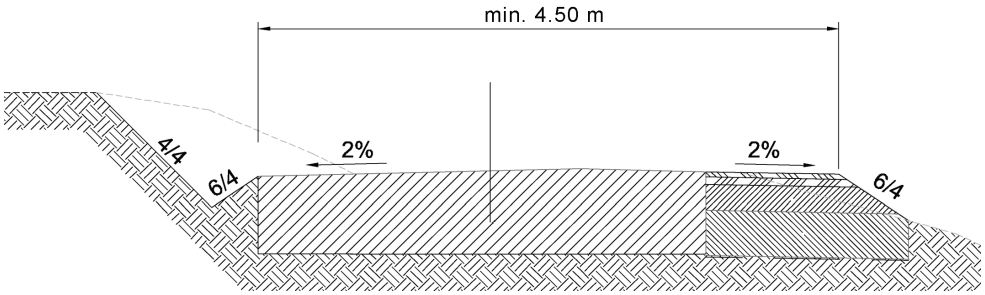


Figure 12: Upgrading of existing roads (example)

If existing private/public tarmac or concrete roads with a drivable width less than 4.50 m have to be used as site roads then these roads are to be widened. In carrying out these measures and construction works all points made under Figure 12 above have to be considered.

The widening of the roads is required for safety reasons. It reduces the risk of the road edges breaking off, since vehicles and cranes with a track width of 3.00 m and a total weight of maximum 140 t have to be employed to ensure the delivery and erection of the WTGS. If drainage ditches run directly along the sides of such roads, special safety measures must be taken.

If during the project delivery breakages begin to show, specific safety measures must be taken to prevent lateral phase cracks displacement. Any costs to GE Energy resulting from "waiting time for repair works" in regard to transport and erection of the WTGS will be passed on to the customer.

GE Energy proposed the following test to evaluate the final condition of the road and to ensure the ground bearing of minimum 12 t axle load for the Transport vehicles. This should also include wet site road conditions.

Plate Load Bearing Test of the Construction Layer

According to the size of the loads having an effect on the ground a distortion module is to be assigned to the subsoil. This distortion module, also called Ev2 value, can be checked by a plate load-bearing test. As a reference the German Institute for Standardization can be used: DIN18134. The relation of Ev1 / Ev2 must be smaller or equal to 2.5. An improvement of the subsoil or the construction layer will be necessary if the Ev2 value is smaller than in following table:

Value of the max. single load in kN (t)	Ev2 in MN/m² of the subsoil	Ev2 in MN/m² of the construction layer
≤ 60 (6.0)	≤ 45	≤ 100
≤ 100 (10.0)	≤ 60	≤ 120
≤ 150 (15.0)	≤ 80	≤ 150
≤ 200 (20.0)	≤ 100	≤ 180

The minimum value for transportation is a single load of 6.00 t per tire.

3.8 Ground Clearance of Transport Vehicles

When constructing the site roads care must be taken to try to keep the gradients of any hills to a minimum. The requirements are explained in Figure 13.

Extra care must be taken to make sure that any sharp road humps along the site roads and access routes are leveled out to reduce the risk of the vehicles grounding and damaging the components and their vehicles.

The overall height of the vehicles employed for the transportation of the tower sections has to be as low as possible. The ground clearance for such vehicles is 20 cm. Therefore, it has to be considered already at the planning stage that depressions and ridges in the access roads are filled in and leveled.

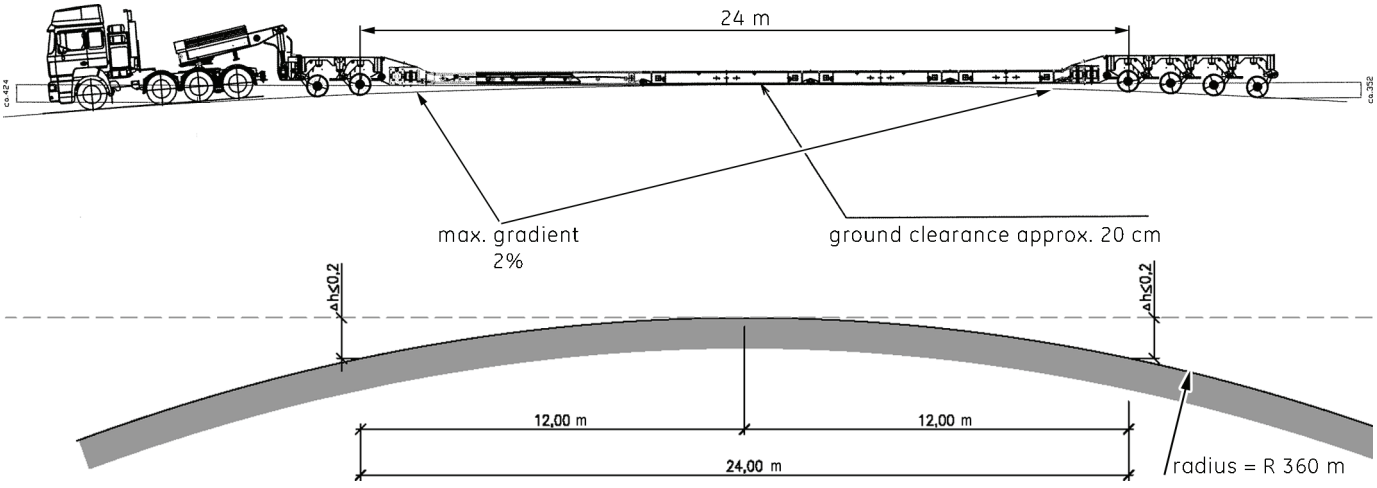


Figure 13: Ground clearance (example)

4 Crane Pad

The crane pads must be constructed as shown in Figure 14 to Figure 18. Both wheel-mounted and crawler-mounted cranes can be used. For the mobilization of those cranes the axle weight will be 12 t.

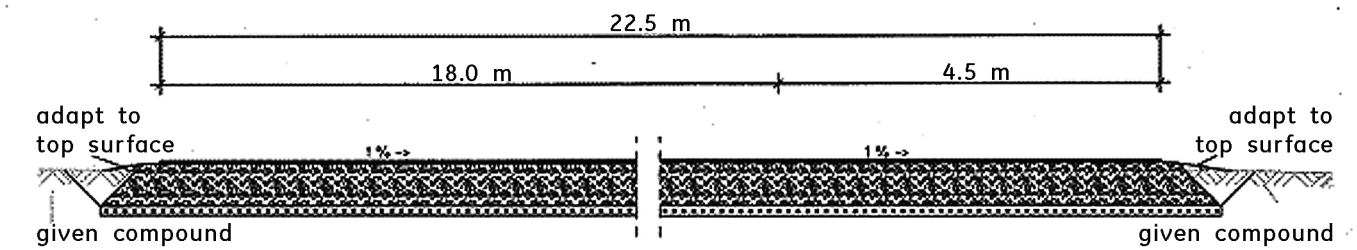


Figure 14: Cross section crane pad

All crane pads must be at-grade with a maximum slope of 1 % of the total length and width of the entire area.

Soil and obstacles may not be deposited around the crane pad or for a distance of 130 m along the site road. This area is required for the assembly of the crane boom.

A 2 m wide gravel path must be constructed from the crane pad/road to and around the turbine to prevent soiling of the plant.

The areas with a width of 10 m on the right and left of the crane pads are used for assembly of the rotor and storage of the plant components (see Figure 20 and Figure 21). Permission for the use of these areas will have to be obtained by the customer from the landowner and submitted to GE Energy before the erection phase starts.

Any variations to the above are only permissible with the approval of a representative of GE Energy.

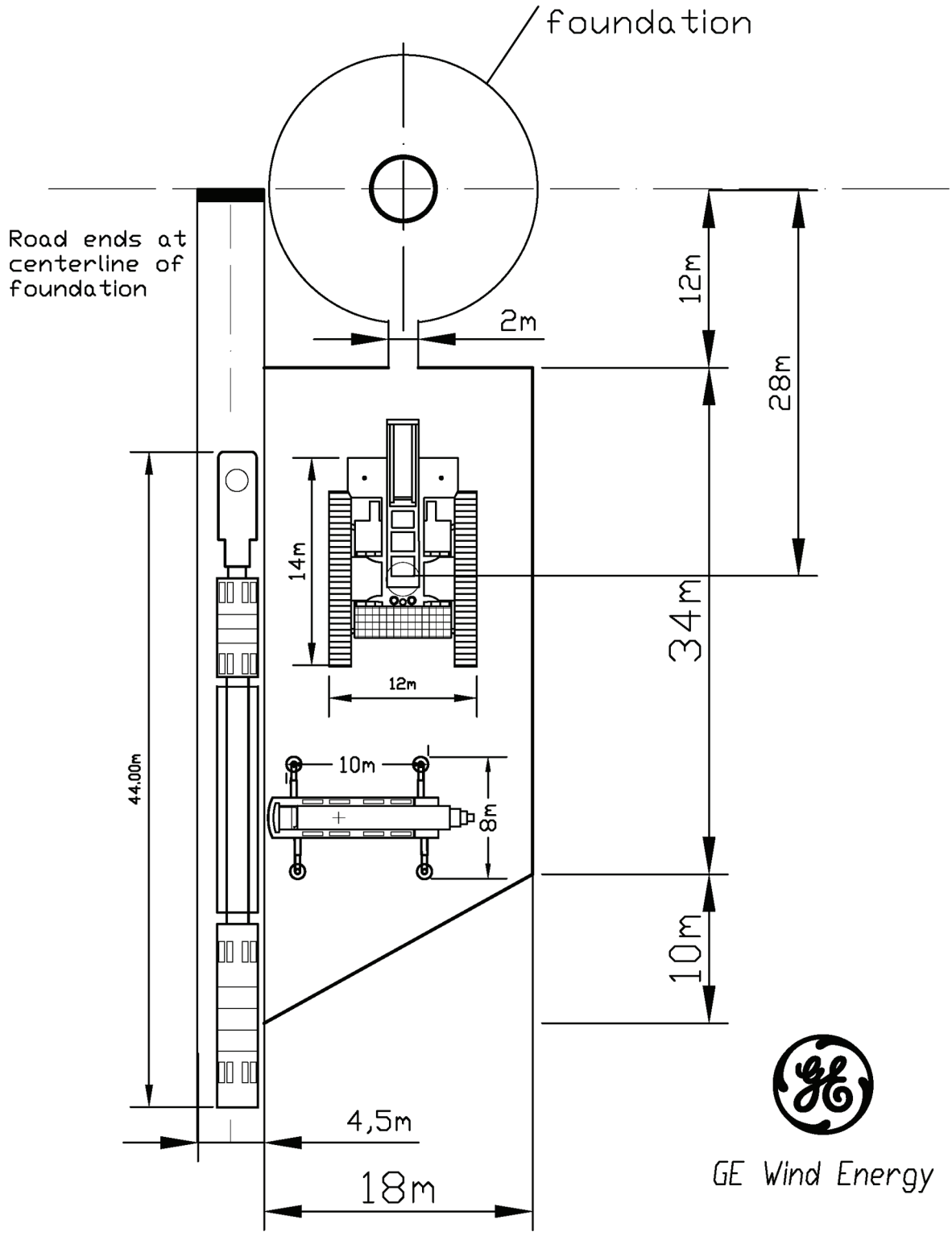


Figure 15: For hub height up to 100 m – option 1 with crane pad alongside the access road, crane and truck positions, max. slope 1 %

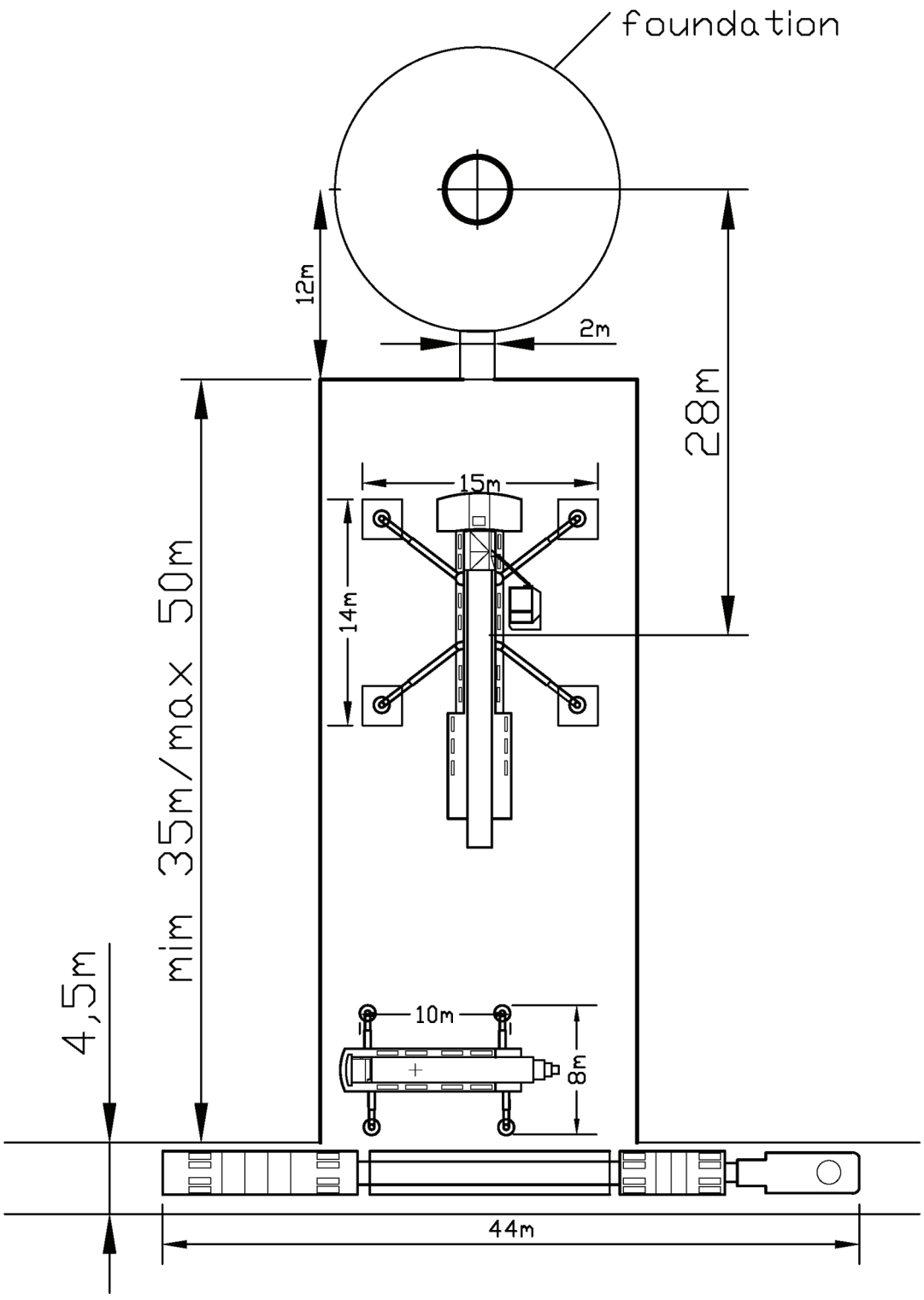


Figure 16: For hub height up to 100 m – option 2 with crane pad perpendicular and max. distance between foundation and access road, crane and truck positions, max. slope 1 %

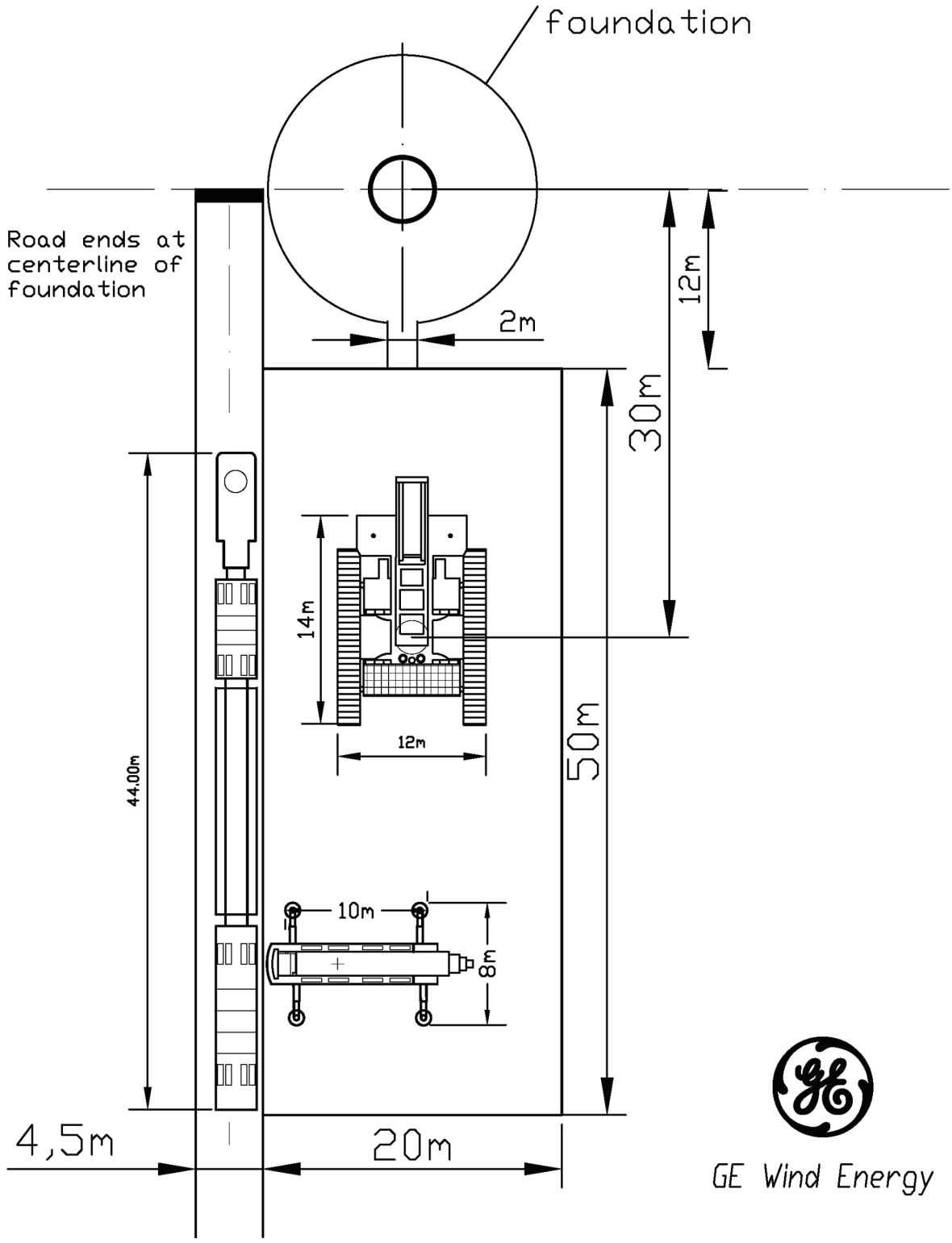


Figure 17: For hub height up to 140 m – option 1 with crane pad alongside the access road, crane and truck positions, max. slope 1 %

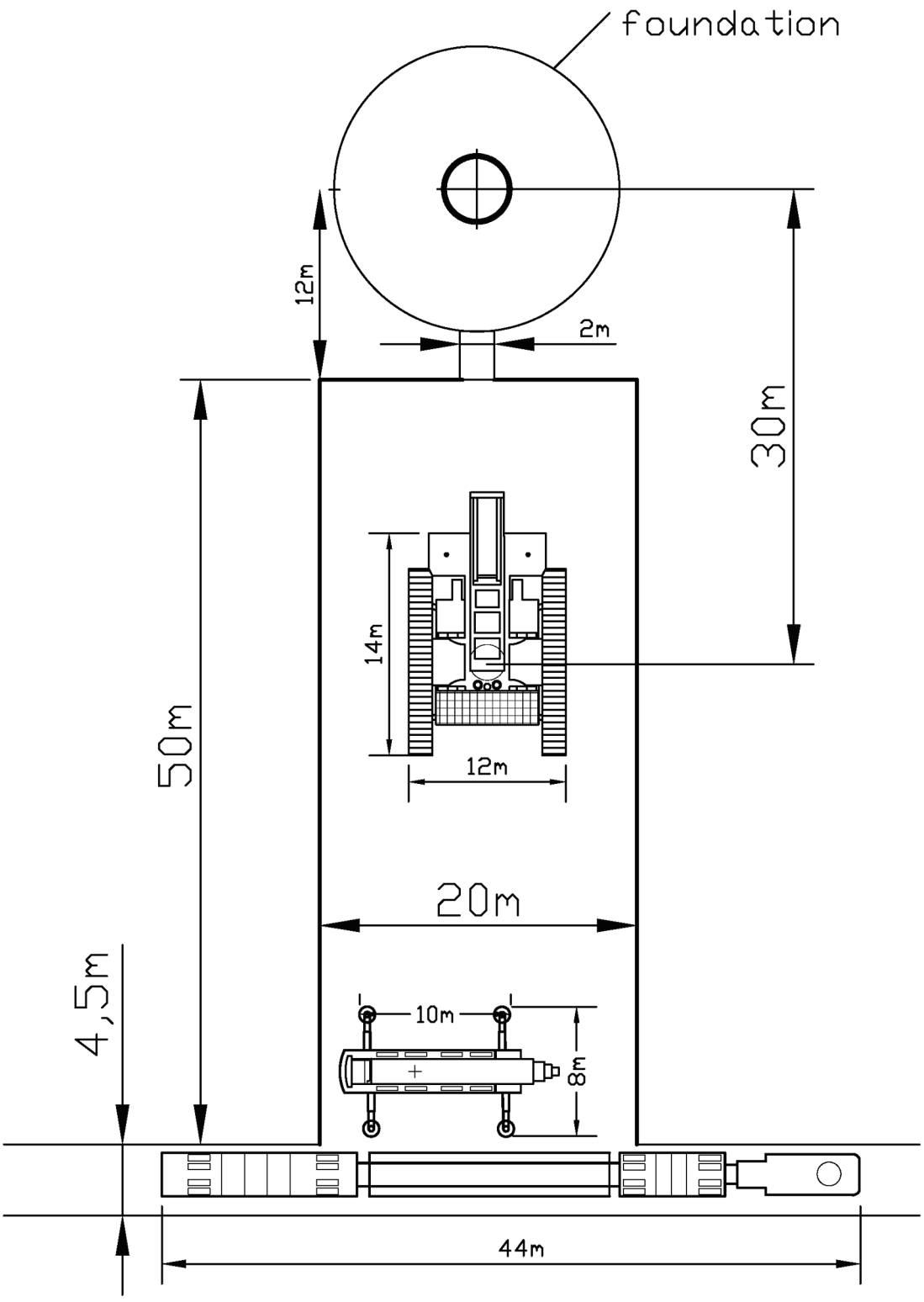


Figure 18: For hub height up to 140 m – option 2 with crane pad perpendicular and max. distance between foundation and access road, crane and truck positions, max. slope 1 %

5 Parking Area / Turning Area

5.1 Parking Area

Parking areas for at least four component transport vehicles with a length of 50 m and a width of 5 m have to be made available within the windfarm area. If the vehicles will be required to park on public roads or highways then the required permits, signs and lighting will have to be obtained from the appropriate authorities by the customer. These permits will be required before transportation activities start.

5.2 Turning Area for Unloaded Vehicles

GE Energy suggests to the customer that at certain areas within the windfarm, turning-areas for the vehicles shall be included in their planning. These areas will firstly allow the vehicles to keep to the designated site roads and reduce the amount of time that they will need for reversing out of the windfarm. Secondly it will reduce the risk of vehicles getting stuck or causing damage.

6 Soil Backfilling/Foundation Area

During the installation of the WTGS an area of 10 m around the foundation (∅ 9 m) is needed for the usage of an all-terrain forklift for the installation of turbine equipment outside the tower. This means that if soil backfilling is required due to the foundation design the finish of this work scope has to be done after the turbine is erected.

A gravel path of 2 m width must be constructed from the crane pad/road to and around the turbine to prevent soiling of the plant.

7 Crawler Crane Movements on Site

If it is planned to use a crawler crane moving on site directly between the turbine unit locations the following points needs to be considered.

- Permits/permissions (from landowner) to move with the crawler crane directly over the land between the several turbines locations shall be obtained by the customer
- Crane pad level of 1 % gradient maximum in all directions
- Crane pads need to be accessible for the crawler crane
- Lateral inclination during movement of the crane: Maximum 2 % gradient
- Free (drive-through) area needed to move between the several turbines locations is 12 m
- There are two options to move the crawler crane:
  - Option 1: One track in the middle of the site road (4.5 m wide), and the other track in the area beside the road (10 m wide)
  - Option 2: Use the free land to move the crane directly between the turbine locations
- Max. slope in moving direction is approx. 10 %
- Free area of 10 m x ? m (length of the crane boom) for the assembly of the crane boom at the first turbine and disassembly at the last turbine
- Ground pressure under the tracks as, for example, for a Liebherr LR 1600 is approx. 220 KN/m². Ground pressure can vary due to different crane type

Please note that additional measures may be necessary in the event of deviant conditions!

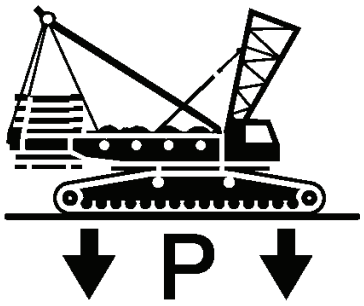


Figure 19: Ground pressure under the tracks

8 Site Compound

GE Energy will require a hardstanding to be constructed by the customer for use as a site compound. This area needs to be leveled and constructed with clean fine gravel stone. GE Energy will place site containers, toilets and equipment in this area and will therefore require electrical connections and waste water collection. The required dimensions of this area are minimum 20 m x 20 m for a windfarm size up to 20 units. GE Energy will give details as to its position within the windfarm in cooperation with the customer at a later date.

Any variations to the GE Energy specification may only be carried out after they have been discussed and approved by GE Energy.

9 Storage of the Plant Components

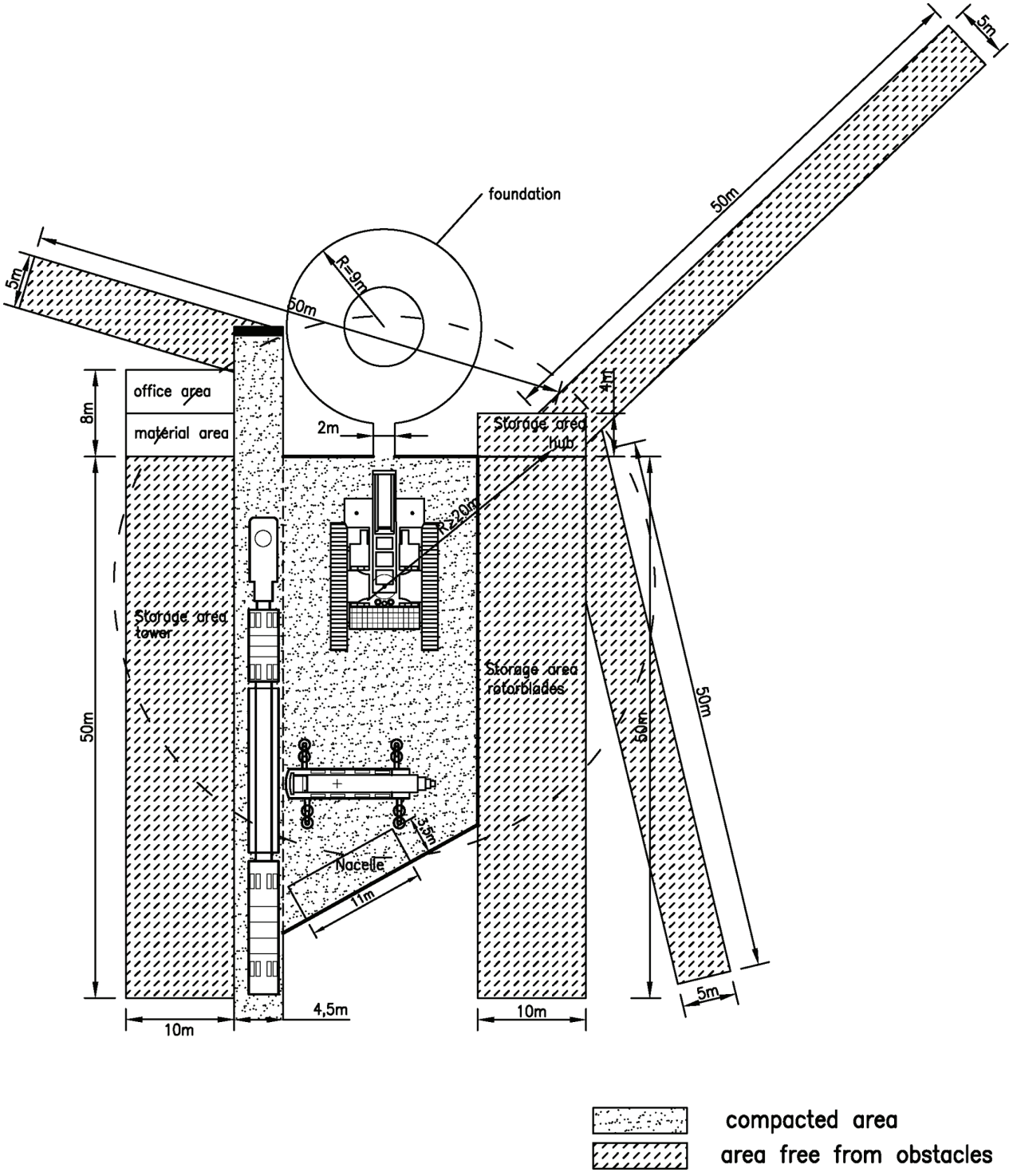


Figure 20: Option 1 with free storage/assembly area alongside the access road

The layout and position of the storage/assembly area can vary due to local surroundings and different hub heights

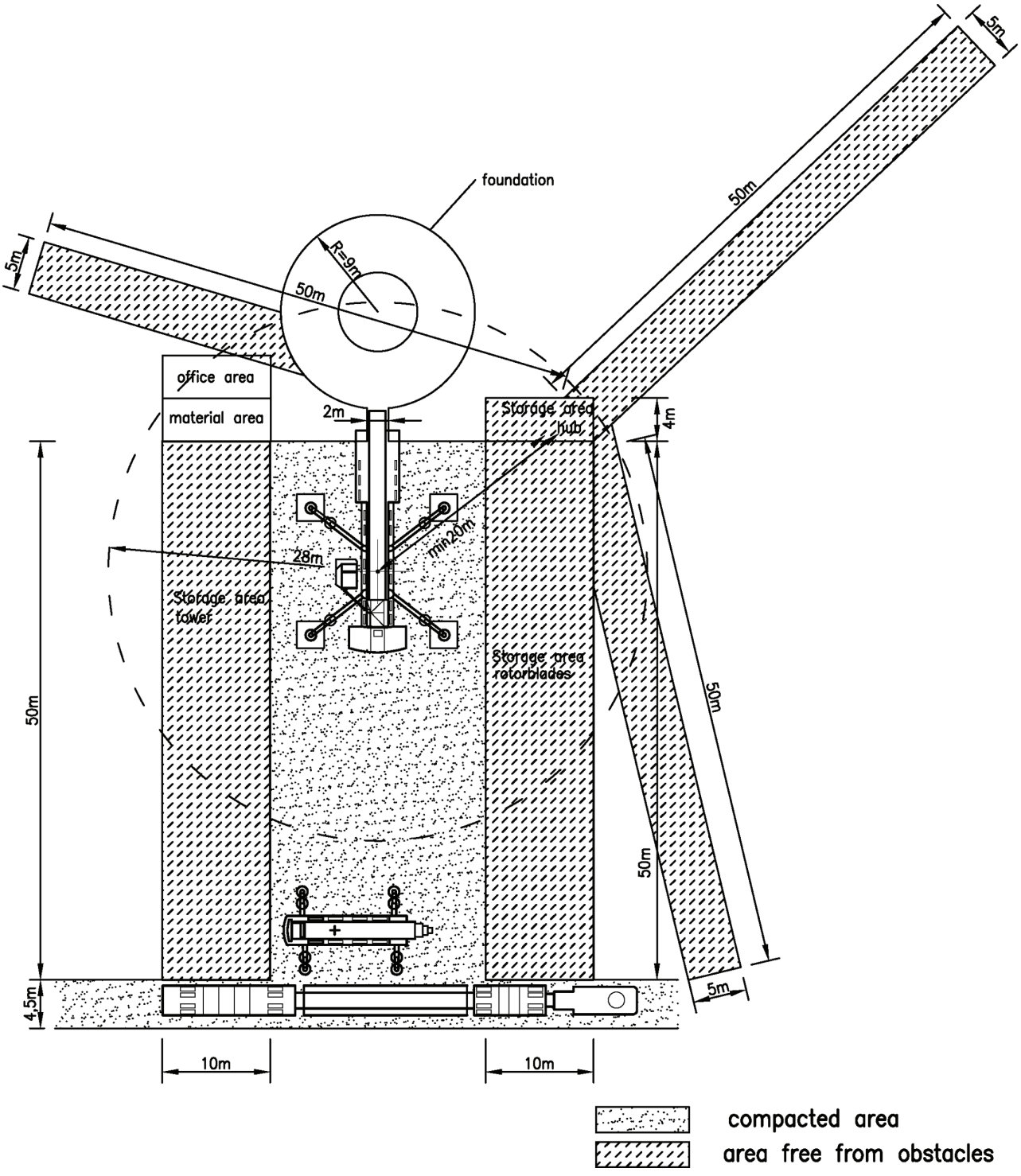


Figure 21: Option 2, perpendicular, with maximum distance between foundation and access road

The layout and position of the storage/assembly area can vary due to local surroundings and different hub heights

10 Crane assembling area

For the assembly of the main boom/jib of the main crane a free area must be provided. This area needs to be accessible for the assisting crane which will always be required. The assisting crane will also require a plain area beside the site road, or along the direction chosen for the assembly of the main boom/jib.

Shown below are some examples of the types of cranes that can be used for the installation of the turbines as well as details of the areas required for the assembly of the main boom/jib and assisting crane. The requirements listed below are based on a stable terrain with a specified maximum gradient/decline for the assembly of the main boom/jib. If the conditions below cannot be achieved, then project specific options will need to be discussed and implemented.

10.1 Crawler Crane with Lattice Main Boom

- Required area for assembly 130 m x 10 m
- Maximum gradient/decline for main boom/jib assembly 8 % uphill
- Clear and flat areas for assisting crane 10 m x 10 m

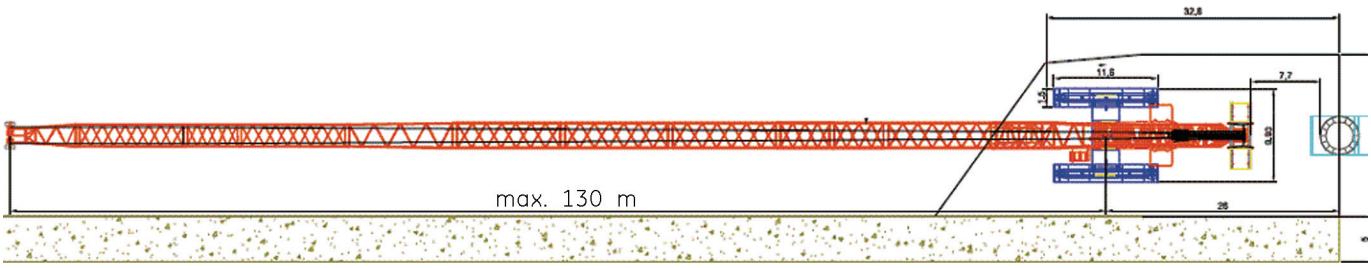


Figure 22: Crawler crane with lattice main boom

10.2 Telescopic Crane with Lattice Jib

- Required area for assembly 90 m x 10 m
- Maximum gradient/decline for main boom/jib assembly 8 % uphill
- Clear and flat areas for assisting crane 10 m x 10 m

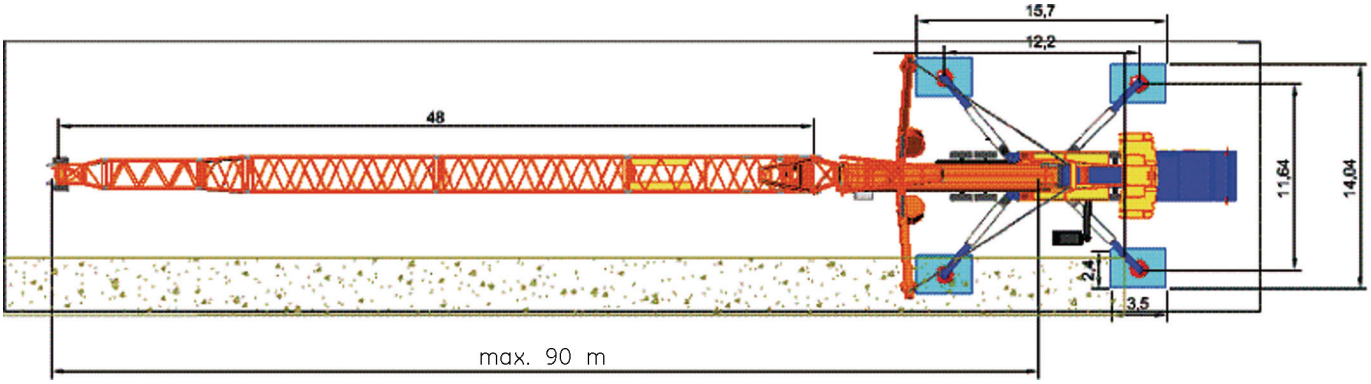


Figure 23: Telescopic crane with lattice jib

10.3 Wheeled Crane with Lattice Main Boom

- Required area for assembly 130 m x 10 m
- Maximum gradient/decline for main boom/jib assembly 8 % uphill
- Clear and flat areas for assisting crane 10 m x 10 m

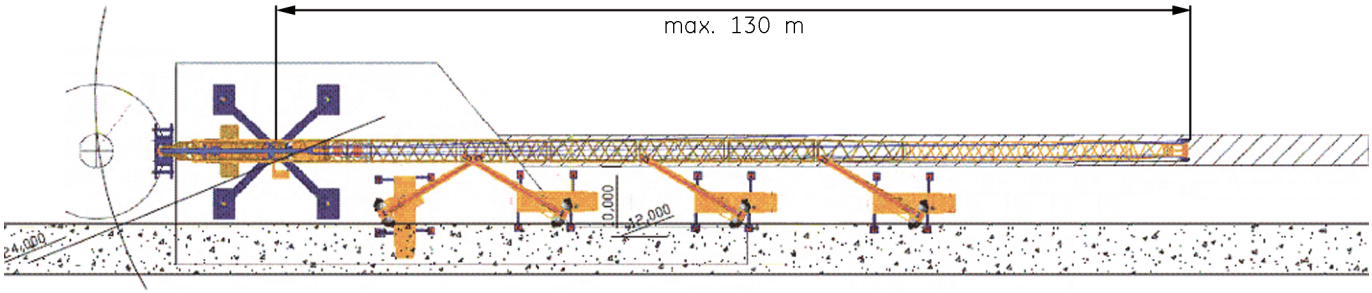


Figure 24: Wheeled crane with lattice main boom

The required area for assembly of the crane boom can vary due to different hub heights, equipment used and to local surroundings. These drawing are only to be used as an example.

Crane boom assembly downhill is complicated and may not be possible. If the assembly of the boom cannot be carried out on a plain or uphill area please contact project management for further instructions.

APPENDIX C
Preliminary Design and Construction Methodology – Marine Cable Crossing Little current Channel

C.B. FAIRN & ASSOCIATES LTD.

MARINE CONSTRUCTION ENGINEERING
PIPELINE & DREDGING CONSULTANTS

NORTHLAND POWER

McLEAN'S MOUNTAIN WIND FARM
MANITOULIN ISLAND, ONTARIO

PRELIMINARY DESIGN
AND
CONSTRUCTION METHODOLOGY

MARINE CABLES CROSSING OF
LITTLE CURRENT CHANNEL OF LAKE HURON
LITTLE CURRENT, ONTARIO

***Prepared for*:**

H.B. WHITE CANADA CORP.

March 15, 2010

18 GREENGATE ROAD, DON MILLS, ONTARIO, CANADA M3B 1E8 TEL. (416) 449-3325 FAX (416) 391-2075

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McLEAN'S MOUNTAIN WIND FARM
MANITOULIN ISLAND, ONTARIO

PRELIMINARY DESIGN AND CONSTRUCTION METHODOLOGY

MARINE CABLES CROSSING OF LITTLE CURRENT CHANNEL LITTLE CURRENT, ONTARIO

1.0 INTRODUCTION

1.1 General

Northland Power Inc. (NPI) proposes to develop the McLean's Mountain Wind Farm (MMWF), located south of the community of Little Current, Ontario in the Municipality of Northeastern Manitoulin and the Islands. The proposed wind farm is expected to consist of approximately 43 wind turbines that will generate about 77 megawatts of electricity and connect to the existing local transmission system. Completion of the project and commissioning of the new MMWF system is scheduled for spring of 2011.

As part of the MMWF project to connect the wind turbines with the Hydro One transmission system located on Goat Island, there will be the need to cross the Little Current Channel of Lake Huron (North Channel) to Goat Island with several marine cables to facilitate transmission connection.

This report presents the proposed preliminary design for installation of the marine cables crossing of the Little Current Channel, in addition to the anticipated construction methods and procedures to be undertaken to carry out and execute the construction work for installation of the cables in accordance with the design specifications.

The proposed location of the marine cables crossing site near the town of Little Current, Ontario is shown in Figure 1.

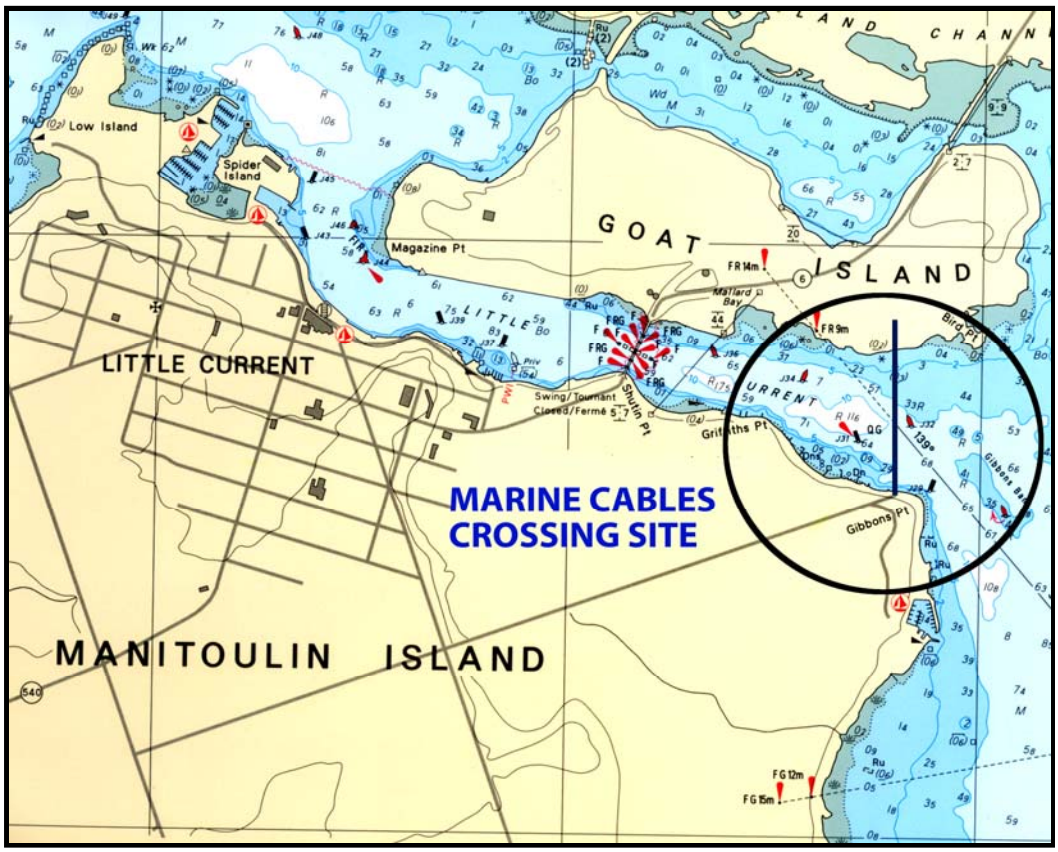


Figure 1: Location of MMWF marine cables crossing site.

1.2 Terms of Reference

C.B. Fairn & Associates Ltd. has been retained by H.B. White Canada Corp., on behalf of Northland Power Inc., to review the requirements for the proposed marine cables crossing of the Little Current Channel (North Channel), prepare a preliminary design with associated drawings, and provide the construction methodology for installation of the cables across the channel.

This report was prepared by C.B. Fairn & Associates Ltd. for H.B. White Canada Corp., Northland Power Inc. and its consultants. The material in the report reflects the best judgment and opinions of C.B. Fairn & Associates Ltd., with respect to the terms of reference and in light of the information available, at the time of preparation.

2.0 PROJECT DESCRIPTION

The proposed McLean's Mountain Wind Farm project involves laying transmission lines from the wind turbine sites on Manitoulin Island to Goat Island where the new lines will connect with the existing transmission system operated by Hydro One.

Specifically, the electrical transmission cables (115 kV) will cross the Little Current Channel at the eastern end of Manitoulin Island in a north-south orientation. There are a total of three (3) electrical cables to be installed across the channel, in addition to one fibre optic cable.

The marine cables crossing portion of the project extends between the north and south shores of the channel. At each shore, the marine cables will terminate at a concrete manhole installed on the respective banks back from the shoreline. On the south shore, the manhole is set back approximately 18 metres from water's edge at sta. 0+000. On the north shore where the ground slopes more gradually, the manhole is positioned approximately 40 metres beyond water's edge at sta. 0+490.

Accordingly, the total length of the channel crossing of the marine cables between manholes on the north and south shores measures 490 metres.

3.0 EXISTING SITE CONDITIONS

3.1 Channel Characteristics

The Little Current Channel at the proposed site of the marine cables crossing measures 432 metres between shorelines along the proposed alignment. Based on the recent bathymetric survey conducted in June 2009, the bank on the south side of the channel appears to rise at a fairly steep slope (average 3.5:1 h:v) while the bank and near-shore area on the north side exhibits a much shallower and gradual slope (average 15:1 h:v).

Maximum water depth along the proposed cables alignment measures approximately 10.5 metres and occurs in the southern section of the channel, although similar deeper waters are also located close to the south shore some 40 metres from water's edge.

The designated navigation channel traverses the proposed cables crossing site in the southern half of the channel where deeper water occurs. The width of the navigation

channel at the crossing site measures approximately 140 metres (sta. 0+105 to sta. 0+245).

Average water level in the Little Current vicinity is recorded at 176.63 metres relative to I.G.L.D. 1985 chart datum, as referenced on the Navigation Chart No. 2207 (Canadian Hydrographic Services). Highest recorded water level between 1918 and 2000 referenced on the chart is 177.40 metres, with lowest recorded water level of 175.60 metres (IGLD 1985).

The site of the proposed marine cables crossing at Little Current may be subject to strong currents in the channel although specific information regarding currents is presently not available at this time. Based on local observations, the Little Current Channel currents will vary but have been described as being fairly swift and strong in velocity at certain times. Further study of the current conditions at the crossing site may be required to determine any potential effects on the installed submarine cables and marine construction operations in the open waters.

3.2 Geotechnical Information

At the time of this report, there was no site specific geotechnical information available pertaining to the proposed marine cables crossing of the Little Current Channel.

However, based on local knowledge and site observations provided by others, combined with reference to past projects undertaken in the Little Current vicinity, it is assumed that the underlying conditions of the channel bottom and shoreline banks consist primarily of bedrock and/or hard till, with minimal to zero upper layer of overburden, both on land and in the water.

Therefore, all trench excavation required for the installation of buried cables presented in the preliminary design is assumed to occur primarily in bedrock, requiring drilling and blasting along the cable right-of-way alignment in order to achieve required trench excavation to grade.

In addition, some sizable boulders were observed identified by the surveyors and identified on the bathymetric survey which may indicate the presence of boulders along the proposed cables alignment which will have to be investigated.

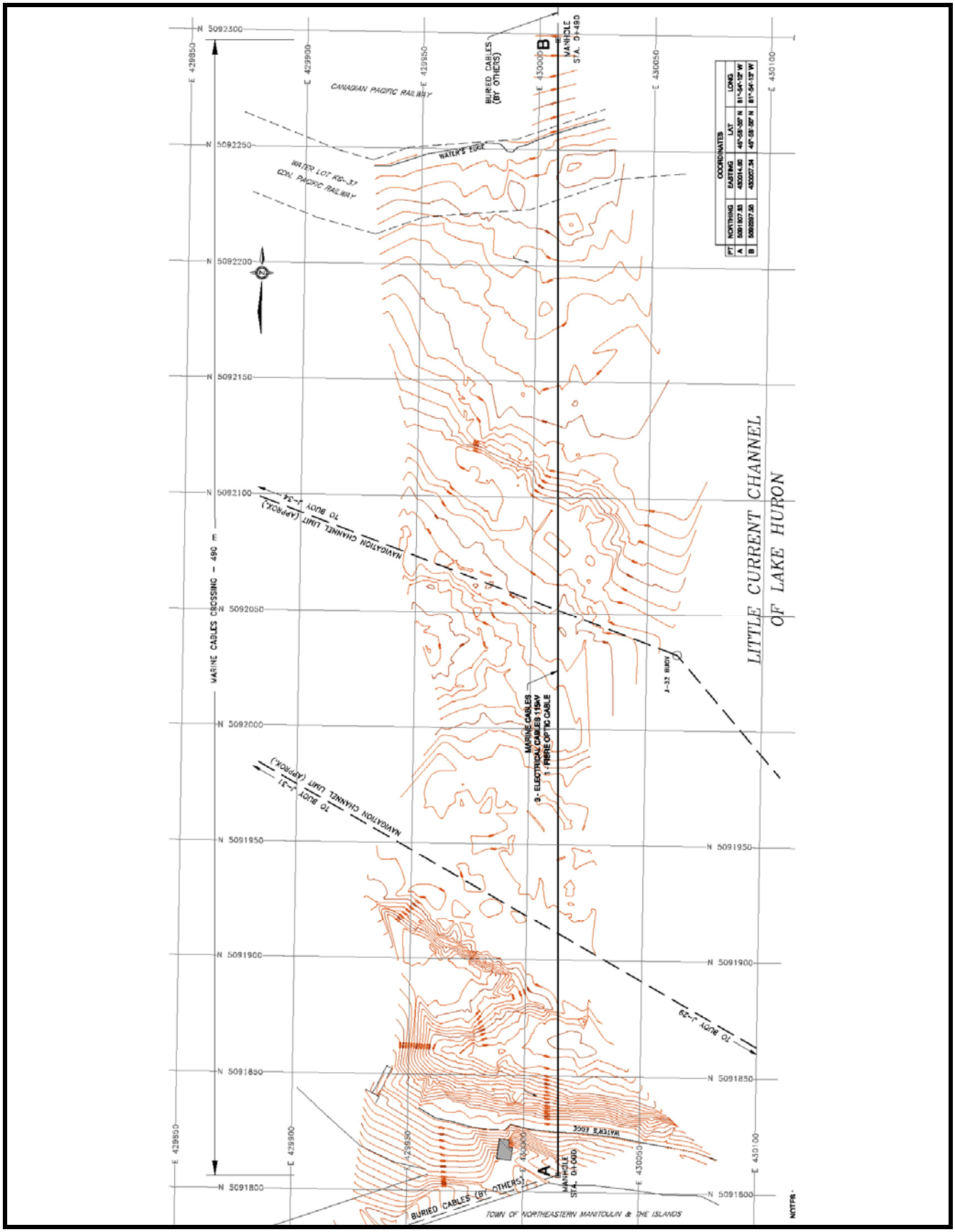


Figure 2 : General Plan – MMWF Marine Cables Crossing

4.0 PRELIMINARY DESIGN – MARINE CABLES CROSSING

The proposed marine cables crossing of the Little Current Channel will extend from the south shore on Manitoulin Island to the north shore on Goat Island between the concrete manholes located at sta. 0+000 and sta. 0+490, respectively (as shown on Figure 2).

The three armoured electrical transmission cables and single fibre optic cable with communication duct will be buried in an excavated trench on the channel banks and in shallow waters near shore on both sides of the channel. For the preliminary design, the cables will be installed in an excavated trench in the channel to 2.0 metres below datum. Where the channel bottom elevation is greater than 2.0 metres below datum, the cables will be laid directly on the channel bottom.

Accordingly, the marine portion of the cables crossing will consist of three (3) design sections. The first section of cables will extend from the manhole on the south shore (sta. 0+000) out to the offshore 2.0 metre depth location in the channel, approximately 10 metres from the shoreline at sta. 0+028. This section of cables will be installed in an excavated trench and subsequently backfilled following installation to original preconstruction conditions.

The second section of cables is laid directly on the channel bottom in deeper water elevations exceeding 2.0 metres below datum. The cables laid on the channel bottom do not require any trenching to be performed and will extend from sta. 0+028 to sta. 0+366, a total length of 338 metres.

The final section of cables is similar to the first section and represents the cables buried in an excavated trench on the north side of the channel, extending from the 2.0 metres depth in the channel (sta. 0+366) to the cables terminus at the concrete manhole (sta. 0+490) on the north shoreline. Due to the flatter slope in the near-shore region of the north shoreline and the gradually rising upland bank, the length of the buried cables on the north side of the channel is much longer than on the south side and measures approximately 124 metres in total length.

Using conventional open cut trenching for the near-shore and bank sections of the proposed channel crossing, the marine transmission cables will be buried in an excavated marine trench to provide the necessary protection and security with a minimum cover of 865 mm (34") over the top of the cables after backfilling, in accordance with design specifications and cable manufacturer's recommendations. The remaining section of the

armoured marine cables across the channel in deeper water will be laid directly on the channel bottom.

Reference is made to Figure 3 for the typical section of buried cables installed in an open cut trench. Figure 4 illustrates the transmission cables laying directly on the channel bottom in the deeper water depths.

The trenched section of installed transmission cables on this crossing project is designed with a bottom width of approximately 1.0 metres to accommodate the three armoured electrical cables and single fibre optic cable, and 0.5:1 (horizontal:vertical) side slopes, as shown in Figure 3. A minimum spacing of 200 mm centre-to-centre between the individual electrical cables (115 kV) is recommended by the cable manufacturer (see Figure 3).

While the transmission cables could be bundled together for installation, this configuration is not preferred since the combined weight of the banded cables would make handling more difficult, banding the cables together is a time-consuming process and will slow the rate of installation across the channel, and raises issues for future maintenance on individual lines. For these reasons, this crossing project is designed with each cable laid independently of the other cables with the specified minimum spacing.

Since the transmission cables will be installed in excavated rock trenches on both sides of the channel, it is recommended that the cables be bedded with a layer of granular material (e.g. Granular A) prior to backfilling the trench with the excavated blasted rock. The trench bedding will be placed above and beneath the installed armoured cables to protect and secure the cables, and avoid any potential damage from directly contacting the rock trench and blasted rock backfill.

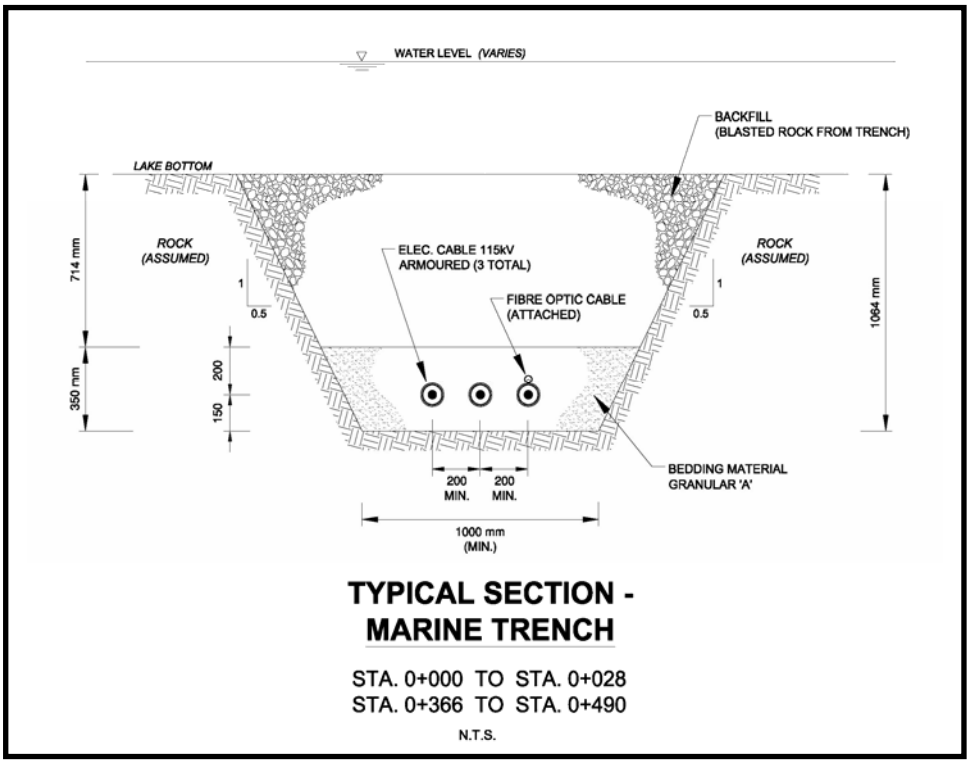


Figure 3: Typical Section – Cables in Marine Trench

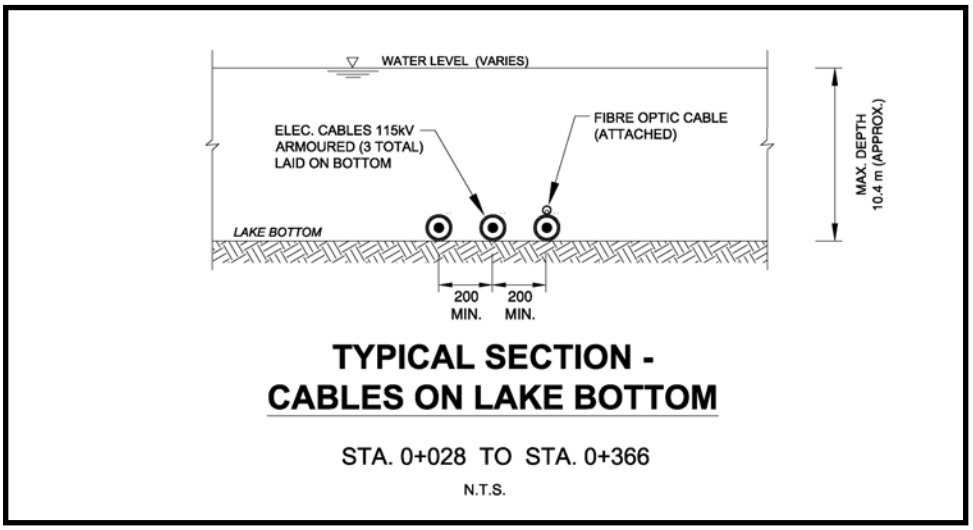


Figure 4: Typical Section – Cables Laid on Channel Bottom

5.0 CONSTRUCTION METHODOLOGY

The installation of the MMWF transmission cables across the Little Current Channel will involve a well-planned sequence of construction work to provide a practical and efficient method of installing the marine cables at the proposed channel crossing site, while minimizing environmental impacts in the channel and surrounding areas.

The work involved in the construction of the marine cables crossing includes preparing the site, excavating the cable trenches both on shore and in water, installation of the transmission cables across the channel, backfilling the excavated trenches, and site cleanup and demobilization.

Specifically, it is anticipated that the execution of the construction works for the marine cables crossing will involve the following work items and sequence. However, it is noted the contractor's actual methods may vary from the procedures presented herein and as such these anticipated methods act as a general guideline.

5.1 Clearing and Grubbing Right-of-Way

Upon arriving at the site and commencing the work, the contractor's first step will entail clearing and grubbing of the cable right-of-way on the shore sections of the south bank (sta. 0+000 to water's edge) and the north bank (sta. 0+490 to water's edge).

5.2 Excavation of Trenches

Construction of the cable crossings will require an open-cut trench to be excavated on the shore and in the near-shore channel where the channel bottom elevation does not exceed 2.0 metres below datum. Due to the assumed presence of bedrock on shore and below the channel bottom, drilling and blasting of the rock along the proposed cable right-of-way alignment will have to be performed in advance of excavating the trench to grade depth.

The contractor will commence the excavation of the trenches with the drilling and blasting of the on-land trenches on both banks, extending from the contract limits (manholes) down to water's edge. Following the blasting operations, the contractor will proceed to excavate the cable trenches on shore down to required grade (approximately 1.1 metres depth below existing ground) using a land-based excavator (backhoe). The blasted rock excavated from the shore trenches will be placed adjacent to the trench and temporarily stockpiled for future backfill following installation of the cables.

Following the excavation of the rock trenches on shore, the contractor will prepare for commencement of the drilling, blasting and excavation of the marine trenches in the near-shore waters. Before any trench activities begin in the water, the contractor will install temporary floating turbidity curtains to encompass the full length of the marine trench working area. These floating turbidity curtains will be continuous and extend out from the shore on both sides of the trench and beyond the end of the marine excavation. The curtains will be employed over the duration of the in-water work including the drilling and blasting, trench excavation, cable installation and backfilling operations. However, if channel currents are too strong on certain days, maintaining the vertical position and effectiveness of the floating turbidity curtains may be challenging. The curtains may benefit from being deployed in the near-shore areas of the channel where currents may not be as great.

The in-water construction work will require the use of floating dredging equipment to carry out the required drilling, blasting and dredging of the marine rock trench. The drilling and blasting operations will be performed from a barge, and the marine trench will be excavated using a barge-mounted excavator (clamshell dredge or backhoe). The barge will be equipped with steel spuds and/or anchors to hold the barge in position while digging. Additional marine equipment may include an attendant tug or workboat. The floating barge will also be used by the contractor for the cable laying operations.

With the turbidity curtains in place, the contractor will commence the drilling and blasting of the underlying rock in the channel bottom. The blasted rock will be subsequently excavated by the contractor to achieve the required grade depth in the open cut trench. The blasted rock excavated from the cable trench will be temporarily stockpiled for re-use as trench backfill following installation of the transmission cables. The barge-mounted excavator will sidecast the blasted rock from the cable trench for temporarily stockpiling on the channel bottom on both sides of the trench.

The turbidity curtains will be positioned to provide sufficient width on both sides of the marine trench to allow the excavated blasted rock to be stockpiled on the inside of these curtains.

5.3 Installation of Transmission Cables

Once the on-shore and marine trenches are prepared, the contractor will proceed with the installation of the 3 electrical transmission cables and single fibre optic cable across the

channel. It is anticipated that the cables will be installed using a floating barge to lay the cables in the trenches and directly on the channel floor.

Using the barge for cable laying operations, the three electrical cable reels and one fibre optic cable reel will be placed at one end of the barge and spaced apart. The large individual cable reels will each be placed in a steel holding frame and each reel will be equipped with a braking system. Before proceeding with the laying procedures, it is recommended that all cables be tested while still on their reels to ensure their integrity and confirm all circuits are satisfactory.

At the other end of the barge, the contractor will install 4 fair leads spaced apart. The cables will be rolled off the large reels and fed through their respective fair leads in preparation to commence cable laying operations. With the barge fully equipped and set up with the required cable reels and fair leads, it will proceed to the north side of the channel where the slope is shallower with spuds deployed to anchor the barge in approximately 2 metres water depth (or as close as the floating barge can get to shore). The four cables will be simultaneously unwound from their respective reels and the ends taken back to the concrete manhole (sta. 0+490). With the cable ends temporarily anchored at the manhole, the contractor will commence laying the cables in the excavated trench.

The tug or workboat will be used to move the barge slowly in a southerly direction along the proposed alignment towards the south shore of the channel. As the barge slowly advances across the channel, the cables will be fed from the barge through the fair leads and into the trench or directly on the channel bottom once deeper water is encountered. It is important that the barge be kept on line as cable laying advances across the channel through the use of a G.P.S. unit.

It is estimated that the barge will move approximately 15 metres at a time and drop its spuds to anchor the barge and allow the fibre optic cable to be attached to one of the larger electrical cables using stainless steel connection bands spaced every 3 metres. This sequence would be repeated across the entire channel width until the barge reaches the south shore. Once the barge has advanced to the south side of the channel, the remaining lengths of cables will be unreeled and taken ashore back to the terminus at the manhole (sta. 0+000) with the cables carefully placed in the excavated trench.

At this point with the cables laid out continuously across the full width of the channel between respective manholes on the north and south shores, the cables will be tested

again to verify they are fully functional and that no damage has occurred during the cable laying operations. Before backfilling of the excavated trench commences, divers will inspect all cables laying in the trenches and on the channel bottom. It is recommended that the diving inspection be recorded on DVD for future reference as part of the as-built records.

Once the cables have passed inspection and the minimum spacing between installed cables verified, backfilling of the excavated trenches will proceed using granular bedding material under and over the cables and the stockpiled blasted rock to return the ground and channel bottom to their original pre-construction contours, as shown in Figure 3.

Following completion of the construction work at the Little Current crossing project including removal of the temporary turbidity curtains, site cleanup and restoration, the contractor's land and marine equipment will be demobilized from the site.

6.0 PROJECT SCHEDULE

On-site construction work for the McLean's Mountain Wind Farm is anticipated to begin in the summer of 2010 following contract award.

Work on the marine cables crossing of the Little Current Channel (North Channel) is anticipated to commence in July 2010, following mobilization of the floating equipment to the site and in accordance with the designated environmental window for in-water work. Due to restrictions concerning fish spawning, it is anticipated that in-water work at the Little Current site will not be permitted during the period from March 15th to July 1st.

Accordingly, the work of this marine cables crossing is anticipated to be performed in the summer and fall months of 2010 (July to September). It is estimated that the construction work including installation of the marine cables across the channel and site restoration as described herein will entail a project duration of approximately 2 months.

APPENDIX D
Preliminary Road Design

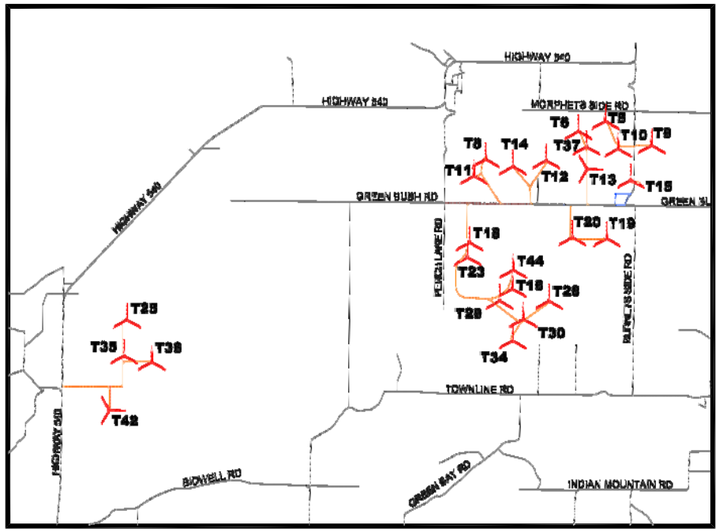
MCLEANS MOUNTAIN
WIND FARM

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LINE "A" SITE PLAN
3	LINES "C" & "D" SITE PLAN
4	LINES "B-1", "B-2" & "B-3" SITE PLAN
5	LINE "A" PLAN & PROFILE
6	LINE "A" GRADING DETAIL
7	LINE "B-1" PLAN & PROFILE
8	LINE "B-2" PLAN & PROFILE
9	LINE "B-3" PLAN & PROFILE
10	LINE "B" GRADING DETAIL
11	LINE "C" PLAN & PROFILE
12	LINE "D" PLAN & PROFILE
13	LINE "D" GRADING DETAIL

LAST REVISION DATE: _____

PRELIMINARY ROAD DESIGN

MANITOULIN ISLAND
LITTLE CURRENT, ONTARIO



PROJECT MAP

AREA MAP

N (NTS)

PLAN PREPARED FOR:

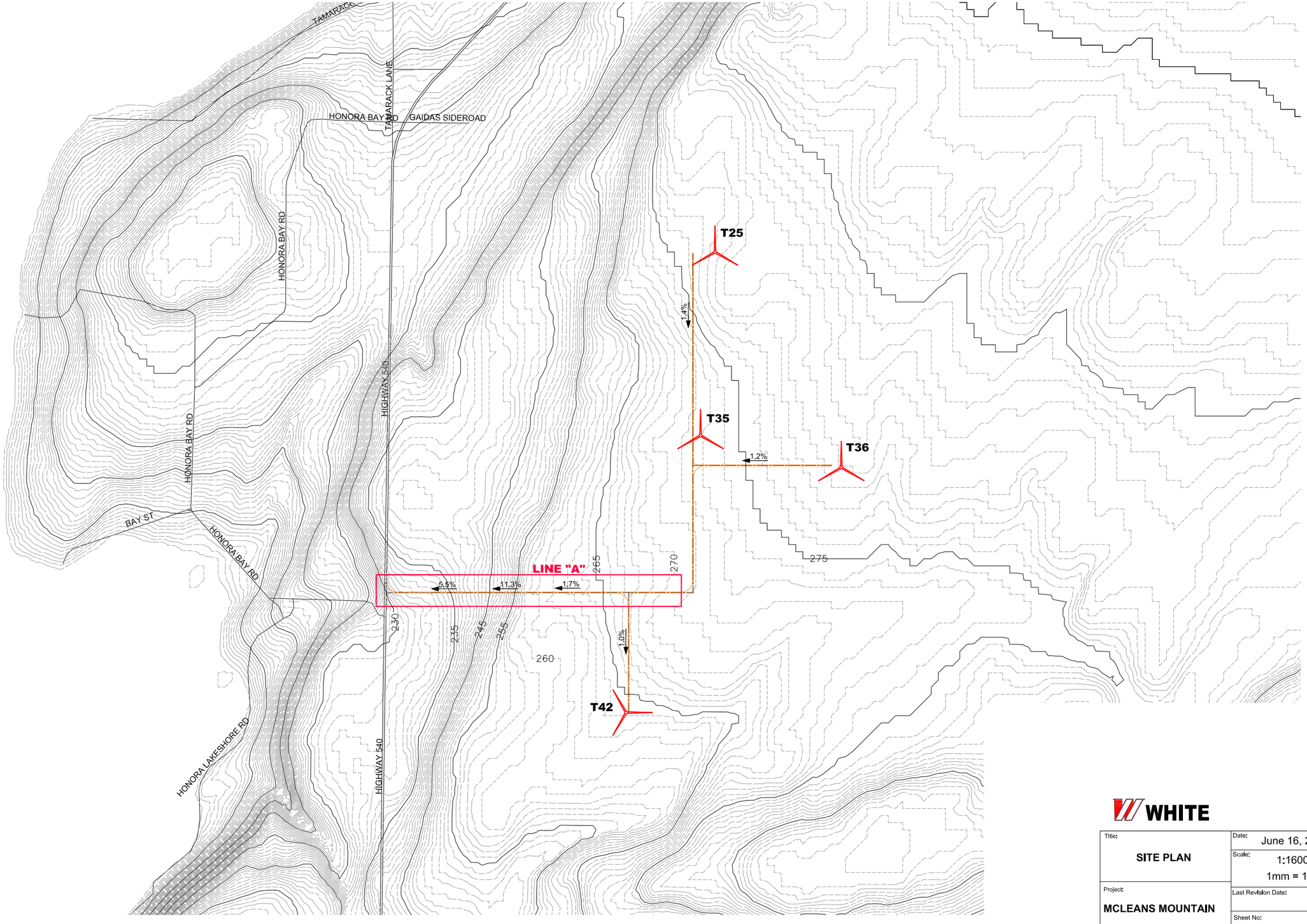
NORTHLAND POWER

30 St. Clair Avenue West, 17th Floor
Toronto, Ontario

PLAN PREPARED BY:

WHITE

11993 South State Road 63
Clinton, Indiana



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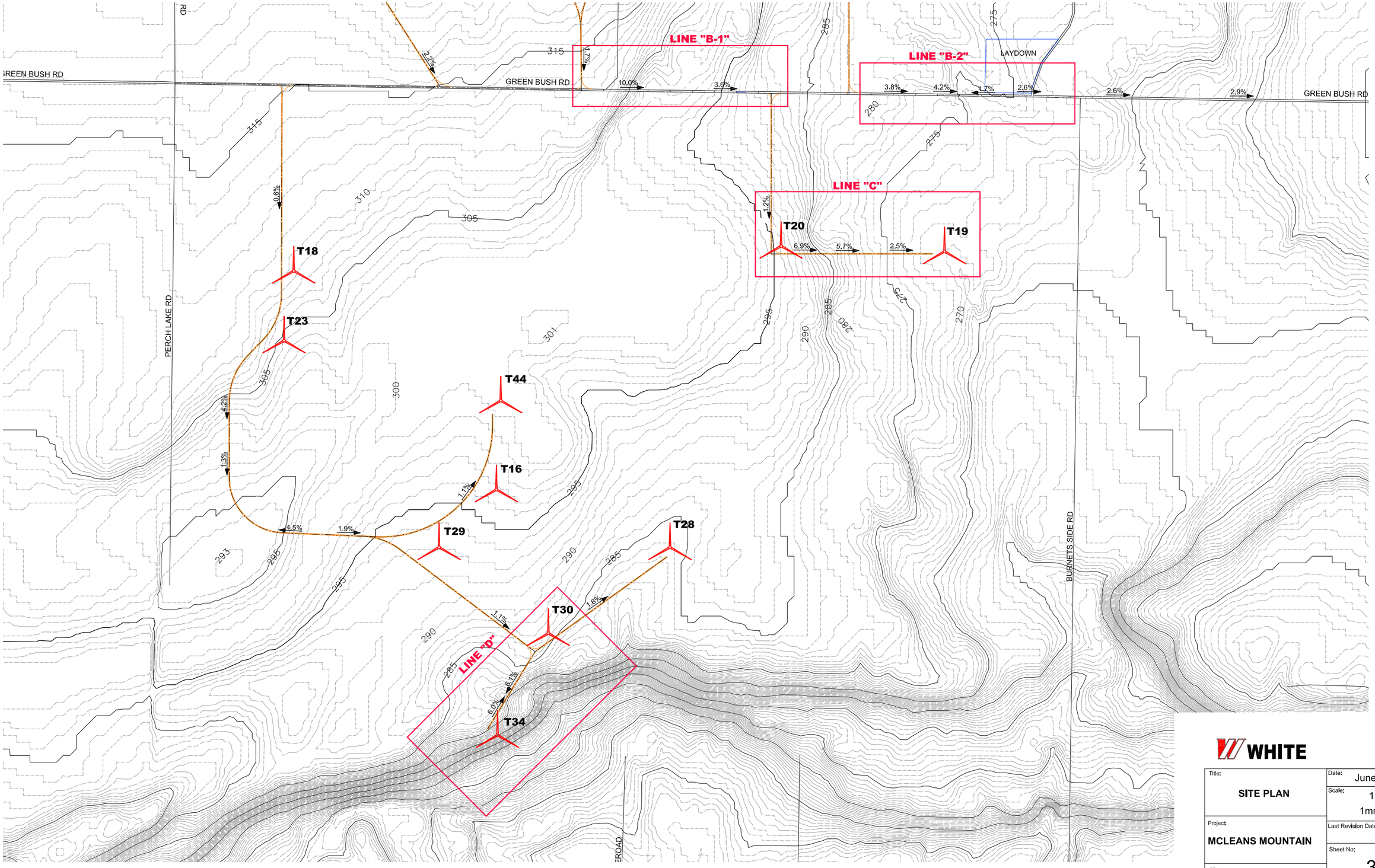

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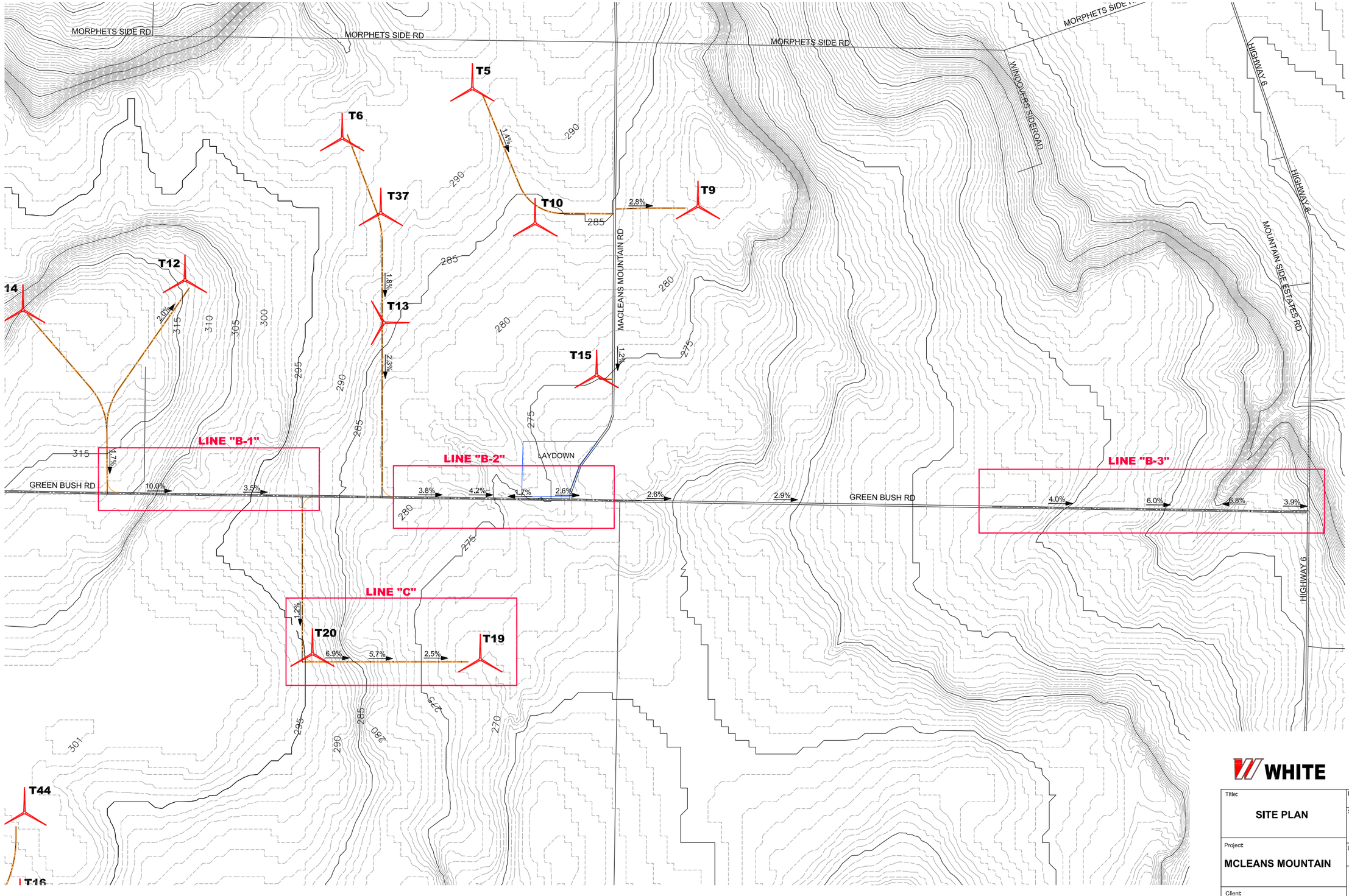

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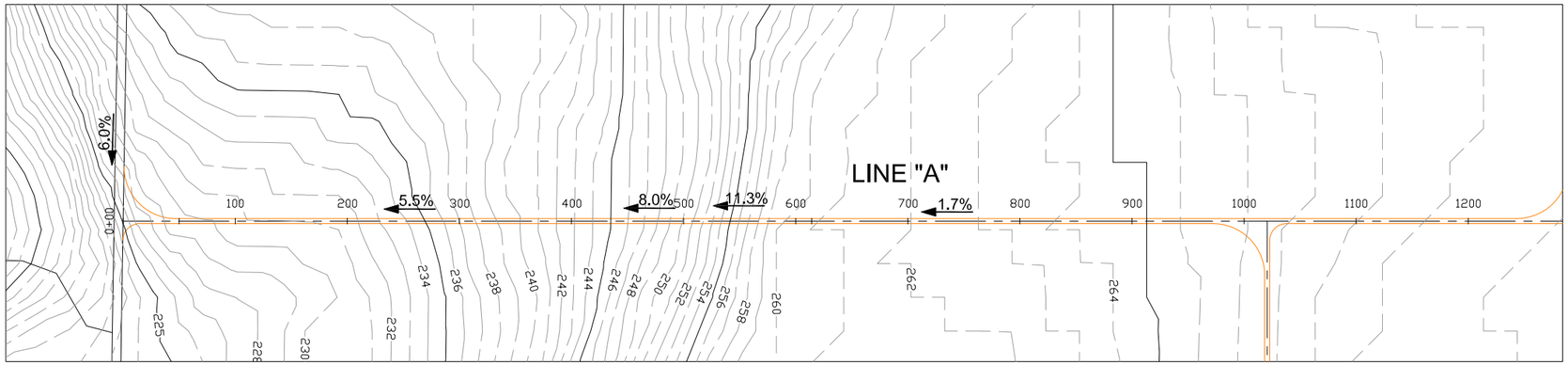

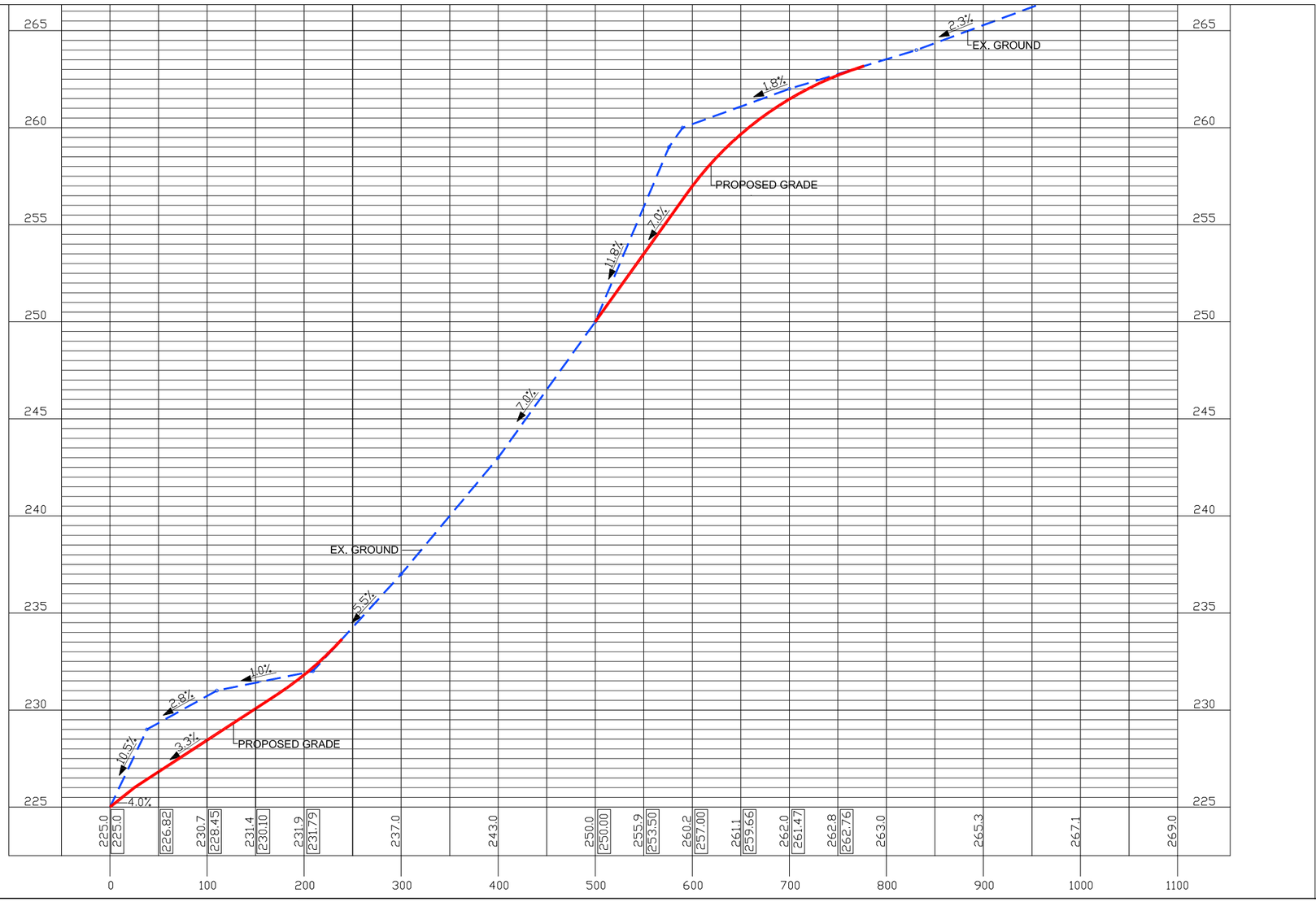

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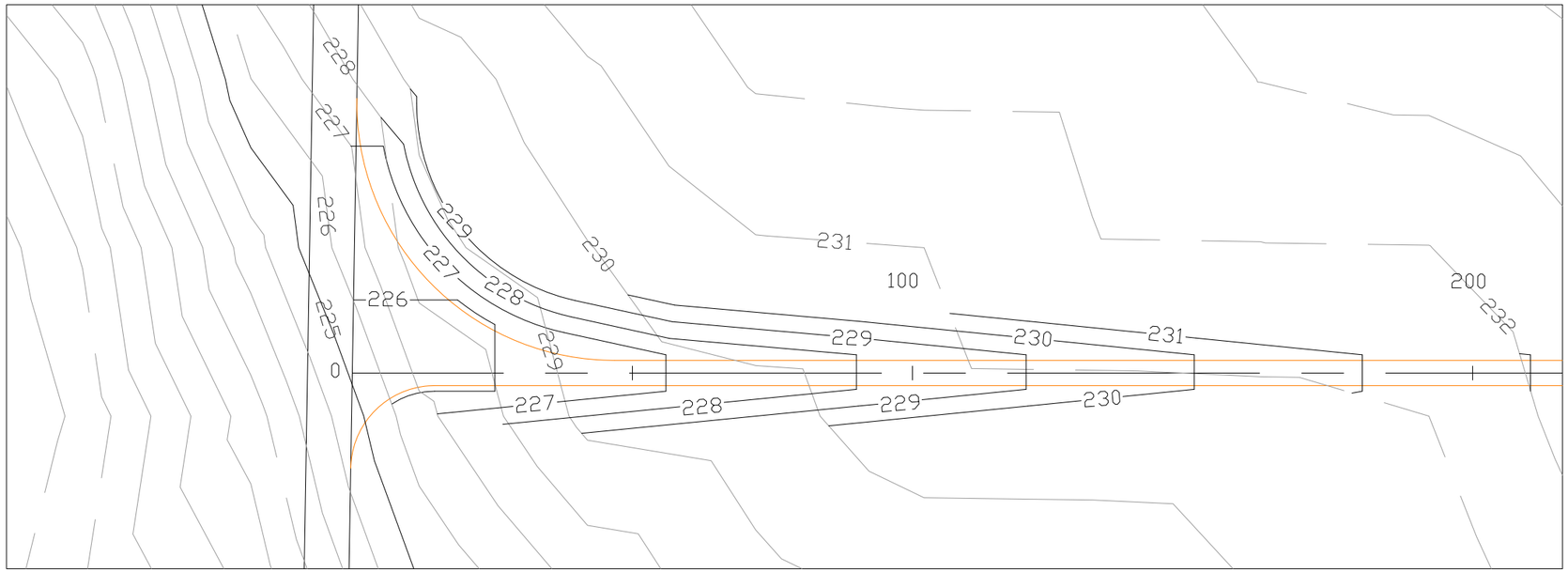
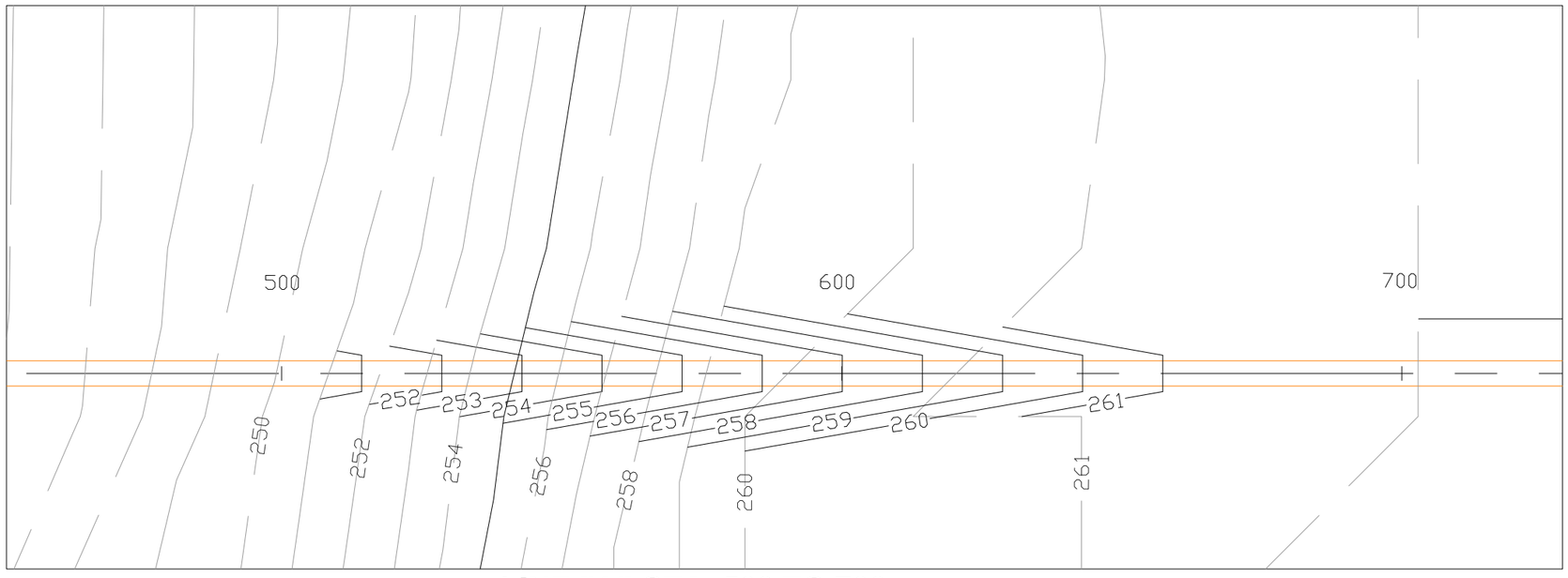


LINE "A"-STA. 0 TO 200



LINE "A"-STA. 500 TO 700

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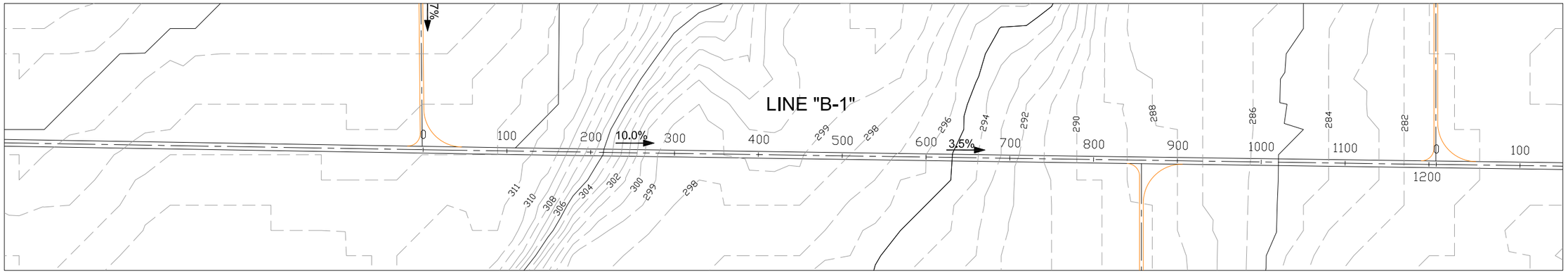
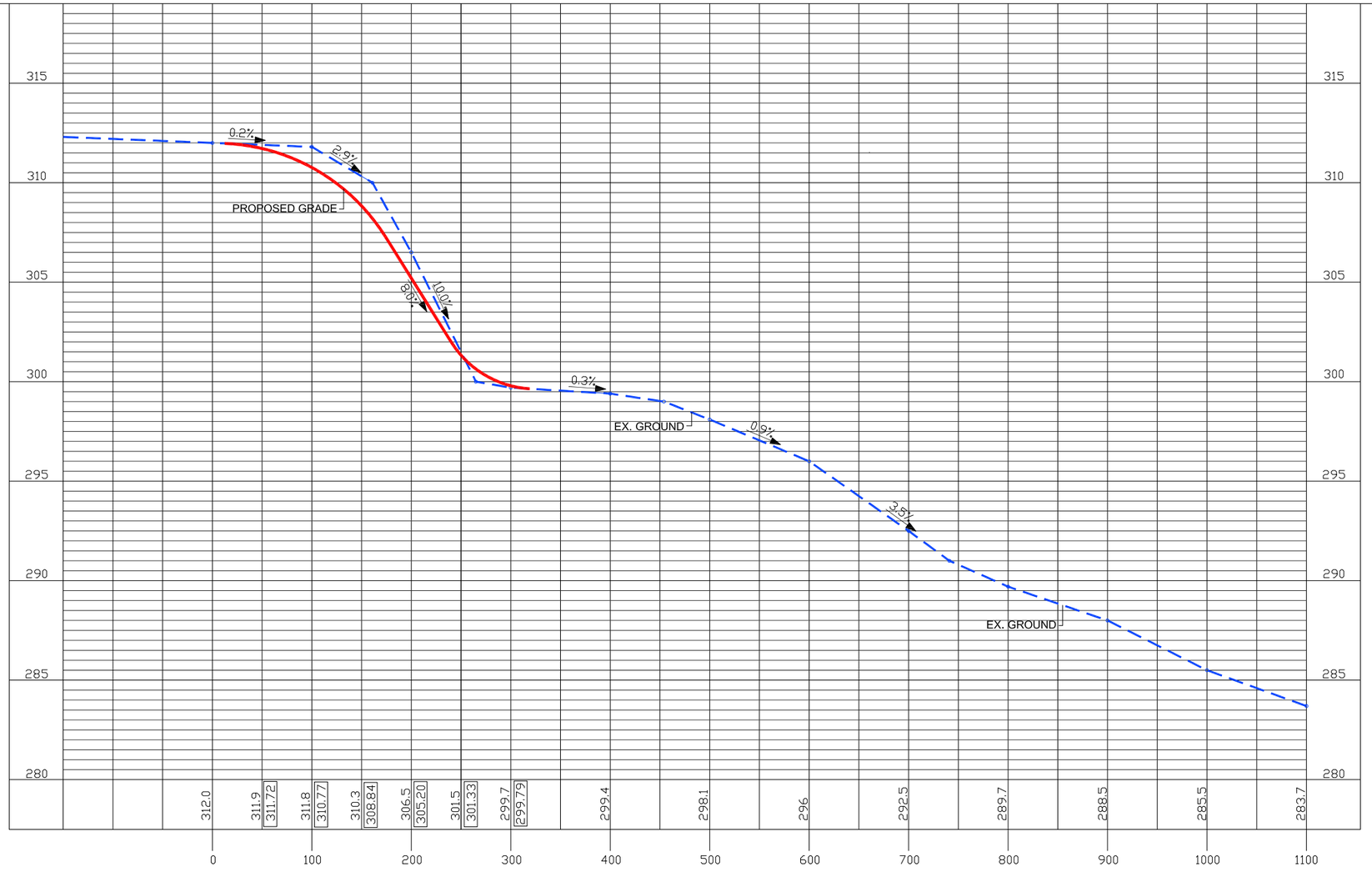
Client: NORTHLAND POWER	





LINE "B-1" PROFILE - GREEN BUSH ROAD

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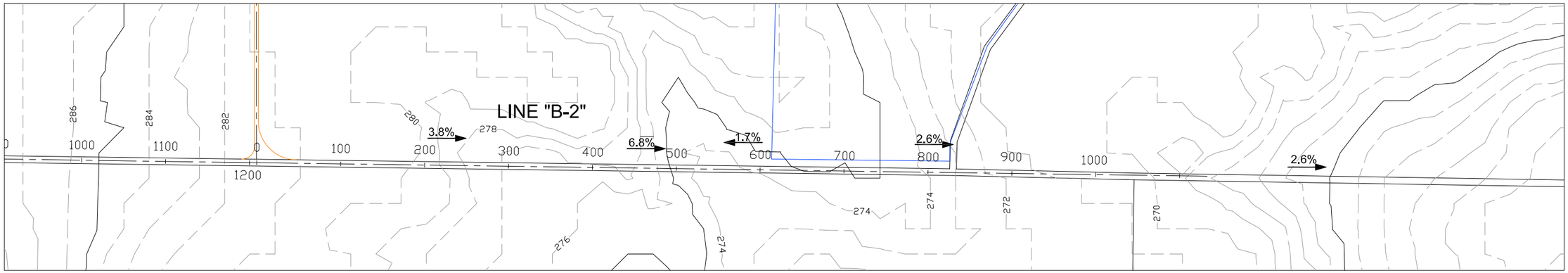
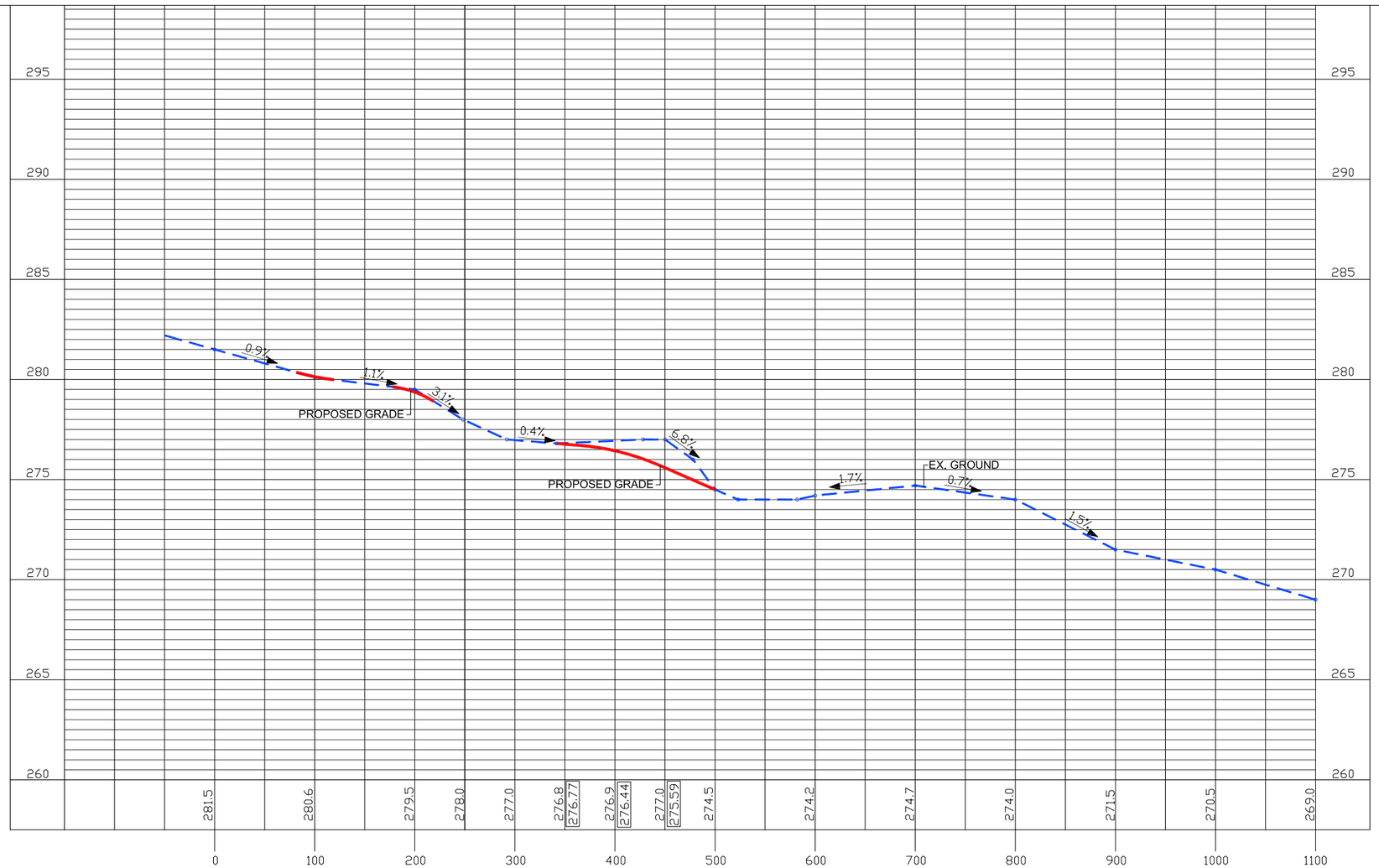
Client: NORTHLAND POWER	Sheet No: 7 of 13





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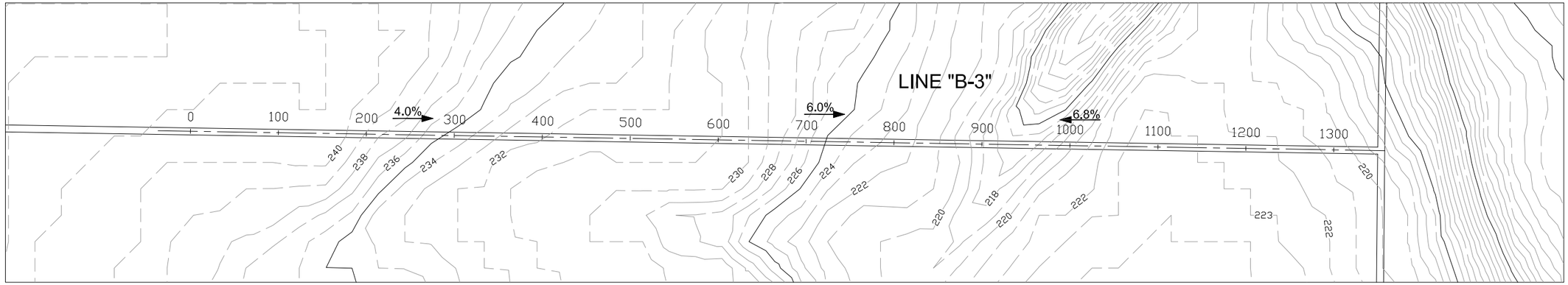

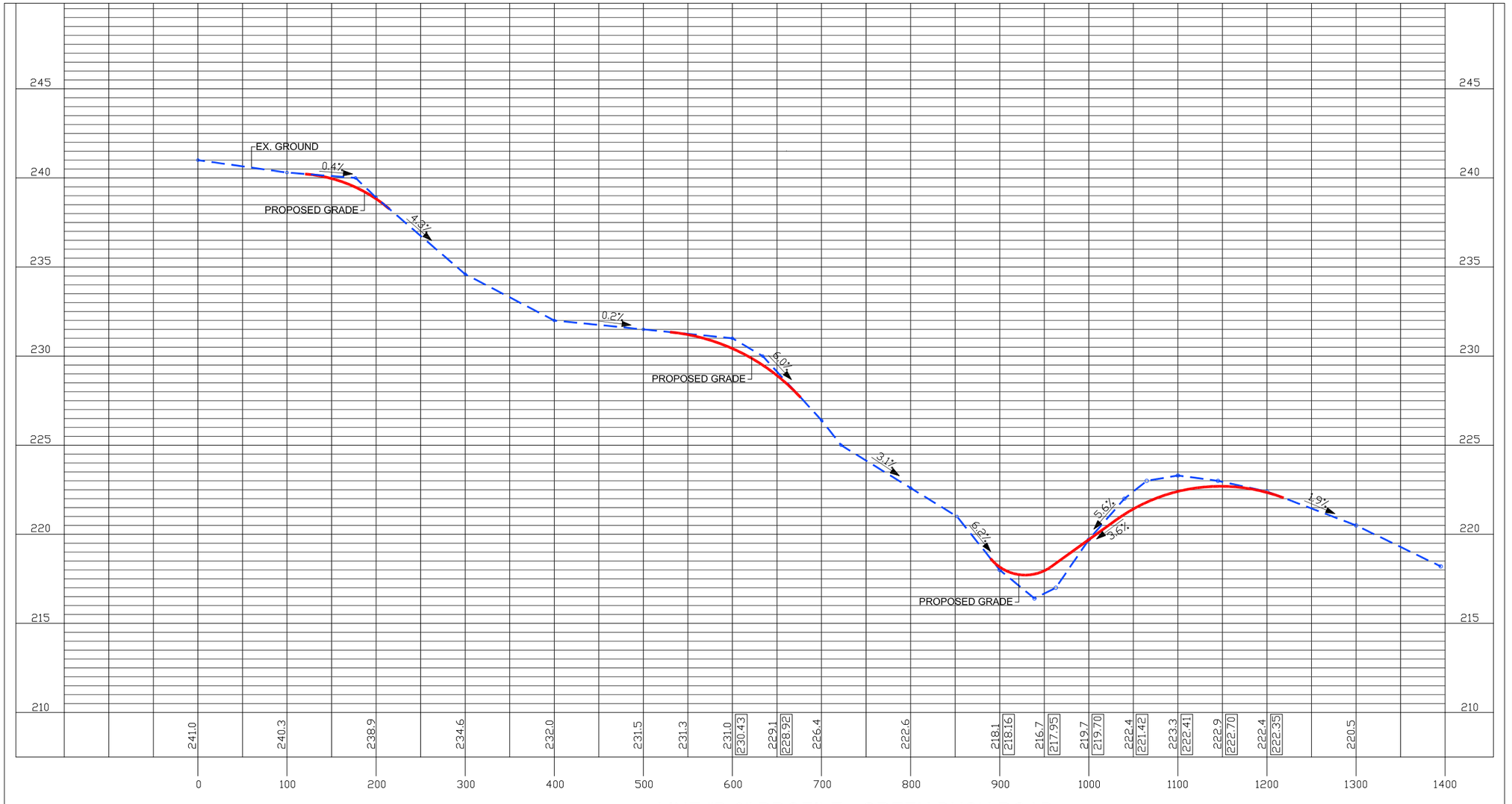

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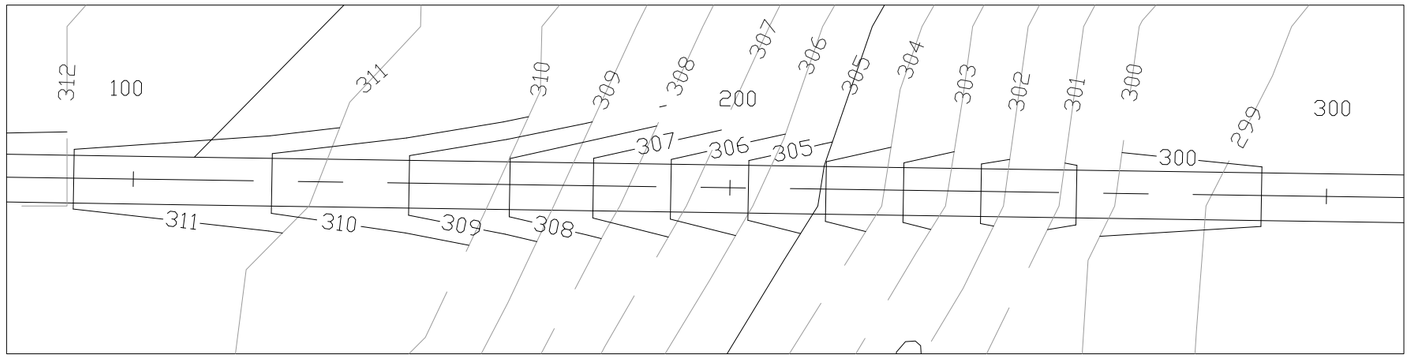
Client: NORTHLAND POWER	Sheet No: 9 of 13



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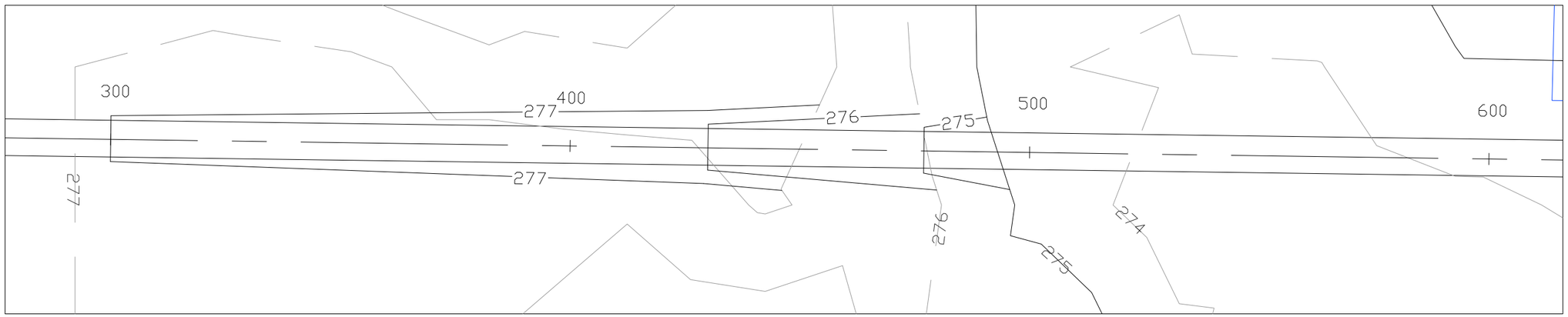

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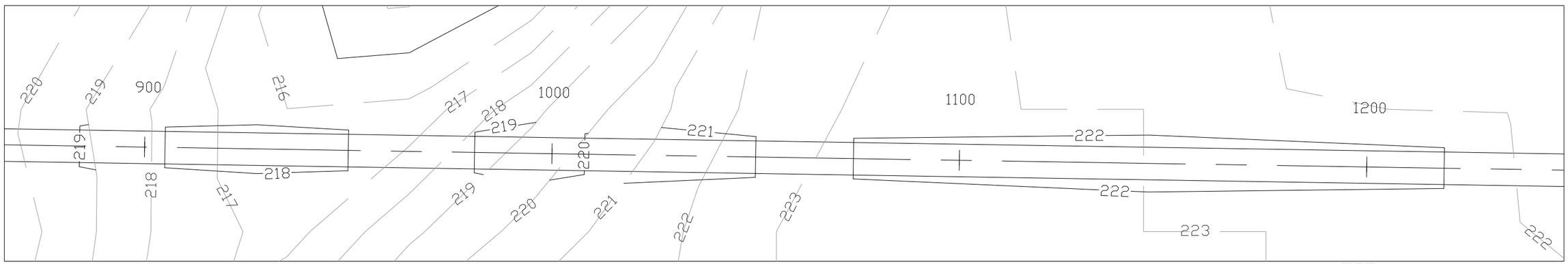

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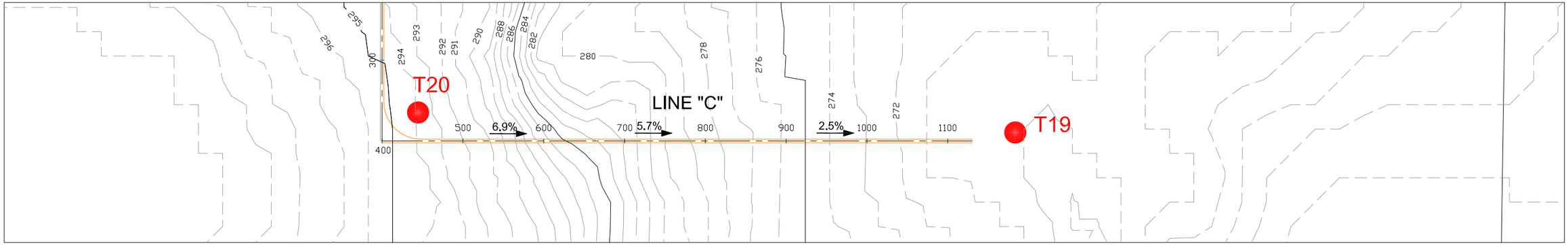

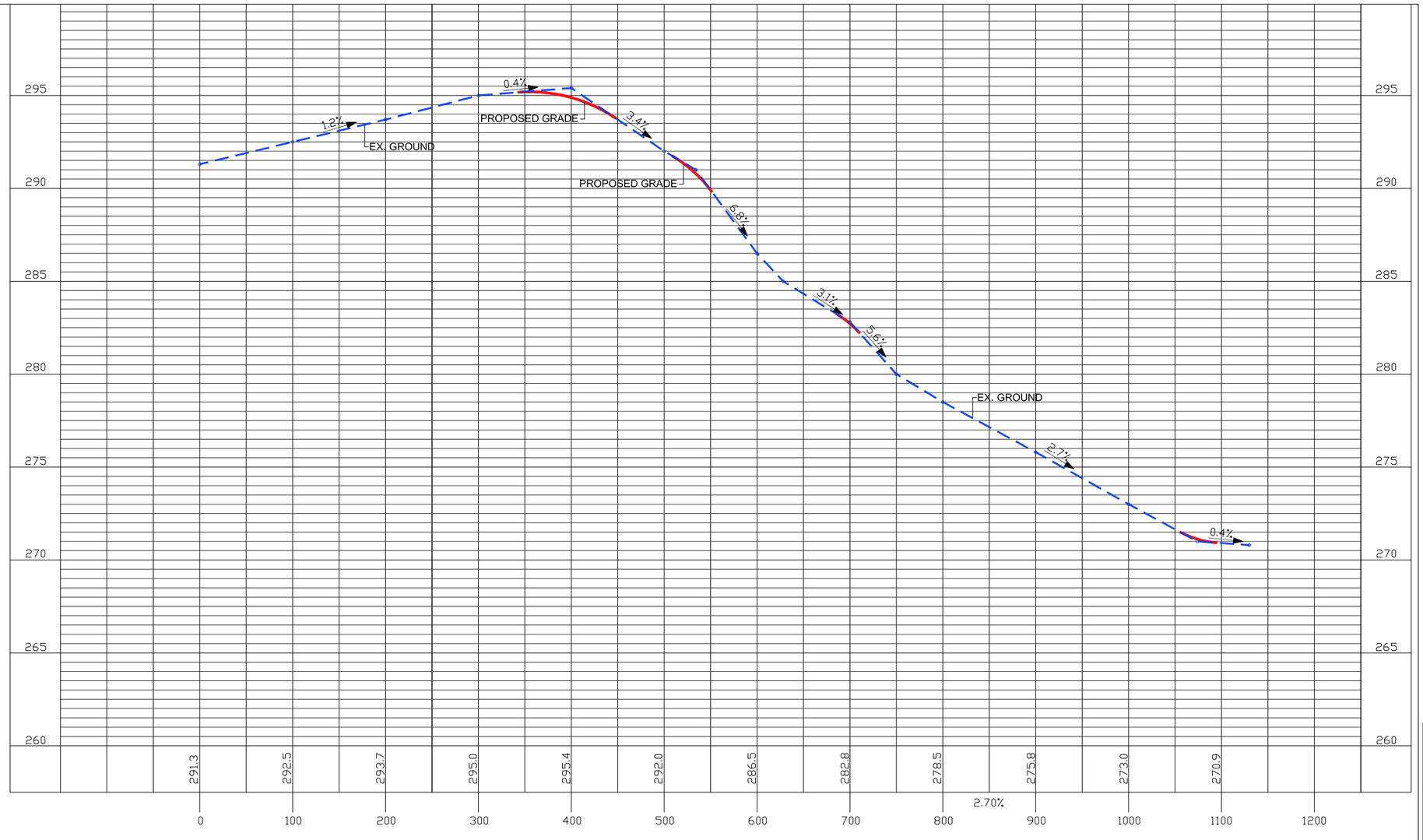

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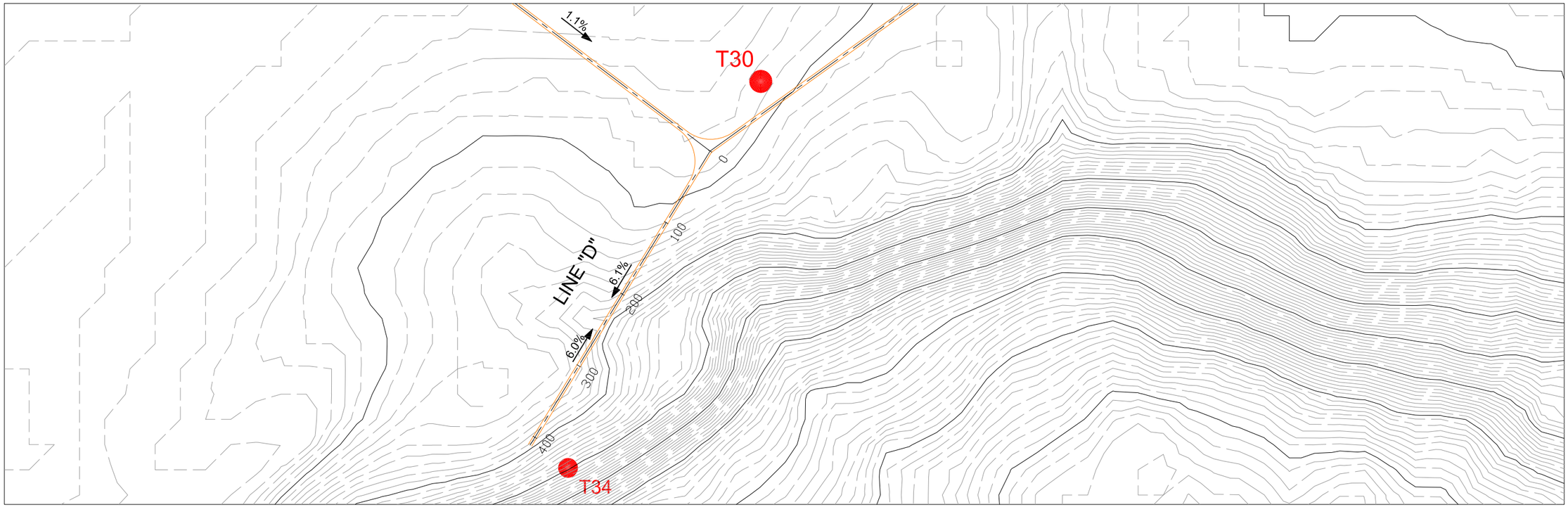

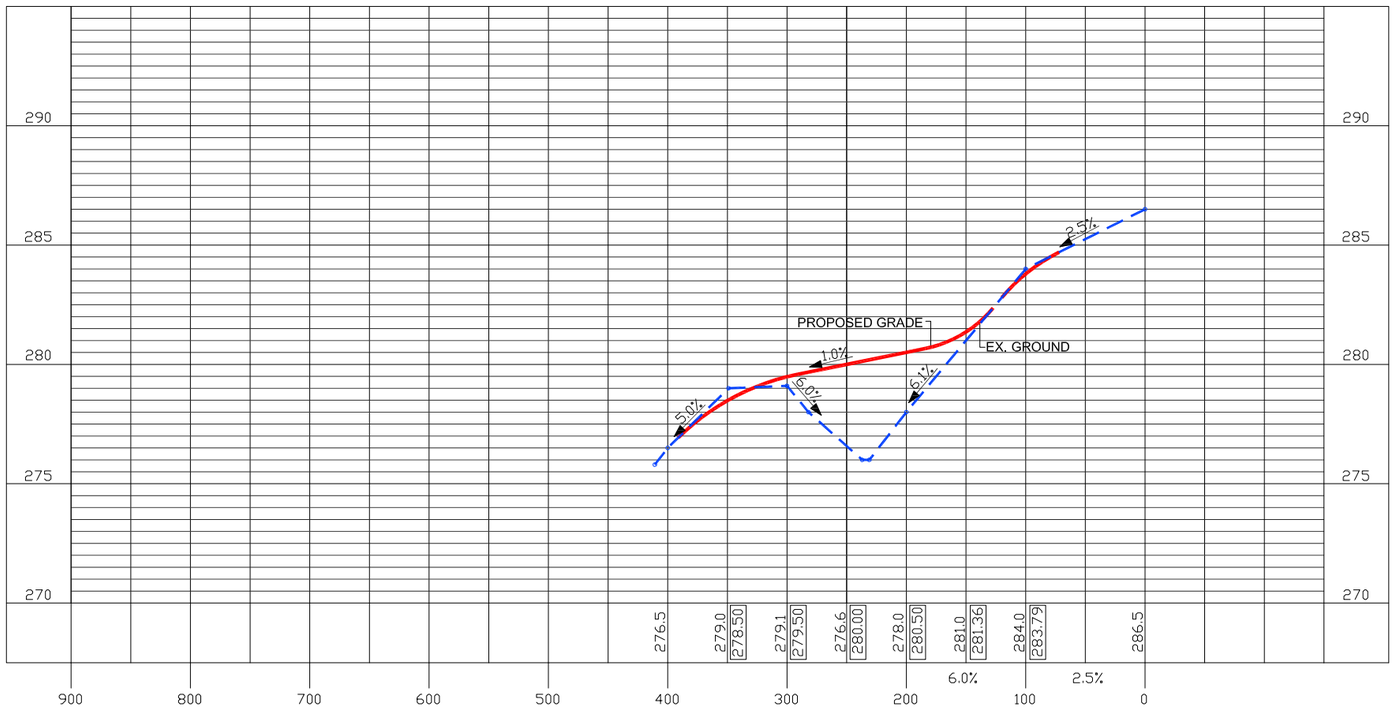

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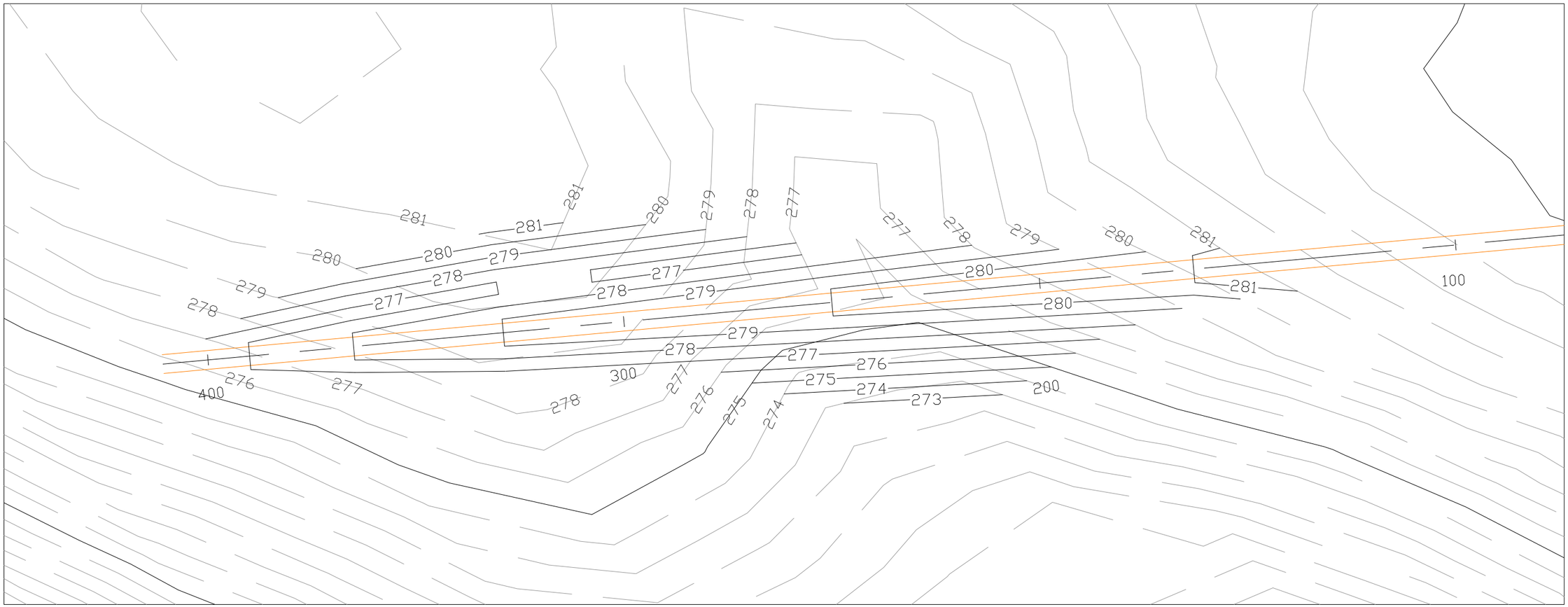

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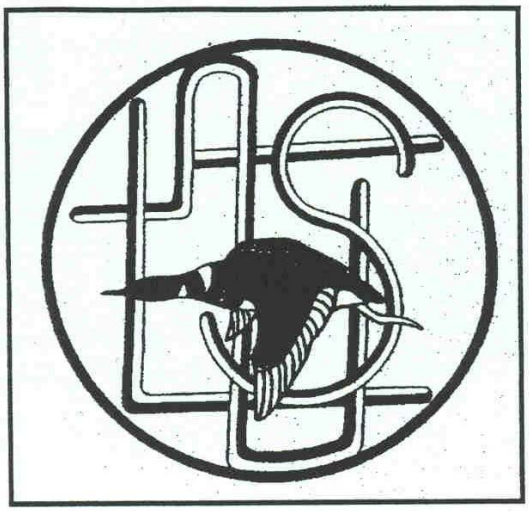
Project: MCLEANS MOUNTAIN	Last Revision Date:
Client: NORTHLAND POWER	Sheet No: 13 of 13

APPENDIX E
Stage 1 and 2 Archaeological Assessments

Report on Stage 1 Archaeological Assessment of the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Islands



Work conducted under Archaeological License P-100
Project Number P-100-016-2009

Dr. P. Julig
Archaeological Survey of Laurentian University
Sudbury, Ontario
Feb. 23, 2009

For: Dillon Consulting
235 Yorkland Blvd. Suite 800
Toronto, Ontario M2J-4Y8

COVER PAGE INFORMATION

Municipal Development File Number	N/A
"T" Number	None
Property Name	Northland Power, Manitoulin Island Wind Farm
Location of Project	Northeast Manitoulin and the Islands (NEMI) in the Township of Howland, District of Manitoulin
Lot Numbers	Part of 66 Lots, within Township of Howland, see Figure 2 Map boundary
Concession Numbers	Concessions within Township of Howland, boundary shown in Figure 1, but not all turbine locations yet determined.
Township	Townships of Howland
Plan Number	N/A
Client	Northland Power (Agent, Dillon Consulting, 235 Yorkland Blvd., Toronto, ON. M2J 4Y8)
Name of Consulting Firm	Archaeological Survey of Laurentian University (ASLU),
Name(s) of Consultant(s)	P. Julig
Project Number	P-100-016-2009
License Number	P-100
Report Completed	June 2009

HERITAGE ACT INFORMATION SUMMARY

This is a Stage 1 Archaeological Assessment of Manitoulin Island Wind Farm, being developed by Northland Power, in the Township of Howland, the Municipality of NEMI (Northeast Manitoulin and the Islands), in the District of Manitoulin.

This Wind Farm, being developed by Northland Power is being proposed on an area including parts of about 66 lots, located on an elevated plateau and on ridges above about 800 feet asl, in the Township of Howland, overlooking parts of Georgian Bay and the North Channel. This Stage 1 archaeological assessment was conducted under License No. P-100. A Field assessment was done on April 23, 2009, with Mr. Rick Martin of Northland Power, to assess possible beach ridge landforms and to evaluate archaeological potential. The Stage 1 background research and final report was completed in June 2009.

The license holder is Dr. Patrick Julig, License # P-100, who conducted the research at Laurentian University as part of the Archaeological Survey of Laurentian University, and compiled the final report.

No departure has been made from the information provided in the license application.

No sites were reported on the actual lots being planned for development. However the broader study area being assessed has several previously reported sites, the Giant site and the Buttermilk Falls site; however they are over 250 meters from planned development.

Permission to conduct the field visit was obtained from Mr. Rick Martin of Northland Power, who accompanied P. Julig, to visit a number of the proposed turbine locations April 23, 2009.

Report on Stage 1 Archaeological Assessment of the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Islands

1.0 Introduction

This is a Stage 1 archaeological assessment of the Manitoulin Island Wind Farm, by Northland Power, and the associated transmission line. This development is situated in the municipality of NEMI (Northeastern Manitoulin and the Islands), within the Manitoulin region, near Little Current, and is situated in the Borden square designated BlHl (Figures 1, 2). The purpose of the Stage 1 assessment is to conduct background archeological, archival/historical and environmental studies, to determine the potential for cultural heritage resources including archaeological sites. The development is planned along ridges and bluffs overlooking Georgian Bay, and certain ancient beach terraces in this part of Manitoulin Island have potential for archaeological sites. The Stage 1 assessment was mandated by the Ministry of Culture in the planning process. This report covers all aspects of the Stage 1 assessment process, which is primarily a "desk-top" research. We will first review what is required for the Stage 1 assessment research and then present the research findings. This is followed by some observations made in a field visit to more carefully assess archaeological potential. This report will provide the classes of information required by the Technical Guidelines of the Ministry of Culture, with respect to the Ontario Heritage Act.

1.1 Background to Stage 1 Assessment

There are four main classes of information used to determine archaeological potential as part of the Stage 1 archaeological assessment.

1. the presence of any known reported archaeological sites on or within 250 meters of the project,

2. specific physiographic features on or close to the property, such as permanent water bodies and specific landforms such as sand and gravel deposits, which may indicate high potential for archaeological sites,

3. certain cultural historical information and features, and

4. specific location information for the development, including local knowledge and site disturbance.

Each of these four categories of information will be evaluated to determine how they contribute to archaeological site potential for the Manitoulin Island Wind Farm. In addition, the traditional pattern of prehistoric and early historic site locations in the eastern Great Lakes forest in the study area vicinity will be evaluated. Specifically, the location and context of previously located archaeological sites will be examined. This overview will provide a regional perspective for site potential. The location of the development on the high bluffs and ridges in Northeastern Manitoulin suggests a moderate potential for archaeological sites in some places, as some sites have been found in similar locations in this part of Manitoulin. The Stage 1 assessment will provide

background research to evaluate the site potential for the entire development property, including the flat uplands away from the bluff zone. For example, some quarry/workshop sites for stone tool manufacture, and hunting sites are located in uplands away from shorelines, where suitable geological materials are situated. Previous reports and surveys have found numerous sites in northeast Manitoulin Island, over the past 10,000 years, including Sheguiandah quarry site (BlHl-2).

The Manitoulin Island Wind Farm is planned on a number of properties, being bounded approximately by the line shown in Figure 1. The specific properties and turbine locations, as well as proposed access roads are shown in more detail on Figure 2. Additionally the associated 15 kV transmission line development is shown on Figure 1, connecting the substation in the northeast part of the development to the grid near Little Current. The precise details of this connection are yet to be finalized, according to Mr. Martin of Northland Power.

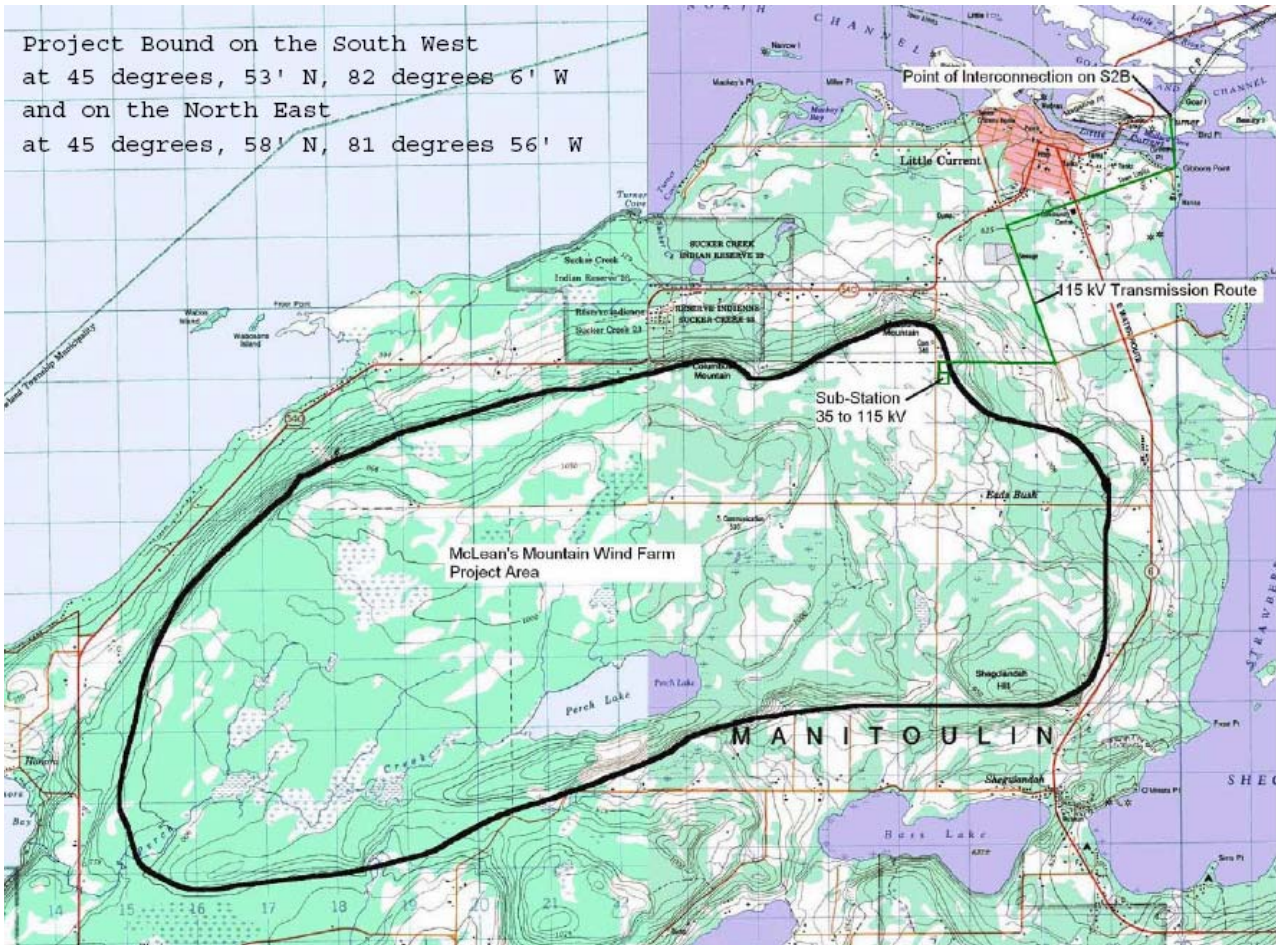


Figure 1. Manitoulin Island Wind Farm approximate project boundary and Transmission Line Route. This project was previously called McLean's Mountain Wind Farm. The grid indicates 1000 meters scale and north is to the top in the figure.

1.12 Proximity to known archaeological sites

The first class of information to determine archaeological potential, according to the Ministry of Culture Guidelines is the presence of archaeological sites on or near the property. There are no known sites (reported sites) on or within 250 meters of the Manitoulin Island Wind Farm proposed project turbine locations, that is, the designated project lots. However a large surface site near Bass Lake (Giant site) and another smaller site (Buttermilk Falls) are fairly near, falling within the boundaries of the larger study area (Figure 2), as discussed below.

The presence of any known reported archaeological sites in the properties being developed, or within 250 meters of the project boundaries, indicates high potential, and would trigger the Stage 2 assessment, that is field survey and test pitting.

The Ontario Ministry of Culture maintains a data-base of known archaeological sites in the province and those in the Manitoulin region (about 48 sites) are listed in Table 1. In addition, there are other sites in the Manitoulin region that have been discovered but not reported in the Borden system, and are thus not in the available Borden Site database. For the purposes of this development project, no barriers to development are posed by the existence of known archaeological sites within 250 meters of the existing project boundaries, as shown in the designated project lots.

However, as mentioned above there is one nearby site of unknown size, the Giant site (BlHl-1), reported by T. Lee in the 1950s, (Julig 2005, see Table 1). This site is located near the boundary of the southeast edge of the development, east of turbine 36, north of Bass Lake Marsh (Figure 2). The Giant Site is a rather large and diffuse scatter of quartzite artifacts in several fields, associated with quarrying and stone tool manufacture from the Paleo-Indian and Archaic period (ca. 9500-7000 years ago). This site's boundaries are poorly defined, as there are numerous surface site lithic scatters associated with the Bar River and Lorraine Formation white quartzite bedrock outcrops around the nearby Sheguiandah (BlHl-2) quarry-workshop site (Julig, 2002). Many fields in the area near the quartzite outcrops at the 225 meter (750-775 ft. asl) elevation have shown some artifacts, however these outcrops are mostly outside of the property. There are also other sites around Sheguiandah associated with the ancient (9500 years ago) Korah beach level, including Buttermilk Falls, west of Burnett's Side road (Figure 2). This site also falls within the yellow "study area" boundary of Figure 2, as well as within the boundaries shown on Figure 1. However, the leased lots shown on Figure 2 have no sites on or within 250 meters. Since the project is not totally finalized as to turbine numbers and locations if any are planned near the existing sites, this would become an issue.

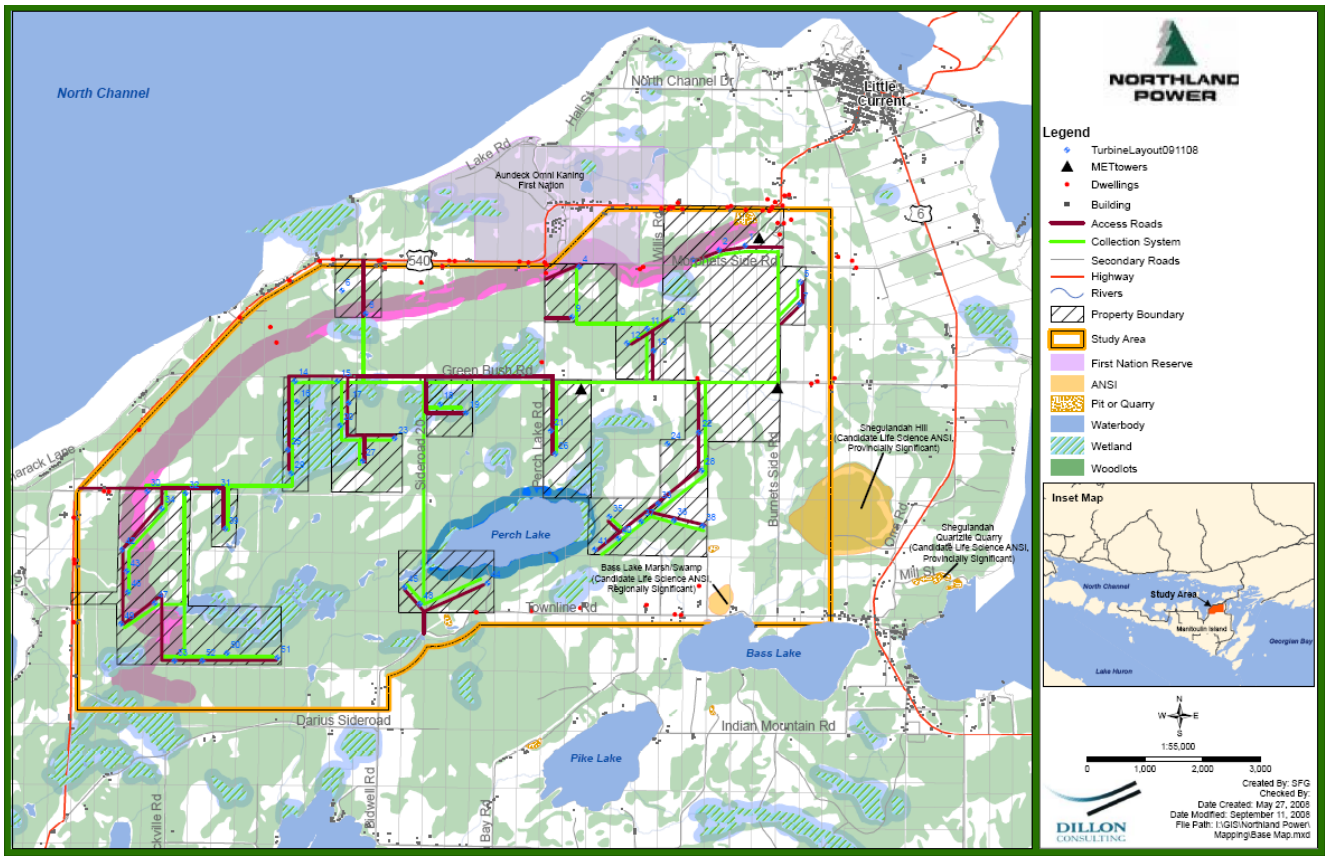


Figure 2. Manitoulin Island Wind Farm showing property boundaries, access roads, transmission lines, the potential 53 turbine locations, and environmental details including water bodies (not all turbine location may be developed).

1.13 Physiographic features indicating high potential for archaeological sites

The main physiographic features that determines archaeological site potential in Northern Ontario is proximity to permanent water bodies. A second criterion is association with certain land-forms and formations. Thirdly, and possibly less importantly, site potential is determined by the presence of well-drained sandy soils.

Specific physiographic features such as proximity to permanent water bodies can signal increased archaeological potential. Other specific landforms such as sandy beaches and sand ridges and deposits such as eskers and moraines, as well as proximity to ancient water (old beach ridges), indicates high archaeological potential. The Manitoulin Wind Farm project is located on relatively high topography, with elevations typically over 900 feet (275 m) (asl) (Figure 1). These elevations of turbine locations are above the ancient (9500 year) Korah Phase beach levels (about 750-775 ft asl) where the first Paleoindian sites, such as Sheguiandah site, are typically located (Julig 2002).

The present permanent water bodies and wetlands associated with the project are shown on Figures 1 and 2. There are three parcels bounding on Perch Lake, the main water body, with extensive associated wetlands. A buffer zone has been established around

Perch Lake, with no turbine locations or access roads within the buffer zone. There are numerous seasonal ponds and wetlands on these rocky limestone (dolomite) uplands. The bedrock is at or near the surface, with a thin layer of till or clay in the depressions. The bedrock is fairly porous, and many seasonal ponds fill in the spring and may dry out in the late summer. Buffer zones are also placed around most of these wetlands, and the development is mostly away from these buffers. There are some exceptions with respect to the hydro lines crossing wetlands and/or buffer zones in some places, as well as some access roads, specifically west of Perch Lake. It appears that the turbine locations # 44, 45, 48, originally beings planned for near Perch Lake have now been cancelled (pers. comm. Mr. Martin).

There are no local esker ridges or major sand deposits in the higher elevations of the development property, however there are some sand and gravel deposits just below the main bluff at the south side of the project, with gravel pits in the near vicinity of the turbine locations 38 and 48, as well as near the northern edge at turbine location 6. These gravel deposits are mostly below the main bluff and with one exception (turbine 6 location), more than 250 meters away from the proposed developments.

One other type of unusual geomorphic feature was considered as contributing to archaeological site potential, and that was high ridge "look-out" locations, such as on McLean's Mountain location where turbine Location 1 and 2 are located. The access roads follow the crest of some of the ridges at several "look-out" locations.

As a result a field visit was conducted to visit several of these "look out" locations to check if the ridges were sand or gravel, and to evaluate the archaeological site potential and this is considered in a later section.

1.14 Historical features and cultural knowledge indicating site potential

Historical cultural features can also signal site potential. These include traditional-use extractive sites, such as ancient quarry sites, aboriginal settlements and cemeteries (including old lumber camps, or trading posts), and historic transportation routes, such as portages and old trails.

Other natural resources that may signal ancient prehistoric sites is suitable silicious lithic materials to make stone tools (chert/flint, fine-grained quartzite, etc.). There are both Fossil Hill Formation chert and fine-grained quartzite on Manitoulin Island, and both materials were used for making stone tools locally, as well as transported around the region for thousands of years (Julig 2002). There are exposed Bar River and Lorrain Formation bedrock quartzite outcrops in the area from Sheguiandah to north of Bass Lake, within the southeast portion of the project area. These were was quarried and used for making stone tools at workshop sites such as Sheguiandah (BlHl-2 outside the project area) and Giant site (BlHl-1, within the project area), and also at the outcrop at Burnett's side road, at Buttermilk Falls (Figures 1,2). There are no bedrock deposits of Fossil Hill formation chert/flint in the project area; however is present fairly nearby, in the central and south side of Manitoulin from Lake Manitou to Wikwemikong (Julig 2005).

1.15 Knowledge specific to the location and evidence for site disturbance

Local knowledge of specific sites or features, and the degree of recent disturbance to the study area are two other types of information of the study area that are researched in the Stage 1 process. Specific local knowledge and findings reported may signal increased archaeological potential; however this would have to be confirmed. For example, there is a built U-shaped dry-stone structure to the west of Burnett's Side Road, within the project area. However it is over 250 meters from any proposed turbine locations (east of turbine 38, Figure 2). This structure is of unknown age, and while it has been used as a deer-hunting blind in recent times, it appears to be of considerable antiquity. It is located near an upland trail and later wagon road trail that ran from Sheguiandah to Little Current (ASI, 1992). There are other reports of local finds of archaeological or early historical interest within the general area from Little Current to Bass Lake, including some Archaic era finds, but these are outside the project boundaries.

Extensive and intensive surface ground disturbance would contribute to low archaeological potential. In terms of recent disturbance to the study area, the surface is somewhat modified by logging, farming, pasturing and old trails; however this would not reduce the archaeological potential too much.

This report will now review the Native culture history of the surrounding Manitoulin and adjacent mainland region and consider archaeological site potential based on the existing reports, site data bases, and unpublished reports.

2.0 STAGE 1 BACKGROUND RESEARCH

Manitoulin Island has a rich prehistoric archaeological record extending from the Paleoindian period at about 10,000 years ago (Julig 2002) until the arrival of the first Europeans in the 16th century. The Great Lakes were an important focal point for prehistoric Native cultures because of the productive coastal environments for many resources, including terrestrial game and the rich fresh-water fishery. Manitoulin, as well as being the largest island, was also part of a traditional canoe travel route through northern Lake Huron. The prehistoric cultural periods represented in this region will be briefly reviewed, along with select key archaeological sites reported in the Manitoulin district. Also part of the Stage 1 research is to determine if there was any historical evidence for use of the survey property, or any significant early historical sites.

2.1 Early Culture History

The prehistory of Ontario goes back to the end of the glacial period or Pleistocene era at about 11, 000 years ago. The first people to occupy the region were Paleoindians (ca. 11, 000 - 7500 B.P. (years before present)) who moved into the Great Lakes from the south and west while glaciers receded in the north. The late Paleoindians, referred to as the Eastern Plano, occupied Manitoulin Island at sites such as Sheguiandah (BlH1-2) by

9500 years ago (Julig 2002; Julig et al. 1991). The Archaic periods (ca. 7500 to 2000 B.P.) and Woodland periods (ca. 2000 B.P. to European contact) followed and all are present on Manitoulin Island, and artifacts from these cultures have been found at the Sheguiandah site, and elsewhere on Manitoulin. All of these cultural periods will be briefly reviewed. The Georgian Bay and Manitoulin regions were to some extent used by both Northern and Southern Great Lakes cultures, as this was an area of trade and considerable cultural exchange occurred (Julig et al.1998).

Paleoindians were mobile hunter-gatherer bands that relied mainly on hunting large and medium size game species. The Paleoindians arrived in the part of North America from northeast Asia, and spread through the Americas before 12,000 years ago. In the western plains regions they hunted the extinct mammoth (*Mammuthus primigenius*) and other large game species with Clovis type fluted-point spears. In the Great Lakes region early Paleoindians lived and traveled along the shorelines of the early Great Lakes (by ca. 11, 000 B.P.), such as Lake Algonquin, a high water stand of Lake Huron. Glacial ice was still present along the north shores of the Great Lakes and taiga and tundra-like environment was present between 10, 000 and 11, 000 B.P. (Julig 2002).

These early colonists appear to have been small mobile bands that depended on herd animals such as caribou as well as elk, moose, possibly mastodon (*Mammut americanum)*, small game and fish. However, archaeologists have not recovered many bones of the food sources they used, or their houses, so we do not have good information on their life ways and subsistence settlement patterns. Because they left silica stone tools of flint and quartzite from widely spaced source regions, we know they traveled (or traded) widely. These artifact distributions of distant materials tell us they traveled long distances.

The high water levels of Lake Algonquin covering most of Manitoulin Island, and fell after about 10, 500 years ago, as the glaciers started to recede. The Late Paleoindians moved into Manitoulin Island, which was connected to the Bruce Peninsula of south-central Ontario at that time. The upper Great Lakes drained through the French River outlet and though the Ottawa valley drainage system, via Lake Nipissing at that time. There was a low-water period, when Georgian Bay was actually a separate lake, and also several flood events that occurred from the west into Lake Superior as the glaciers melted. As these floods cascaded into Lake Huron life would have been unstable as the beach zones and hunting and fishing areas would have changed regularly.

There is limited direct evidence for the Paleoindian way-of-life in the north. Few artifacts other than stone tools have survived; however, inferences have been gained from site locations, size and context. Their chipped stone tools include materials from widely spaced geological sources, indicating considerable mobility and interaction with other widely spaced bands (Julig et al. 1989). Their tool forms include large lanceolate shaped points, large bifaces used for as knives, and many unifacial tools made from flakes, such as scrapers and engraving tools. Such tool kits or assemblages have been recovered at Sheguiandah (B1H1-2) and in Killarney, along with the waste products (debitage) from the tool making activities (Julig et al. 1991; Julig 2002; Lee 1957). The Paleoindians preferred obtaining these stone tool materials from bedrock outcrops rather than from secondary deposits such as tills and gravels. The Sheguiandah site (B1H1-2) and the nearby Giant site (B1H1-1) on the north shore of Bass Lake (within the study area) are local examples, and there are many others (ASI 1992; Julig 2002; Julig et al. 1991).

These early inhabitants also used small amounts of local Fossil Hill Formation cherts (flints) of Silurian age, probably from the Wike Flint site (BjH1-1) to the east side of South Bay, on the Wikwemikong reserve. Further to the east, in Killarney Park, there are similar indications of Paleoindian activity at the George Lake site (Greenman 1966) at an ancient quartzite quarry.

The Archaic period cultures (ca. 7500 to 2000 B.P.) had many similarities to the Late Paleoindians in the upper Great Lakes. In the Boreal forest it is referred to as the Shield Archaic (Wright 1995), and along the St. Laurence lowlands as the Laurentian Archaic. The hunting-gathering-fishing way of life continued with evidence of some larger macro-bands using the larger lakes and rivers throughout the region, and greater focus on specific resources such as fish. The regional use of native copper from Lake Superior for tools and ornaments occur prior to 6000 years ago (Beukens et al. 1992). There was continued use of local quartz, quartzite, as well as poorer quality stone such as greywacke materials for stone tools. Studies indicate repetitious use of sites including Sheguiandah (B1H1-2), Giant (B1H1-1), Cummins (DcJi-1) and others along the north shore from Paleoindian to Archaic times (Julig 2002).

New hunting technology is evident from the Archaic era with the recovery of side-notched Early Archaic spear points. In addition other new stone tool forms appear such as ground stone gouges and trihedral chipped adzes, which indicate a variety of woodworking activities. Certainly watercraft such as dugout canoes, were used at this time. Few Early Archaic sites have been radiocarbon dated in local region, however, the Foxie Otter site on Spanish River, north of Manitoulin, has a date of 7670 +- 120 B.P., one of the earliest dates for the Early Archaic occupation in these regions (Hanks 1988). On Manitoulin such ground stone gouge tools have been found at Little Current, an atlatl weight from near Pike Lake (west of Bass Lake), and copper artifacts are reported from sites around Gore Bay and Lake Woseley on Manitoulin Island.

Archaic era sites are often difficult to clearly identify unless specific tool forms such as those mentioned above are recovered. Since water levels in the Georgian Bay Basin were at times both lower and higher than currently (fluctuated) many coastal Archaic sites were flooded depending on their elevation. The specific property in this study is above the ca. 5,500 B.P. Nipissing beach level, and was available for the Archaic era peoples, however the upland bluffs (most turbine locations) would have been well back from the beaches at that time.

The Woodland period, after ca. 2,000 years ago, is marked by a number of changes in technology, social organization and burial practices; however, much continuity is evident in basic subsistence practices and resources used. The Woodland period is normally subdivided into Middle Woodland (ca. 2,000 to 1,000 B.P.) and Late Woodland (ca.1,000 B.P. to Historic contact), with the Middle Woodland across the region manifest as the Laurel culture that extends from Northern Minnesota to Quebec (Wright 1995), and the Point Peninsula Culture also present across the Lower Great Lakes.

Burial mounds and larger villages are part of the Laurel Middle Woodland culture pattern, along with new technology, particularly the appearance of ceramic (clay) pottery vessels. At Killarney (Speigel site), a Middle Woodland burial mound complex is present (Greenman 1966). The East Sheguiandah site (B1H1-3) near the Government

dock at Sheguiandah was identified by T. Lee (1963) as a Middle Woodland village, and others are present in the region.

During the Middle Woodland the use of fishing nets is evident from net sinkers. Copper continued to be used for tools and ornaments along with bone harpoons and a variety of stone tools, as well as the distinctive stamp decorated finely made pottery. At the Speigel site in Killarney, the presence of chert artifacts of southern flint and the Adena burial mound complex indicates social connections to the southern Lake Huron region and beyond. The Middle Woodland people had very widespread social interaction and trade networks, and some artifacts of non-local materials have been found at the nearby Sheguiandah East Middle Woodland site.

The Late Woodland period (1,000 B.P. to contact) is marked by the appearance of a variety of ceramic styles from the northern Great Lakes as well as Iroquoian influence from the southern shores. Considerable trade is evident throughout the Manitoulin region, which culminated with the arrival of the Europeans and the establishment of the fur trade. The trade networks of the Odawa of Manitoulin were well established with the Huron and other groups, with whom they traded.

There are several recorded sites on Manitoulin Island that date to this period, including the Shawana site (BkHk-1) (at Wikwemikong Reserve), and at Providence Bay (BkHn-2), as well as on the west side of South Bay, and in the Slash area of Manitoulin. The artifact assemblages of the Late Woodland include the characteristic ceramics and small triangular and side-notched points, and at around 1620 A.D., the appearance of European trade goods such as glass trade beads and some European copper kettles and steel tools.

The Historical Period on Manitoulin begins in the early 17th century (1600s) when the reports of the early French explorers and missionaries of hunters, fishers and gatherers who lived in the lands and islands of Georgian Bay and spoke Algonquian language, different from the Huron and other Iroquoian tribes to the south. The Ojibway, Odawa and Potawatomi Nations became known as the Confederacy of the Three Fires, with the Odawa occupying Manitoulin Island and the Bruce Peninsula, Potawatomi in upper Michigan and the Ojibway the north and east shores of Georgian Bay and elsewhere across the southern Canadian Shield and down the Ottawa valley (Fox 1990).

The first European visit with the Ottawa (Odawa) tribes of Manitoulin is recorded by Champlain in 1615, who met with a group of 300 men at the mouth of the French River. They were known to Samuel de Champlain as the Cheveux relevés or “standing hairs”, because they greased and painted their very straight hair. The term Odawa is from the Algonquian term *adawe* which means to trade, to buy, to sell, as they were great traders and travelers (Fox 1990: 457).

Manitoulin is derived from *manitou* the Ojibway term for spirit; however the term first appearing in the *Jesuit Relations* is the Huron word “Ekaentoten”. The Jesuit mission of St. Peter on Manitoulin dates to 1648 (Major 1943).

In the mid-1600’s warfare developed with the Iroquois to the south, and the Huron and other tribes were driven westward from their territories (Hiedenreich 1987: Plate 37). The Ojibways and Odawas were also involved in these wars, and were somewhat successful in their battles. The region was somewhat depopulated after 1660, and European diseases spread throughout the region. By the later part of the 1600s the

hostilities declined, and Algonquian bands moved back along the North Shore and on Manitoulin.

Other Algonquian groups spread to southern Ontario and the Detroit, Michigan area, but by the 1830s many had moved back to Manitoulin as the reserve system was established. The details of the historical era on Manitoulin are complex and beyond the mandate of this report. Relatively few of the historic sites from this era have been recorded on Manitoulin; however more prehistoric sites have been recorded in the vicinity of this study, as will be discussed in the next section.

2.2 Previous Surveys and Recorded Sites

Over forty archaeological sites are recorded for the Manitoulin District and are registered in the database of the Ontario Ministry of Culture in Toronto according to the Borden National Site Registration System (Table 1). Most of these sites have been documented by surveys in the past fifty years, mainly on the eastern half of the island. There has been no systematic survey over most of the island, and there are certainly many more unrecorded sites. There have been excavations of some of the major sites as mentioned in the previous section. Most of the surveys have concentrated in particular areas, such as the between Lake Manitou and Little Current around the village of Sheguiandah, where there are many sites associated with the whitish Bar River and Lorraine Formation quartzite, used by early prehistoric groups for making stone tools. In 1991 the Archaeological Master plan of Howland Township, by Archaeological Services Inc. (ASI 1992) also recorded many new sites in this part of Manitoulin Island.

The first records of prehistoric sites in the district were made by Dr. Robert Bell, Geologist for the Canadian Geological Survey, who in the 1870's collected and excavated from the sites at Killarney. Bell also obtained quartzite specimens from Sheguiandah from J. Nottman, a local collector (Julig 2002).

The first formal archaeological research program in the Manitoulin District was conducted by Dr. Emerson Greenman of the University of Michigan who came annually for seventeen years in the 1930's and 1940's to the Killarney area and he also surveyed on

TABLE 1: ARCHAEOLOGICAL SITES IN EASTERN MANITOULIN VICINITY

BjHl-1 Wike flint site	BlHl-1 Giant site
BjHl-2 Thomas Bay	BlHl-2 Sheguiandah
BjHl-3 Jock Bay	BlHl-3 Sheguiandah East
BjHm-1 Manitou River	BlHl-4 North /W Sheguiandah
BjHm-2	BlHl-5 Bass Lake 1
BjHj-1 Kaboni Beach	BlHl-6 Bass Lake 2
BjHj-2 “ ”	BlHl-7
BkHk-1 Shawana	BlHl-8 Bass Lake 3
BkHk-2	BlHl-9 Bass Lake 4
BkHm-1	BlHl-10 Sheguiandah Hill
BkHm-2 West Bay	BlHl-11

BkHn-1		BlHl-12	
BkHn-2		BlHl-13	
BkHn-3	Providence Bay	BlHl-14	Bass Lake 5
BkHn-4	Dewar	BlHl-15	Gravel Pit
BkHn-5	Arnold Farm	BlHl-16	Garden 1
BkHn-6	Sailor's Rock	BlHl-17	Garden 2
BkHn-7		BjHm-1	East Face
BlHj-1	Speigel	BjHm-2	West Face
BlHj-2		BlHm-3	Valley 1
BlHk-1		BjHm-4	Valley 2
BlHk-3	Bold Point	BjHm-5	Valley 3
BkHl-1		BlHm-6	Valley 4
BkHl-2		BjHm-7	Valley 5

** Names are given for the select prehistoric sites and those mentioned in the text.*

Manitoulin Island. Important sites investigated included Killarney Bay 1 (Speigel, BlHj-1) and George Lake in Killarney, as well as Providence Bay (BkHn-2, Table 1), which was later excavated by T. Conway.

In 1951 Mr. Tom Lee of the National Museum of Canada started a survey of Manitoulin Island and identified a number of sites, most in the vicinity of Sheguiandah village. Included were the large sites of Sheguiandah (BlHl-2), Giant site (BlHl-1) and sites BlHl-3 to 10 (Table1). Most of these sites are of Paleoindian or Archaic affiliation, except Sheguiandah East which is Early Woodland. Lee also reported a site (BkHm-2) on the north shore of Lake Manitou, on the northeast shore of Bass Creek. Further to the north of Lake Manitou Lee reported site BkHl-1, a collection of quartzite artifacts (16) from near a white quartzite outcrop. The local Bar River formation quartzite is excellent for tool stones and native inhabitants quarried glassy outcrops for making stone tools over very long periods (ca.10,000 years).

Thor Conway, former Ontario provincial archaeologist conducted an archaeological survey on Manitoulin Island in the 1980's. He reported a number of sites including the Wike Flint site (BjHl-1), and others ranging from Archaic to Late Woodland (Odawa) and Historic era along the south shore on the Wikwemikong Reserve (Table 1). Two sites (BkHj-1 and BjHj-2), one Late Woodland site and a 19th century village were recorded at Kaboni beach by Conway; however these have not been studied. At the mouth of the Manitou River, Conway reported the multi-component Archaic and Late Woodland Manitou River site (BjHm-1). Conway also reported a number of other late prehistoric sites at West Bay (BkHm-2), Prairie Point on the North Channel (B1Hj-3), and the Providence Bay historic Odawa site (BkHn-3). Conway also reported several Archaic sites near the Mindemoya River (BkHn-4 and BkHn-5), however, none of these have not yet been published on, and only preliminary reports available for some sites such as Shawana (Conway 1989).

In 1991 Archaeological Services Inc. (1992) conducted an Archaeological Master plan for the Township of Howland, as part of the Sheguiandah site investigations. A local

archaeological survey was conducted and eleven new sites were reported, all to the northeast of Lake Manitou. These are sites BlHl-14 (Bass Lake 5) through BlHm-7 (Table 1), and all are assigned to the Late Paleoindian or Archaic periods, based on the types of stone quartzite artifacts recovered.

This summary of known sites and past research indicates many sites reported in eastern parts of Manitoulin Island, of all cultural periods. Some sites such as BkHm-1, are on lakes, and many are at favored fishing locations along rivers and streams, such as the Shawana site. However, a number of sites (8) are found inland (away from the water) such as between Lake Manitou and Sheguiandah, but close to the Bar River quartzite outcrops which were used for tool manufacture. This is a common pattern, since the favored fishing locations were attractions both in prehistoric times and today, however for many thousands of years the local white Bar River formation quartzite was a major resource, as it was used for making stone tools for nearly 10,000 years, and it is still mined today. The southeast part of this project borders into this area of white quartzite outcrops used for making stone tools, and several sites actually lie within the boundaries of the project area, however none really close to planned turbine locations (Figure 2).

2.3 Present and Past Environment of Area

Archaeologists also study the present and past environment to assist in predicting prehistoric site locations, including the landforms where sites may have been preserved and/or destroyed through time. This section will consider the biophysical environment around eastern Manitoulin Island.

The surficial geological and water level history for this area has been very dynamic, with major changes in shoreline locations through time. The entire area was glaciated prior to about 11,000 B.P., and then covered by Lake Algonquin between ca. 11,500 and 10,500 years ago. The water levels then subsided to uncover major portions of the island, but many areas (below about 225 meters) may have again been flooded at about 9,500 B.P. during the Early Mattawa flood (Lewis and Anderson 1989; Julig 2002). The upper parts of the project area became dry land after about 9,500 until about 5,500 B. P., when portions were again flooded by the rising Lake Nipissing stage, and then dries again after water levels decline by about 2000 years ago until the present. During much of this time the lower elevations were likely thick cedar and mixed deciduous forest.

With respect to the floral environment (forests) vegetation of the area is typical of deciduous-coniferous mixed forest of the Great Lakes-St. Lawrence forest region. These forests are common in areas of good to poor drainage depending on the local soil types. The area historically had large white pine (*Pinus strobus*) in the uplands, and various deciduous species in well-drained areas and tree species such as white cedar (*Thuja occidentalis*) and trembling aspen (*Populus tremuloides*) in the lowlands, and white pine and bur oak in the upland regions. Since there was selective harvesting of conifers in early logging operations and more recent logging of hardwoods sugar maple (*Acer saccharum*) and red oak (*Quercus rubra*), and other species, the forests in the study area are a mixture of many species. In addition to those species mentioned above there are minor amounts of the conifer species, balsam fur (*Abies balsamea*), eastern hemlock (*Tsuga canadensis*), and white spruce (*Picea glanca*), particularly along the shore and in

the lower areas. Other deciduous species scattered through the forest include white ash (*Fraxinus americana*), basswood *(Tilia americana*), elm (*Ulmus americana*) and birches (Betula sp.) In general the topographic lows are mostly cedars and aspen, while the uplands are predominantly hardwood deciduous species of maple, oak, ash and beech, with minor amounts of basswood and poplar. These are now excellent deer cover, and have changed greatly since more permanent settlement and farming, particularly in the past two centuries. Prior this area was more suitable for woodland caribou and moose, as the remains of two butchered caribou wee recovered at the Shawana site (Conway 1989).

The forests have also changed considerably in earlier times, from the Paleoindian period to the present, due to gradual climate change. Initially, after the waters subsided from Lake Algonquin at ca. 10,500 B.P., it was an open pine woodland with other conifer species such as cedar and balsam in the poorly drained areas and some deciduous in the better-drained areas. There was a cooling event related to the Lake Agassiz flood event, and the vegetation changed back to spruce dominance at ca. 9,500 B.P. (Julig 2002). From 8,000 years ago it warmed up, and white pine again became the dominant species, replacing red pine, jack pine and spruce (Julig 2002). Forest fires were common, thus the ecological cycles of vegetation succession would occur. Also, the changing levels of swamps have an effect on local vegetation and land use, which can be affected by climate change, as well as species such as beaver.

Faunal resources (animal species) on Manitoulin Island have likewise changed greatly through time, particularly during the historic period. Woodland caribou (*Rangifer tarandus*) were common on Manitoulin in the early historical and prehistoric times and became locally absent only in the past century. This herding species thrives on climax boreal forest, as they feed on the lichens in such environments. Caribou were likely a major food source of early populations, particularly Paleoindians (Julig 2002), since the early post glacial environment was suitable. The Shawana site dating to about 500 years ago has caribou faunal remains, and is believed to represent a fall butchering site.

White-tailed deer (*Odocoileus virginianus*) are browsing ruminants that prefer secondary growth areas, and as mentioned their numbers have expanded greatly since farming was introduced on Manitoulin Island. They were not common in prehistoric times, except further south. They can be taken in larger numbers when they "yard" in conifers in the winter months. They were an important food and leather source for native populations to the south. However, they were likely rare in the prehistoric past with the predominant climax white pine forests.

Other “big-game” cervid species such as moose (*Alces alces*) and wapiti or elk (*Cervus canadensis*) were also available at various times during the Holocene. During the early and middle Holocene from 10, 000 to 4,000 years ago, with changing water levels, there may have been abundant coastal habitat and land connections to other parts of Ontario, which would have promoted the dispersal of species such as elk. Moose and deer are not too compatible due to disease, and Manitoulin was probably more suitable for moose and caribou in prehistoric times then for elk and white-tailed deer, as they were absent to rare. Black bear was also widely used by natives in the central subarctic.

Native Algonquian populations in the Upper Great Lakes used all smaller species such as beaver, hare, woodchuck, raccoon, and muskrat. Beaver (*Castor canadensis*) was particularly important for boreal forest Algonquian groups such as the Ojibwa and Cree, who prized the fat meat with its high caloric value (Julig 1982). Birds were also

important food sources, including both waterfowl and other species, such as the now extinct passenger pigeon (*Ectopistes migratorus*). The migratory passenger pigeons feed on beech mast and other seeds from deciduous trees and stands of these species existed on Manitoulin.

Fish were the major food source for the Ojibwa, Odawa, Cree and other First Nation cultures in this area of the Great Lakes. Annual spawning runs in the spring and fall (depending on species) were times when large numbers were taken; however, they were procured year round with nets, hooks and spears. Species common to the study area and Georgian Bay include lake trout (*Salveninus namarycush*), lake white fish (*Coregonus upeaformus*), northern pike (*Esox lucius*), lake sturgeon (*Asipenser fulvescens*), as well as many others. Those species, which were naturally fatty, such as whitefish and lake trout, were preferred because of their higher caloric content; however, both large (sturgeon and lake trout) to smaller species (i.e. whitefish, suckers and bullheads) would provide valuable food resources in the area of east Manitoulin Island. Many of these fish species have been identified at Shawana site, from their bones.

Plant resources were likewise many and varied, used for foods, medicines, crafts and building and many other uses. Well over 100 species were used, and Manitoulin is particularly diverse with respect to plant life. The local environment supports species typical of the boreal forest, Great Lakes-St. Lawrence, as well as more southern species. The limestone alvars and uplands, typical of the study area, range from damp to very dry in the summer, and support many unusual and some rare species, some of which were traditional medicines.

This review of the biophysical environment and available subsistence resources indicated a region very rich in traditional wild resources. In fact, the north shore of Georgian Bay was the traditional homeland for the Ojibwa clans, with the Odawa occupying Manitoulin and other along the North Shore and eastern Lake Superior, and the Potawatomi were to the west in what is now upper Michigan. Fish and other resources were abundant in this part of the Great Lakes. Particularly favored site locations for the Woodland Algonquian cultures, such as the Amikwa, Missisauga, and various Odawa bands were near the Georgian Bay shoreline at major rivers and streams. The coasts and shores were most favored locations, with less use of the interior uplands, except for some hunting and gathering. Major campsites were normally near the water.

From this summary of previous sites and finds, environment and geomorphology, it is apparent that for this upland bluff survey area has relatively low potential for prehistoric and early historic sites. There are few permanent streams or lakes on this bluff (Figures 1 and 2), and most of the planned turbine sites are well above the ancient shoreline, which is a well developed geomorphic feature. Some parts of the upland bluff would have been an island in ancient Paleoindian times, when water levels were high. There may have been hunting of woodland caribou on these upland regions in more ancient times, as the remains of a butchered caribou were recovered at the Shawana site to the east.

The major archaeological attraction in the southeast part of the project area is the presence of the Bar River and Lorrain formation quartzite rock, which was excellent for making spear points, scrapers and other stone tools, and these natural quarries were used for thousands of years. Several sites are known from within the project area, but not specifically at or within any turbine location planned to date (Figure 2).

3.0 Field Visit to Development Property

As mentioned previously, evaluation of archaeological potential of specific landforms required a field visit, to determine if certain ridges along the crests of bluffs and "look-out" spots were sand or gravel, possibly eskers, or alternatively glacial till, and/or coastal ice-pushed features from ancient high water levels. In addition some of the turbine locations were in the vicinity of sand and gravel deposits (sand pits) below the bluff, warranting a visit to check archaeological potential. Representative views are shown below for some of these locations.

In total five locations were field checked as follows:
1. Access road to turbines 1, 2, 3, on McLean's Mountain, which appears to follow the crest of the look-out ridge, with sand deposits below ridge,
2. Access road and turbine location 4, following a ridge,
3. Access road and turbine location 5 at Morphet's Side Road,
4. Access road and turbine location 36, north of Bass Lake, with gravel pit below the bluff, and
5. Turbine locations 30, 34, and access road to turbines 42, 43 and 46, 49. These were at slightly lower elevations around 800-850 feet ASL, when Paleoindians were present in Eastern Manitoulin.

Figure 3. Typical upland terrain near turbine location 36, southern part of study area, showing old roadway along concession line, cedar and bur oak vegetation, and poor drainage with bedrock near the surface, with low archaeological potential.

Figure 4. Turbine location 34, above Honora Bay, view to west, at 850ft ASL, situated above the Korah beach ridge level. This area has been pastured, bedrock is near the surface, with no sand or gravel deposits, and archaeological potential is low.

Figure 5. Ridge on MacLean's Mountain where access road to turbine locations 1, 2, and 3 is planned. This ridge is clay and rock, suggesting a glacial till deposit.

Figure 6. View to northwest of Georgian Bay North Channel from **t**urbine location 2, on McLean's Mountain. The ridge is rock cored with a till veneer and little sand or gravel evident, indicating low archaeological potential.

4.0 Conclusions

In the boreal forest archaeological sites are often found within 300 meters of permanent water sources, particularly major lakes and rivers. Workshops for manufacture of stone tools (chipping of chert, quartz/quartzite, and slate) often occur where such geological outcrops of the raw material are found. In this Manitoulin Wind Farm development project, there were several moderate to high potential surfaces for archaeological sites in the southeastern art of the project, near the outcrops of white quartzite along Burnett's Side Road, where several sites (Giant site, Buttermilk Falls site) are present. However the turbine locations and access roads as presently planned, would not impact this area.

The majority of the development has relatively high topography, above the ancient Korah level beach, associated with Paleoindian sites on Manitoulin. The upland plateau is well removed from most permanent water sources, and there are few other natural features to be attractive for ancient campsites. There are no eskers or sand ridges across these high plateaus, they are quite flat, and we have found no sites on them in survey elsewhere on Manitoulin (Julig 2005).

The major permanent water body in the study area is Perch Lake; however no development is planned within 300 meters or more of this lake (Figure 2). There are several small streams, however most are ephemeral first-order streams that may dry out in late summer, and not suitable for fish spawning. There is some semi-permanent water

(wetlands) associated with the small streams, however this is not permanent water and the majority of the property has bedrock fairly near the surface. The one stream that is permanent runs from Perch Lake to Honora Bay (Figures 1, 2). An access road is planned across this stream, and if this is built in the future, this area of stream crossing should be checked (Stage 2 survey).

The final permanent water associated with this development is the transmission line crossing of the channel east of Little Current, to connect to the main line on Goat Island (Figure 1). The details and precise location of this connection are not yet fully planned, however if there are large towers erected or other soil disturbance then the locations on either side would require Stage 2 survey, as these are high potential shoreline locations.

5.0 Summary and Recommendations

The following is a summary of the archaeological assessment based on the various classes of information. Of these, the only confirmed factors to the Manitoulin Island wind farm development site is proximity to several existing archaeological sites in the southeast portion, near Burnett's Side Road, the white quartzite bedrock outcrops used for stone tool manufacture, and several water crossing locations.

1. The majority of the project area has low archaeological potential, and well removed above most permanent water, is mostly high plateau with near surface bedrock, has no evidence of eskers or similar features, and the vast majority of the area does not contain useable toolstone.
2. The stream draining Perch Lake to Honora Bay is permanent water, has moderate to high archaeological potential, and if an access road is built across, a Stage 2 survey and test-pitting is required.
3. The transmission line crossing east of Little Current may require excavation for transmission towers, and Stage 2 survey, as noted above.
4. In conclusion, because Stage 1 assessment has indicated that three predictors for high potential for archaeological sites are present, namely proximity to several existing sites and suitable toolstone deposits, and two locations with permanent water, some Stage Stage 2 investigations of those areas are recommend if development proceeds.
5. Although this study has found low archaeological potential for much of this property, there is always the possibility of buried deposits. If artifacts or human remains are found in the course of excavation of the property the appropriate authorities should be contacted.

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December 23, 2009

RE: Project Information Number P-100 -016-2009, Stage 1 Assessment of Manitoulin Island Wind Farm

Dear Licence Administrator,

Enclosed please find four copies of the licence report for Project Number P-100 -016-2009, Stage 1 Assessment of Manitoulin Island Wind Farm. We trust that you will find this satisfactory.

The client, Dillon Consulting (address in report) is requesting that you review and comment on this report as soon as possible.

Thank you very much,

Patrick Julig Lic.# P-100

CC. Dillon Consulting
235 Yorkland Blvd.
Suite 800
Toronto, ON. M2J 4Y8

Ministry of Culture

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Ministère de la Culture

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Ontario

January 15, 2010

Dr P. Julig
Archaeology Survey of Laurentian University
Sudbury, ON

Dear Pat,

Re: Review and acceptance into the provincial register of reports the archaeological assessment report entitled "Report on Stage 1 Archaeological Assessment fo the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Islands" written June 2009, received on December 30, 2009
PIF: P100-016-2009
RIMS: HD00045

This office has reviewed the above-mentioned report, which has been submitted to this Ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. This review is to ensure that the licensed professional consultant archaeologist has met the terms and conditions of their archaeological licence, that archaeological sites have been identified and documented according to the 1993 technical guidelines set by the Ministry and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario.

This Stage 1 background study has identified various areas of archaeological potential within the development area. It is recommended that a Stage 2 field assessment is required for those areas identified in the report. The Ministry of Culture concurs with the report recommendations and accepts this report into the provincial register of archaeological reports.

Please contact me with any concerns regarding this matter.

Yours

Paige Campbell
Acting Archaeology Review Officer
cc Dillon Consulting

STAGE 2 ARCHAEOLOGICAL ASSESSMENT
McLEAN'S MOUNTAIN WIND FARM
Part Lots 13-16, Concession 1
Part Lots 12-14, Concession 2
Geographic Township of Howland
Northeastern Manitoulin Island (NEMI)
District of Manitoulin
Original Report

F-000522-WIN-130-601, F-000520-WIN-130-601

Prepared for

Northland Power
and
Ministry of Tourism and Culture

SCARLETT JANUSAS
ARCHAEOLOGICAL AND HERITAGE
CONSULTING AND EDUCATION
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Previous Licenses for areas within 50 m P027-093-2010 Stage 2
P027-140-2011 Stage 2, P100-016-2009 Stage 1

License # P027, PIF #P027-142-2011
July 3, 2011

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Project Personnel

Project Manager Principal Archaeologist, And Report Preparation	Scarlett Janusas (P027)
Assistant Field Director	Chelsea Robert
Field Crew	Rachel Boniface Angela Holmes Megan Powers Amelia Sweiger Virginia Sweiger

Acknowledgments

Scarlett Janusas Archaeological and Heritage Consulting and Education extend our thanks to Mr. Rick Martin of Northland Power for showing us the site and for ensuring that we had the correct alignment of the access roads, delineating the site in the field, and for all his support throughout the project. We also extend our thanks to Kirsten, also of Northland Power, who provided support throughout the project.

Executive Summary

The proponent, Northland Power, retained the services of Scarlett Janusas Archaeological and Heritage Consulting and Education (SJAHCE) to conduct a Stage 2 archaeological resource assessment on new site layouts for two access roads for the McLean Mountain Wind Farm. The access roads will service turbine locations T29 and T34. The access roads cut across part of Lots 13-16, Concession 1 and part of Lots 12-14, Concession 2, geographic Township of Howland, Northeastern Manitoulin and the Islands (NEMI). The access roads were 10 m in width and part of the area traverses and existing farm roadway.

The archaeological assessment was triggered by the Green Energy Act.

A Stage 1 archaeological assessment of a large area encompassing the areas of proposed access road changes was conducted by the Archaeological Survey of the Laurier University in 2009. A Stage 2 archaeological assessment of turbine areas, staging areas, access roads and transmission corridors was conducted by SJAHCE in 2010.

The current Stage 2 archaeological assessment of the study property was conducted under license P027 (Scarlett Janusas, PIF #P027-142-2011) on June 27th, 2011 with good to excellent assessment conditions. None of the area could be ploughed and was therefore subject to a test pitting methodology conducted along the 10 m wide access road in two lines spaced 3 metres apart. The linear length was tested in standard 5 m intervals.

No cultural material was located during the Stage 2 archaeological assessment.

The following is therefore recommended:

- With respect to this specific study area related to the access to, and construction of the access roads which will service turbines 29 and 34 (see Figures 3 and 4 for exact location details), no further archaeological assessment is required.
- It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Registry or Archaeology Reports referred to in Section 65.1 of the Ontario Heritage Act.
- Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.

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

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism and Culture, 2011).

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

STAGE 2 ARCHAEOLOGICAL ASSESSMENT
McLEAN'S MOUNTAIN WIND FARM
Part of Lots 13-16, Concession 1
Part of 12-14, Concession 2
Geographic Township of Howland
Northeastern Manitoulin and Islands (NEMI)
District of Manitoulin
Original Report

1.0 PURPOSE – Development Context

The proponent retained the services of Scarlett Janusas Archaeological and Heritage Consulting and Education (SJAHCE) to conduct a Stage 2 archaeological resource assessment on a proposed realignment of two access roads in the McLean Mountain Wind Farm project. Both access roads originate from Townline Road and follow an existing farm lane, where they then split: one goes to the area of Turbine 29, and the other goes to the area of Turbine 34. The access road crosses part of Lots 13 – 16, Concession 1, and, part of Lots 12-14, Concession 2, in the geographic Township of Howland. Only those areas of archaeological potential along the proposed access routes were subject to archaeological assessment. Figures 1 and 2 illustrate the general location of the study areas, and Figures 3 and 4 illustrates the location of the proposed two access roads. In addition, an alternative to the south of the most northern access road, is a gravel ridge. Only areas of archaeological potential were assessed.

Access roads were 10 metre widths and differed in length depending on the location (see Figure 3 and 4).

The archaeological assessment was triggered by the Green Energy Act. The FIT numbers for this project are: F-000522-WIN-130-601, and F-000520-WIN-130-601.

A Stage 1 archaeological assessment of the entire McLean Mountain Wind Farm area was conducted by the Archaeological Survey of Laurentian University in 2009 (PIF P100-016-2009). A Stage 2 archaeological assessment of the former layout and areas of archaeological potential was conducted in 2010 by SJAHCE (P027-093-2010). A Stage 2 archaeological assessment was conducted in May 2011 for the realignment of three access roads and one easement. The assessment was conducted by SJAHCE in 2011 (P027-140-2011). The current Stage 2 archaeological assessment is conducted under PIF P027-142-2011.

The current Stage 2 archaeological assessment was conducted under license P027 held by Scarlett Janusas on June 27th, 2011 under excellent conditions (high of 24 degrees C and sunny).

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consulting Archaeologists (Ministry of Tourism and Culture, 2011).

Figure 1
Location of Project in Northern Ontario

Figure 2
Location of Project Area on Manitoulin Island

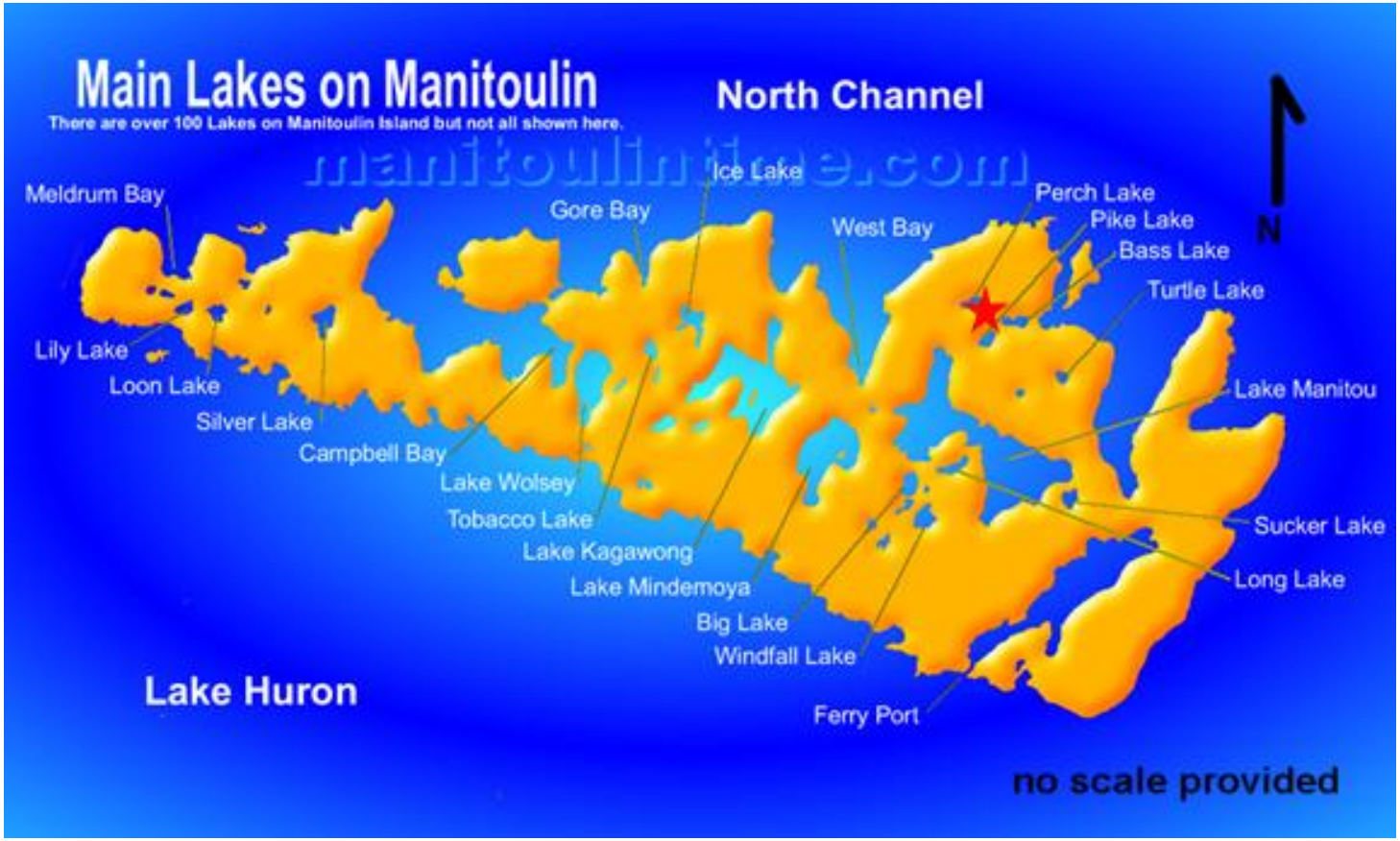


Figure 3
Location of Proposed Access Roads

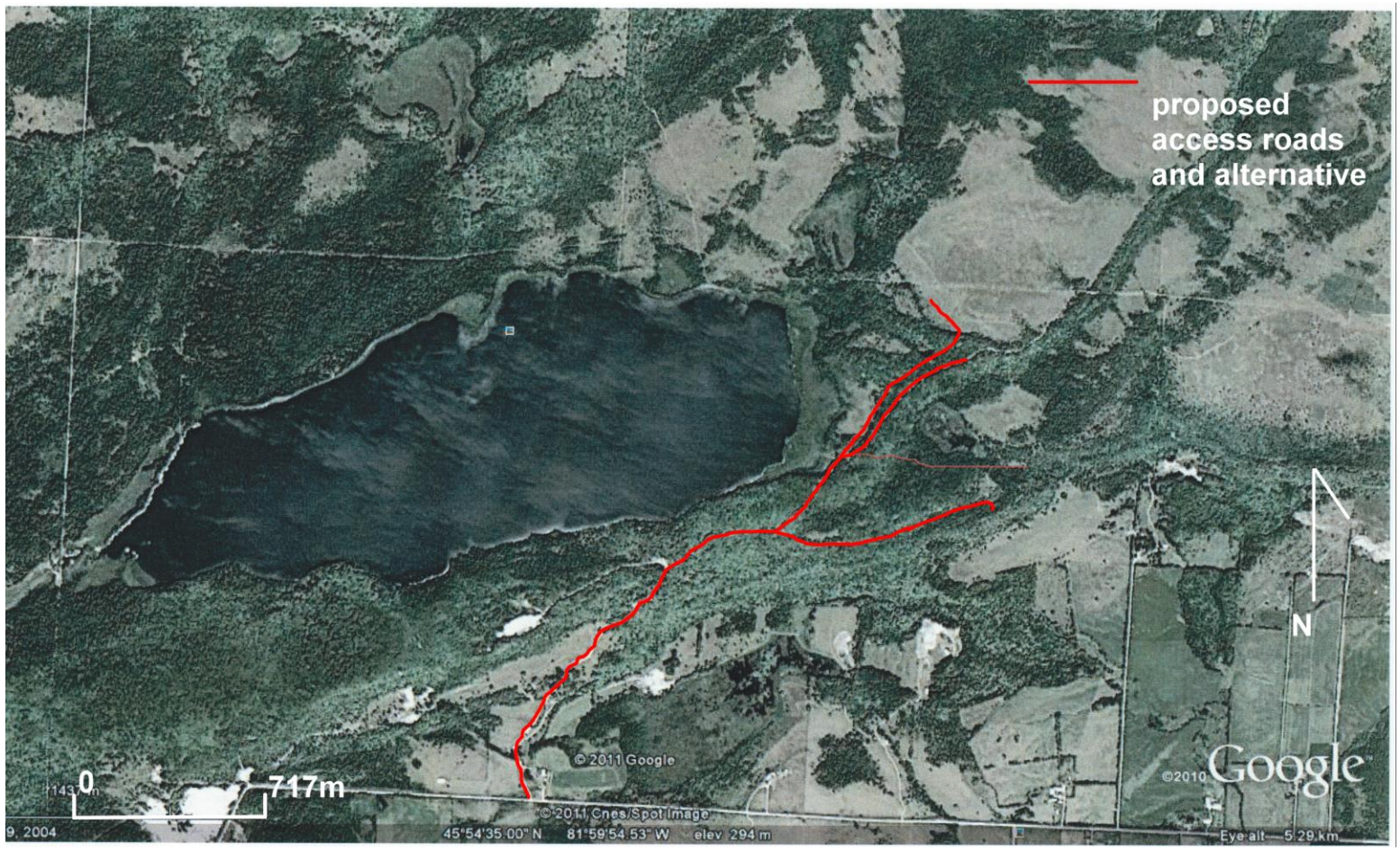
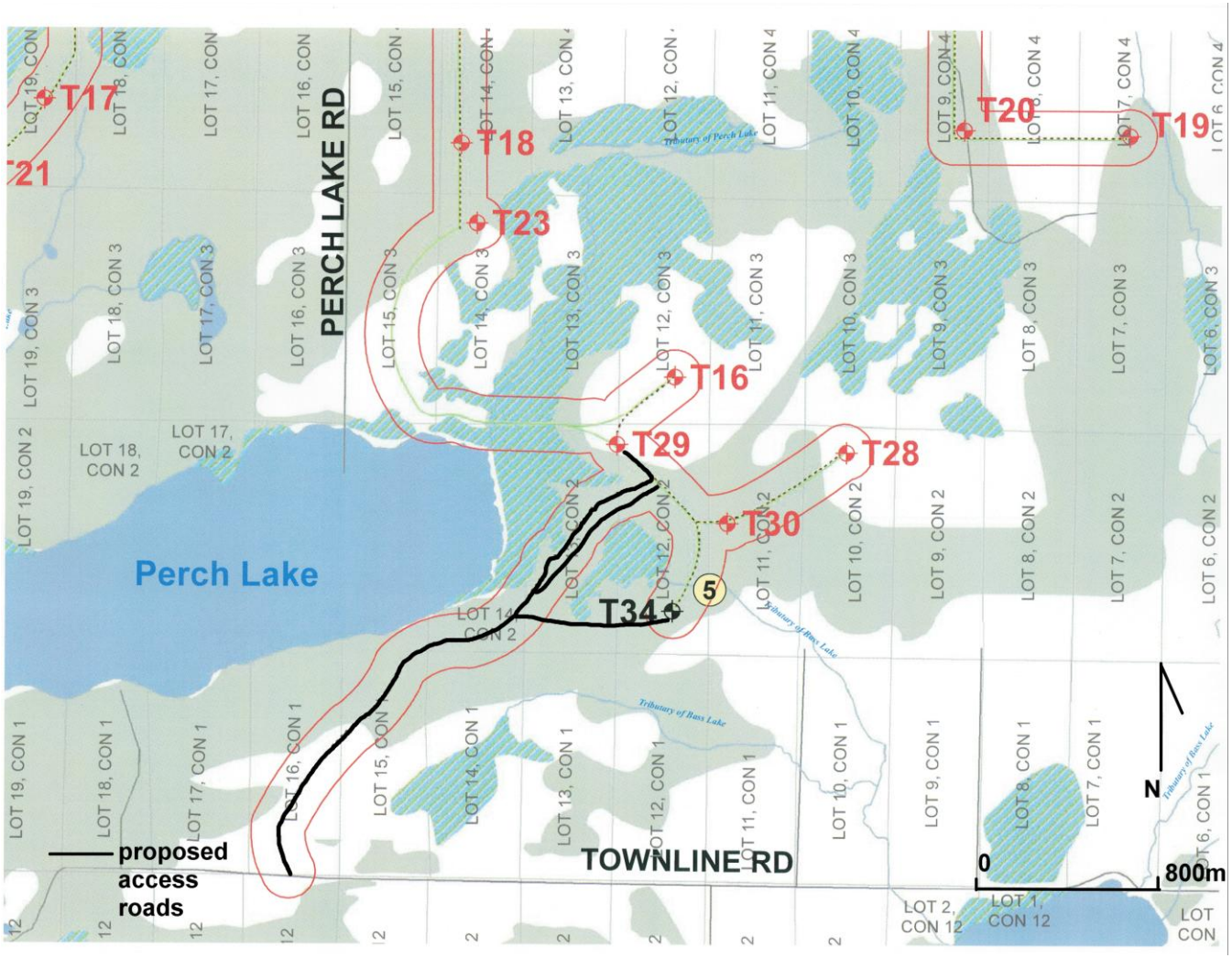


Figure 4
Proposed Access Roads to Turbines 29 and 34



This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2.0 Study Methods

2.1 Stage 1 Summary (Background Research)

A summary of the background research and recommendations are presented below from the 2009 Stage 1 background research report prepared by Archaeological Survey of Laurentian University (2009:21):

1. The majority of the project area has low potential, and well removed above most permanent water, is mostly high plateau with near surface bedrock, has no evidence of eskers or similar features, and the vast majority does not contain useable toolstone.
2. The stream draining Perch Lake to Honora Bay is permanent water, has moderate to high archaeological potential, and if an access road is built across, a Stage 2 survey and test pitting is required.
3. The transmission line crossing east of Little Current may require excavation for transmission towers, and a Stage 2 survey, as noted above.
4. In conclusion, because Stage 1 assessment has indicated three predictors for high potential for archaeological sites…, namely proximity to several existing sites and suitable toolstone deposits, and two locations with permanent water, some Stage 2 investigations of those areas are recommend [sic] if development proceeds.

SJAHCE determined that based on the proximity of the wetlands, Perch Lake, intermittent streams, small plateaus, a gravel ridge, and an escarpment face; parts of the access road realignment were subject to Stage 2 archaeological assessment.

2.2 Stage 2 (Field Assessment)

None of the areas archaeologically assessed were agricultural properties that could be ploughed. The areas either consisted of pasture with high rock content, with bedrock very close to the surface, exposed bedrock, scrub areas, or woodlot. Assessment therefore consisted of using a test pitting methodology, conducted in 5 metre intervals.

Test pits were a minimum of 30 cms in diameter and were excavated either to refusal (bedrock) or into 5 cms of sterile subsoil. If features were encountered, during the test pitting, no deeper testing was done but the feature recorded and photographed (no features were encountered). Soils from the test pits were screened through 6 mm mesh, and holes were backfilled. Each test pit was examined for stratigraphy and presence of cultural features.

If any positive test pits were encountered (that is, containing archaeological artifacts or cultural features), and it was not obvious that the find would proceed to a Stage 3 assessment, 8 additional test pits spaced at no more than 2 m intervals from the positive test pit would be used to assess the positive find and a one metre square excavated over the positive test pit. If sufficient positive test pits were found in the normal 5 m grid pattern to warrant proceeding to Stage 3, the above was not conducted.

Finds from the test pitting assessment were recorded using a GARMIN GPSmap 60CSx, with an accuracy of 2 m or less. Photographic documentation of field conditions and finds were maintained throughout the project, in addition to field notes. Any artifacts recovered were bagged and tagged according to provenience, tied to a permanent datum, and returned to the lab for processing.

3.0 RESULTS

The following discusses each of the three areas of archaeological assessment. Permission to access the properties and recover artifacts should any be located was provided by the proponent prior to the assessment. Assessment was conducted on June 27th, 2011. The weather was warm and sunny with a high of 24° C. Conditions were deemed good to excellent for purposes of archaeological assessment.

3.1 Townline Road to Turbine 29 Access Road

The access road begins at Townline Road for both Turbines 29 and 34, and then divides further to the north. For purposes of this study, the proposed access road is assigned to Turbine 29. Approximately 40% of the proposed access road follows and existing farm roadway (Photograph 1). This roadway is approximately 3 metres in width for most of its length, although there are areas along a steep embankment where the roadway is 5 to 6 metres in width (Photograph 2). Two lines on either side of the laneway were subject to test pitting conducted in 5 metre intervals. Only those areas deemed to exhibit archaeological potential were assessed. For example, there is a farm pond located near Townline Road, and this area was assessed. Along a plateau area, there was a small intermittent stream, and the area 50 m on either side of this area, and including the plateau area, were assessed in 5 m intervals (Photograph 3). The area near a wet meadow was assessed in 5 m intervals (Photograph 4). Areas where a small isolated elevation occurred were also subject to test pitting assessment. Areas within 50 m of any wetlands or other water bodies were also assessed using a test pitting methodology. Test pits ranged in depth from 10 to 25 cms, and were either gravelly or organic topsoil. No cultural materials were located during the test pitting survey.

Photograph 1
Test Pitting Near Townline Road facing South

Photograph 2
Widening of Road facing Southwest

Photograph 3
Area of Intermittent Stream and Small Plateau facing Northeast

Photograph 4
Test Pitting Adjacent to Wet Meadow facing Southwest

3.2 Alternative Access Road – Gravel Ridge

An agent for the proponent accompanied SJAHCE for most of the archaeological assessment, ensuring that the correct access route was being archaeologically assessed. The agent requested that the gravel ridge, which parallels part of the access road to Turbine 29, also be subject to archaeological assessment. The gravel ridge runs at a higher elevation than areas to the northwest or southeast of it. The ridge is used as a snowmobile/recreational vehicle trail. Two lines were established at a distance of 4 metres from each other, and test pits followed the standard 5 m interval grid. Photograph 5 illustrates testing along the ridge. The test pits were gravelly in nature, and no deeper than 18 cms. No cultural materials were located during the assessment of this ridge.

Photograph 5
Test Pitting along Gravel Ridge facing Northeast

3.3 Access Road Cut Off to Turbine 34

The route was well flagged for the access road, and for some distance paralleled a limestone scarp face (top side of the scarp). Testing was conducted only along the scarp face as it was the only area of archaeological potential (Photograph 6). Test pits were shallow with bedrock being close to the surface. No cultural materials were located during the archaeological assessment of this area.

Photograph 6
Test Pitting Adjacent to Scarp

Table 1 presents the UTM locations of the photographs. Figure 5 illustrates the locations of the photographs and their orientation.

Table 1
UTM Coordinates for Photographs

Photograph Number	UTM Coordinates	Direction of Photograph
1		Southeast
2		Southeast
3		Northeast
4		Easterly
5		Northeast
6		West

Figure 5
Location of Photographs

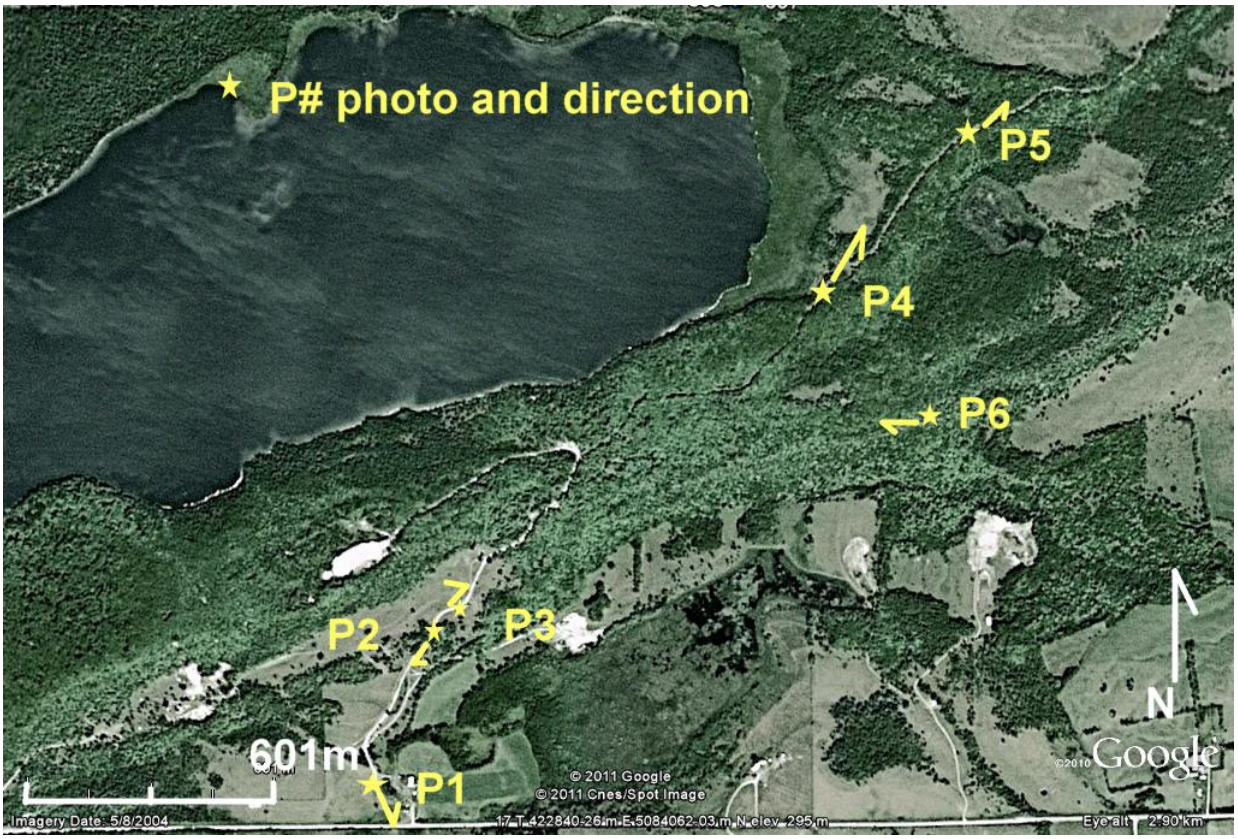
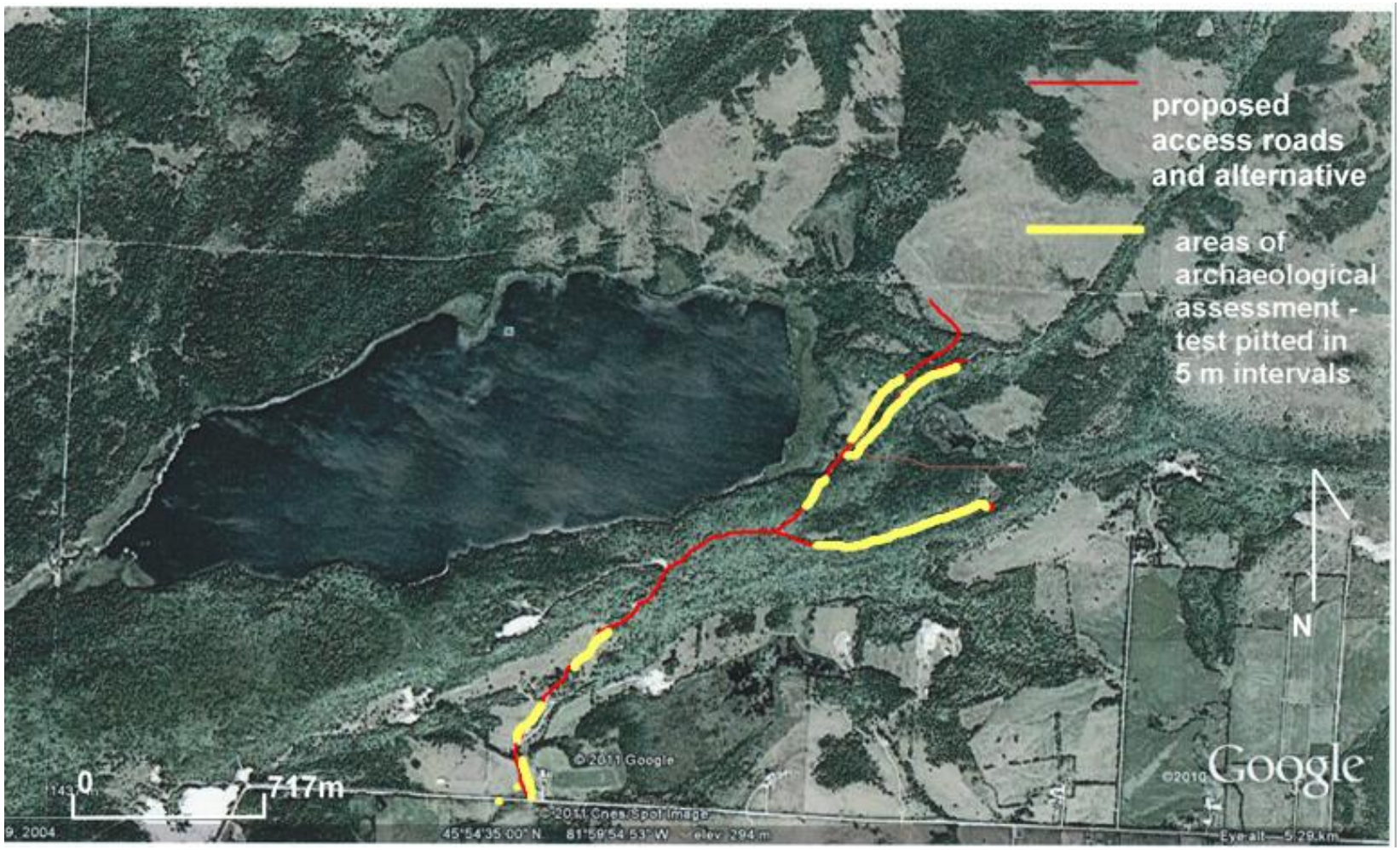


Figure 6 illustrates the areas of archaeological assessment and methodology.

Figure 6
Assessment Area and Methodology



4.0 RECOMMENDATIONS

No cultural material was located during the Stage 2 archaeological assessment.

The following is therefore recommended:

- With respect to this specific study area related to the access to, and construction of the access roads which will service turbines 29 and 34 (see Figures 3 and 4 for exact location details), no further archaeological assessment is required.
- It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Registry or Archaeology Reports referred to in Section 65.1 of the Ontario Heritage Act.
- Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.
- The Cemeteries Act, R.S.O. 1990 c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism and Culture, 2011).

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

5.0 REFERENCES CITED AND CONSULTED

Archaeological Survey of Laurentian University
2009 Report on Stage 1 Archaeological Assessment of the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Island. P-100-016-2009. On file with the Ministry of Tourism and Culture, Public Registry.

Government of Ontario
2009 **The Green Energy Act.**

1990a **The Ontario Heritage Act R.S.O. 1990.** Ontario Regulation 9/06, made under the Ontario Heritage Act. Criteria for Determining Cultural Heritage Value or Interest. Queen's Printer, Toronto.

1990b **The Environmental Assessment Act. R.S.O. 1990, C. E18.**

1990c **The Planning Act. R.S.O. 1990.**

Ministry of Culture
2004 Draft Standards and Guidelines for Consulting Archaeologists. Ministry of Culture.

Ministry of Tourism and Culture
2011a **Standards and Guidelines for Consulting Archaeologists.** Ministry of Tourism and Culture.

Scarlett Janusas Archaeological and Heritage Consulting and Education
2010 Stage 2 Archaeological Resource Assessment McLean's Mountain Wind Farm, Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8, Part of Lot 20, Concession 11; Part of Lo t9, Concession 6; Part of Lots 7-8, Concession 5; Part of Lot 7, Concession 4; Part of Lot s11-13, Concession 2; Part of Lot 14, Concession 3; Part of lot 19-20, Concession 4; Part of Lot 31, Concession 1; Part of Lots 22,-23,25-26, Concession 12, Geographic Township of Howland, Northeastern Manitoulin and the Islands (NEMI), District of Manitoulin. P027-093-2010. On file with Ministry of Tourism and Culture.

2011a Stage 2 Archaeological Resource Assessment McLean's Mountain Wind Farm Addendum. Received by MTC January 26, 2011. On file with Ministry of Tourism and Culture.

2011b Stage 2 Archaeological Assessment, McLean's Mountain Wind Farm, Part Lots 12-15, Concession 3, Geographic Township of Howland, Part Lot 24, Concession 12, Geographic Township of Bidwell and Goat Island (formerly known as Mink Island area), Northeastern Manitoulin and the Islands (NEMI), District of Manitoulin. P027-140-2011. Submitted to Ministry of Tourism and Culture.

STAGE 2 ARCHAEOLOGICAL ASSESSMENT
McLEAN'S MOUNTAIN WIND FARM
Part Lots 12-15, Concession 3
Geographic Township of Howland
Part Lot 24, Concession 12
Geographic Township of Bidwell and
Goat Island (formerly known as Mink Island area)
Northeastern Manitoulin Island (NEMI)
District of Manitoulin

Original Report
F-000522-WIN-130-601, F-000520-WIN-130-601

Prepared for
Northland Power
and
Ministry of Tourism and Culture

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Previous Licenses for areas within 50 m P027-093-2010 Stage 2
P100-016-2009 Stage 1
License # P027, PIF #P027-140-2011
July 3, 2011

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Project Personnel

Project Manager Principal Archaeologist, And Report Preparation	Scarlett Janusas (P027)
Assistant Field Director	Chelsea Robert
Field Crew	Rachel Boniface Angela Holmes Megan Powers Amelia Sweiger Virginia Sweiger

Acknowledgments

Scarlett Janusas Archaeological and Heritage Consulting and Education extend our thanks to Mr. Rick Martin of Northland Power for arranging transportation and access to the site areas, for delineating the location of the proposed new access road alignment, and for all his support throughout the project. We also extend our thanks to Kirsten of Northland Power for her support and assistance throughout the project.

Executive Summary

The proponent, Northland Power, retained the services of Scarlett Janusas Archaeological and Heritage Consulting and Education (SJAHCE) to conduct a Stage 2 archaeological resource assessment on new site layouts for two access roads for the McLean Mountain Wind Farm. A new access road is being proposed north of Perch Lake, across Lots 12-15, Concession 3, in the geographic township of Howland. Two new access roads were proposed east and south of Perch Creek, across Lot 24, Concession 12 in the geographic township of Bidwell. In addition, a proposed easement corridor was proposed for Goat Island (formerly known as the Mink Island Area). The access roads were 10 m in width. The width of the easement was 31 m, but was widened to 40 m for archaeological assessment purposes. The study area is part of Northeastern Manitoulin and Islands (NEMI) in the District of Manitoulin.

The archaeological assessment was triggered by the Green Energy Act.

A Stage 1 archaeological assessment of a large area encompassing the areas of proposed access road changes was conducted by the Archaeological Survey of the Laurier University in 2009. A Stage 2 archaeological assessment of turbine areas, staging areas, access roads and transmission corridors was conducted by SJAHCE in 2010.

The current Stage 2 archaeological assessment of the study property was conducted under license P027 (Scarlett Janusas, PIF #P027-140-2011) on May 16th, 2011 with good to excellent assessment conditions. None of the affected areas could be ploughed and were therefore subject to a test pitting methodology conducted along the 10 m wide access road in two lines spaced 3 metres apart. The linear length was tested in standard 5 m intervals. The proposed easement was subject to test pitting of areas of scrub and the remaining area was exposed bedrock which was subject to pedestrian transect. The easement was assessed in 5 m intervals.

No cultural material was located during the Stage 2 archaeological assessment.

The following is therefore recommended:

- With respect to this specific study area related to the access to, and construction of the access roads north of Perch Lake and east and south of Perch Creek (refer to Figure 3 and 4 for location details), and for the proposed easement (refer to Figure 5), no further archaeological assessment is required.
- It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Registry or Archaeology Reports referred to in Section 65.1 of the Ontario Heritage Act.

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This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism and Culture, 2011).

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

STAGE 2 ARCHAEOLOGICAL ASSESSMENT
McLEAN'S MOUNTAIN WIND FARM
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Geographic Township of Howland
Part of Lot 24, Concession 12
Geographic Township of Bidwell
Goat Island (formerly known as Mink Island area)
Northeastern Manitoulin and Islands (NEMI)
District of Manitoulin
Original Report

1.0 PURPOSE – Development Context

The proponent retained the services of Scarlett Janusas Archaeological and Heritage Consulting and Education (SJAHCE) to conduct a Stage 2 archaeological resource assessment on a proposed realignment of three access roads in the McLean Mountain Wind Farm project. The first access road is located north of Perch Lake, and the remaining two access road realignments are located east and south of Perch Creek. The Perch Lake access road runs across (on an east-west alignment) part of Lots 12-15, Concession 3 in the geographic Township of Howland. The Perch Creek access roads (n=2) realignment run across part of Lot 24, Concession 12, in the geographic Township of Howland. In addition, a proposed easement was assessed on Goat Island (formerly known as Mink Island area), which is located northeast of the town of Little Current. Figures 1 and 2 illustrate the general location of the study areas, and Figures 3-5 illustrate the location of the proposed access roads and easement.

Access roads were 10 metre widths and differed in length depending on the location (see Figures 3-5). The easement is 31.5 metres in width. The adjacent (west side) area noted on Figure 5 was subject to a Stage 2 assessment by SJAHCE (P027-093-2010) in 2010. No cultural materials were located during that assessment. For purposes of this current assessment, a width of 40 metres was subject to assessment to capture a small area between the proposed transmission corridor and the possible easement.

The archaeological assessment was triggered by the Green Energy Act. The FIT numbers for this project are: F-000522-WIN-130-601, and F-000520-WIN-130-601.

A Stage 1 archaeological assessment of the entire McLean Mountain Wind Farm area was conducted by the Archaeological Survey of Laurentian University in 2009 (PIF P100-016-2009). A Stage 2 archaeological assessment of the former layout and areas of archaeological potential was conducted in 2010 by SJAHCE (P027-093-2010). The current Stage 2 archaeological assessment is conducted under PIF P027-140-2011.

The current Stage 2 archaeological assessment was conducted under license P027 held by Scarlett Janusas on May 16, 2011 under excellent conditions (high of 9 degrees C cool and windy.

Figure 1
Location of Project in Northern Ontario

Figure 2
Location of Project Area on Manitoulin Island

Figure 3
Location of Access Road Realignment North of Perch Lake

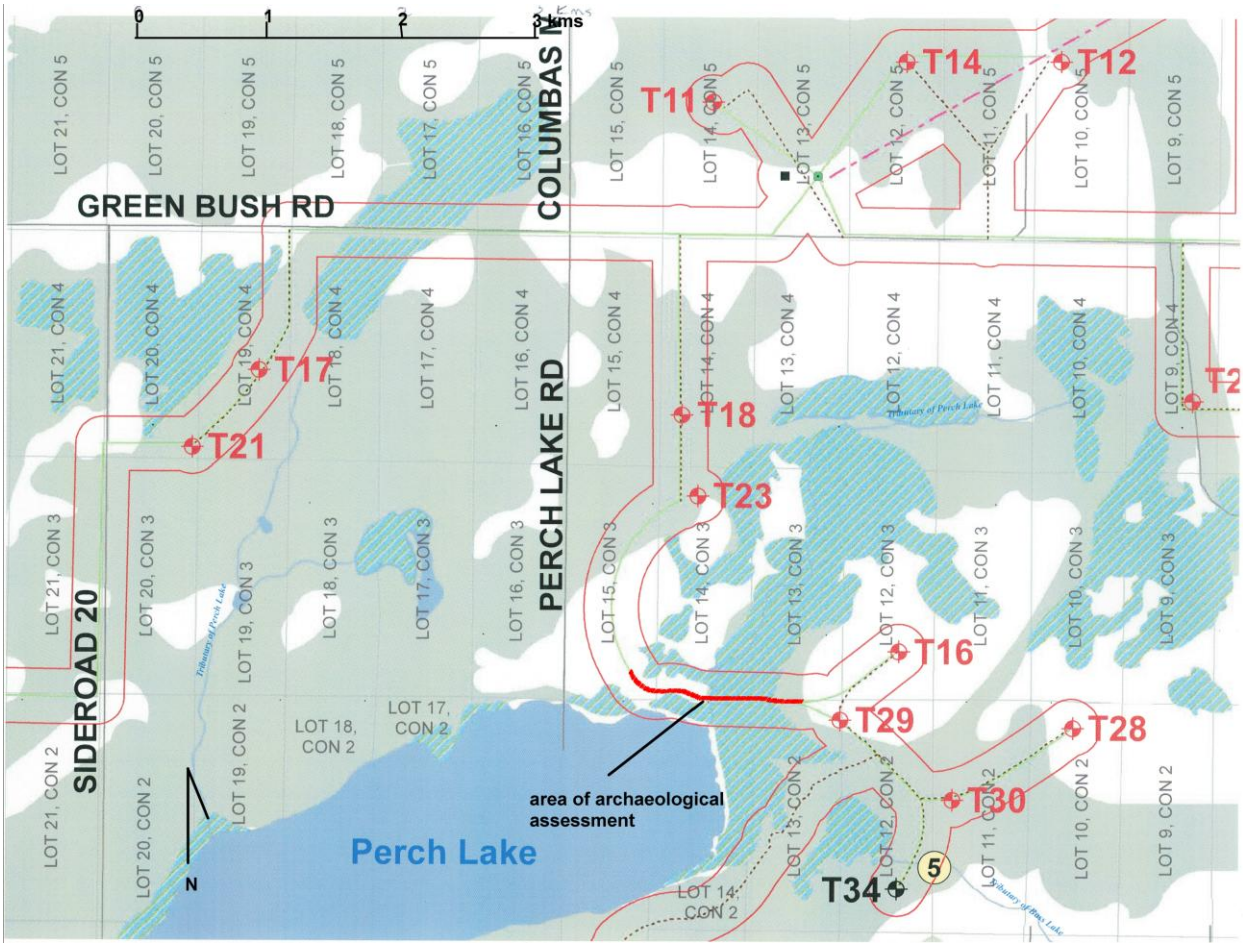


Figure 4
Location of Access Road Realignment East of Perch Creek

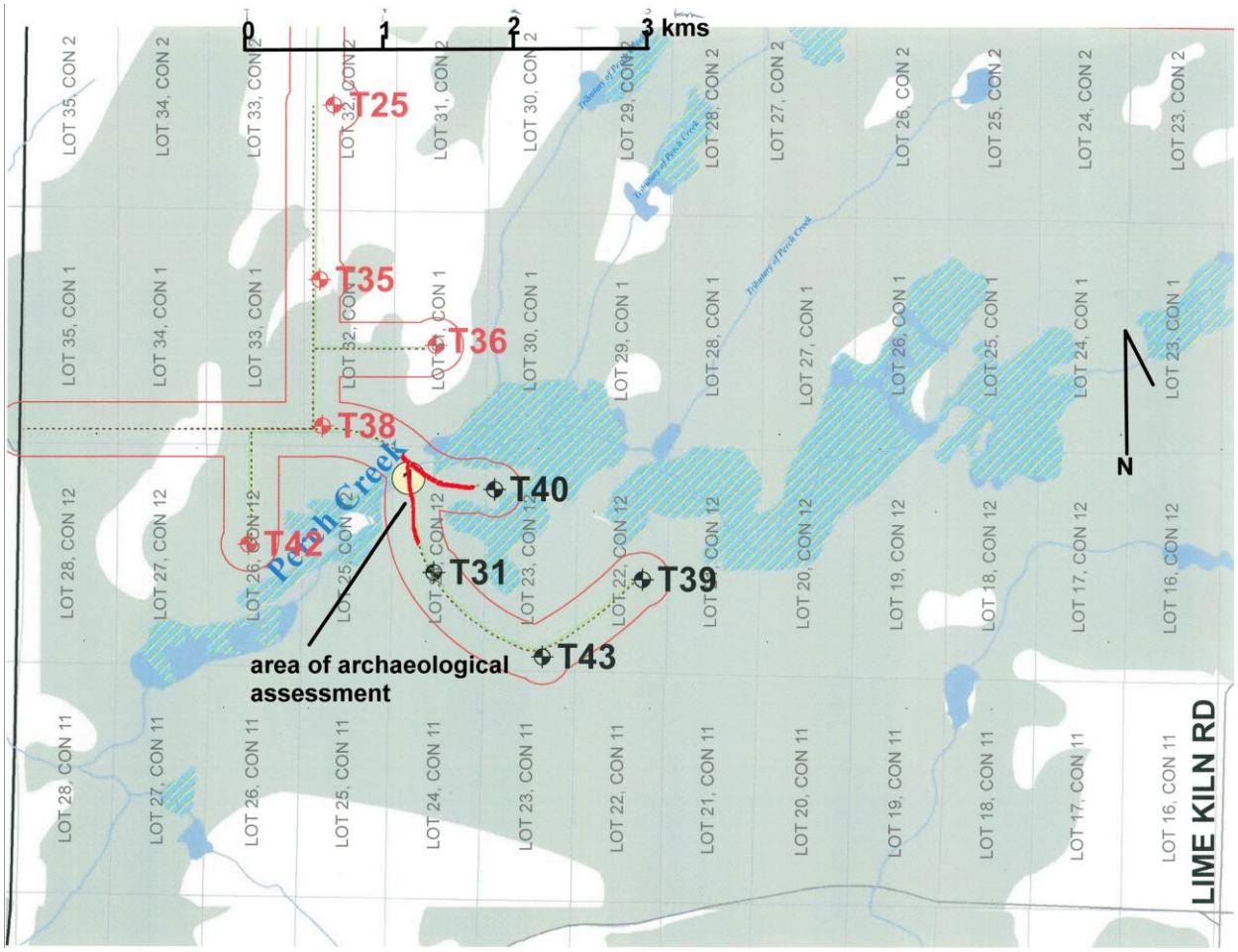
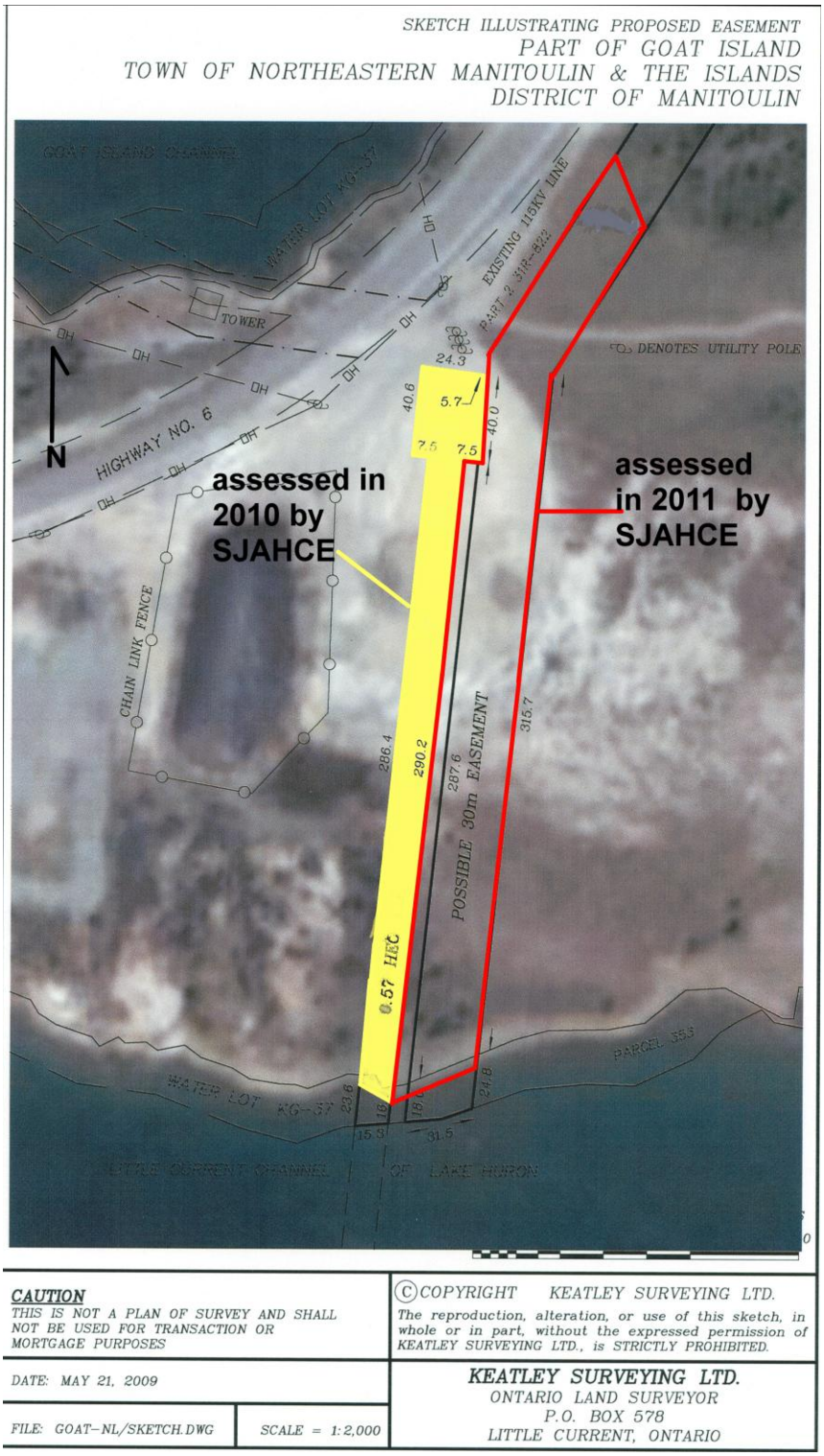


Figure 5
Proposed Easement on Goat Island



CAUTION
THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR TRANSACTION OR MORTGAGE PURPOSES

DATE: MAY 21, 2009

FILE: GOAT–NL/SKETCH.DWG

SCALE = 1:2,000

KEATLEY SURVEYING LTD.
ONTARIO LAND SURVEYOR
P.O. BOX 578
LITTLE CURRENT, ONTARIO

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consulting Archaeologists (Ministry of Tourism and Culture, 2011).

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2.0 Study Methods

2.1 Summary of Stage 1 (Background Research)

A summary of the background research and recommendations are presented below from the 2009 Stage 1 background research report prepared by Archaeological Survey of Laurentian University (2009:21):

1. The majority of the project area has low potential, and well removed above most permanent water, is mostly high plateau with near surface bedrock, has no evidence of eskers or similar features, and the vast majority does not contain useable toolstone.
2. The stream draining Perch Lake to Honora Bay is permanent water, has moderate to high archaeological potential, and if an access road is built across, a Stage 2 survey and test pitting is required.
3. The transmission line crossing east of Little Current may require excavation for transmission towers, and a Stage 2 survey, as noted above.
4. In conclusion, because Stage 1 assessment has indicated three predictors for high potential for archaeological sites…, namely proximity to several existing sites and suitable toolstone deposits, and two locations with permanent water, some Stage 2 investigations of those areas are recommend [sic] if development proceeds.

SJAHCE determined that based on the proximity of the wetlands, Perch Creek, Perch Lake and the water between Little Current and Goat Island (North Channel), parts of the access road realignment and easement were subject to Stage 2 archaeological assessment.

2.2 Stage 2 (Field Assessment)

None of the areas archaeologically assessed were agricultural properties that could be ploughed. The areas either consisted of pasture with high rock content, with bedrock very close to the surface, exposed bedrock, or scrub areas. Assessment therefore consisted of using a test pitting methodology, conducted in 5 metre intervals. Along the access roads, which will have a 10 m wide configuration, 2 lines spaced three metres apart were test pitted to ensure satisfactory coverage of the entire access road. The area of the easement was larger and was subject to test pitting in areas of scrub in 5 metre intervals. The remaining areas of the easement were exposed bedrock and these areas were assessed using a pedestrian transect interval conducted in 4 m intervals, and 3 m intervals along the shoreline.

Test pits were a minimum of 30 cms in diameter and were excavated either to refusal (bedrock) or into 5 cms of sterile subsoil. If features were encountered, during the test pitting, no deeper testing was done but the feature recorded and photographed (no features were encountered). Soils from the test pits were screened through 6 mm mesh, and holes were backfilled. Each test pit was examined for stratigraphy and presence of cultural features.

If any positive test pits were encountered (that is, containing archaeological artifacts or cultural features), and it was not obvious that the find would proceed to a Stage 3 assessment, 8 additional test pits spaced at no more than 2 m intervals from the positive test pit would be used to assess the positive find and a one metre square excavated over the positive test pit. If sufficient positive test pits were found in the normal 5 m grid pattern to warrant proceeding to Stage 3, the above was not conducted.

In the case of positive finds found during pedestrian transect survey, a 20 m radius from the findspot would be subject to additional assessment conducted in 1 m intervals. All finds, both from test pitting or pedestrian transect assessment, were recorded using a GARMIN GPSmap 60CSx, with an accuracy of 2 m or less. Photographic documentation of field conditions and finds were maintained throughout the project, in addition to field notes. Any artifacts recovered were bagged and tagged according to provenience, tied to a permanent datum, and returned to the lab for processing.

3.0 RESULTS

The following discusses each of the three areas of archaeological assessment. Permission to access the properties and recover artifacts should any be located was provided by the proponent prior to the assessment. Assessment was conducted on May 16th, 2011. The weather was cool, high of 9° C, and sunny. Conditions were deemed good to excellent for purposes of archaeological assessment.

3.1 Perch Lake Access Road

The Perch Lake access road was accessed using ATV's. Areas within 50 m of Perch Lake or any wetlands or other water bodies were assessed using a test pitting methodology. The length of the access road subject to archaeological assessment was approximately 1.5 kms long. No cultural materials were located during the test pitting survey.

The study area was generally level, and was intersected by two small freshets cutting across the access road to Perch Lake. The area was pasture with high rock content. Test pits were approximately 15 cms in depth, and the subsoil was either clay or bedrock. At the eastern end of the study area, a gate and fencing delineated a change in topography, from level (west) to a gradual rise in elevation (east). On the east side of the gate was a small culvert for diverting a small stream to Perch Lake. The disturbance in this area was minimal, and still subject to test pitting. The access road along the elevated area of the property also served as an existing snowmobile and recreational trail. The remnants of a snake rail fence were located along the south side of the trail.

Photographs 1 – 4 illustrate the access road/study area.

Photograph 1
Facing East along Access Road

Photograph 2
Facing East Towards Gate and Culvert

Photograph 3
Snake Rail Fence along South Side of Access Road facing East

Photograph 4
Culvert and Rise in Elevation facing East

3.2 Perch Creek Access Road

The Perch Creek access roads were accessed using ATV's. Areas within 50 m of Perch Creek or any wetlands or other water bodies were assessed using a test pitting methodology. The length of the access roads subject to archaeological assessment was approximately 1.25 km long. No cultural materials were located during the test pitting survey.

The study area was generally level to very gently sloping. There were areas of wet meadow adjacent to the access roads. The area was pasture with high rock content.

Photographs 5 and 6 illustrate the assessment conditions.

Photograph 5
Facing West towards Perch Creek

Photograph 6
Facing South

3.3 Goat Island Easement

The Goat Island easement was accessed by crossing the bridge from Little Current over the North Channel and continuing along Highway 6 to a service road located on the east side of Highway 6. A service road intersected the easement area, and was considered to be disturbed to a high degree (road bed) and was therefore not archaeologically assessed.

There were areas of scrub that were subject to test pitting, and large areas of exposed bedrock and the shoreline. The latter two areas were subject to pedestrian transect survey. Photographs 7-9 illustrate the conditions of the archaeological assessment.

Photograph 7
Test Pitting Easement facing North

Photograph 8
Shoreline Area Subject to Pedestrian Transect facing West

Photograph 9
Area of Exposed Bedrock facing Southwest

Table 1 presents the UTM locations of the photographs. Figures 6-8 illustrate the locations of the photographs and their orientation.

Table 1
UTM Coordinates for Photographs

Photograph Number	UTM Coordinates	Direction of Photograph
1		East
2		East
3		East
4		East
5		West
6		South
7		North
8		West
9		Southwest

Figure 6
Location of Photographs Perch Lake Area

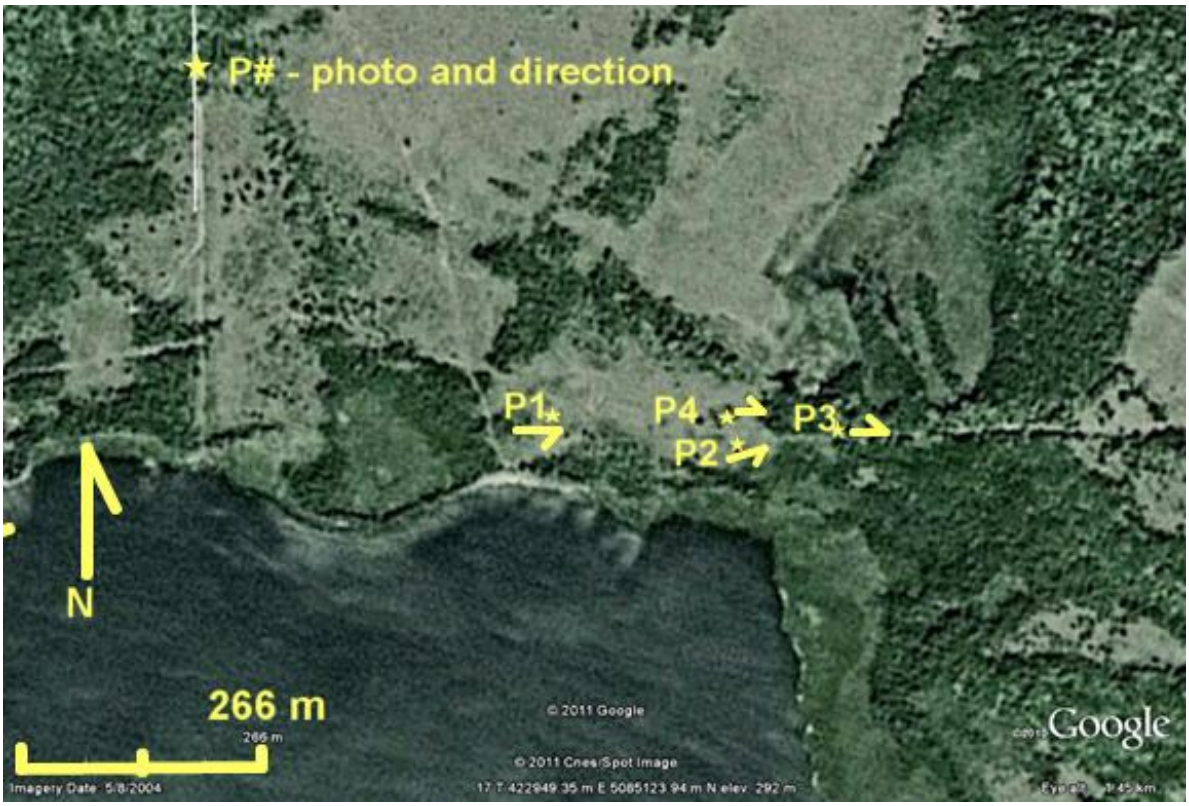


Figure 7
Location of Photographs Perch Creek Area

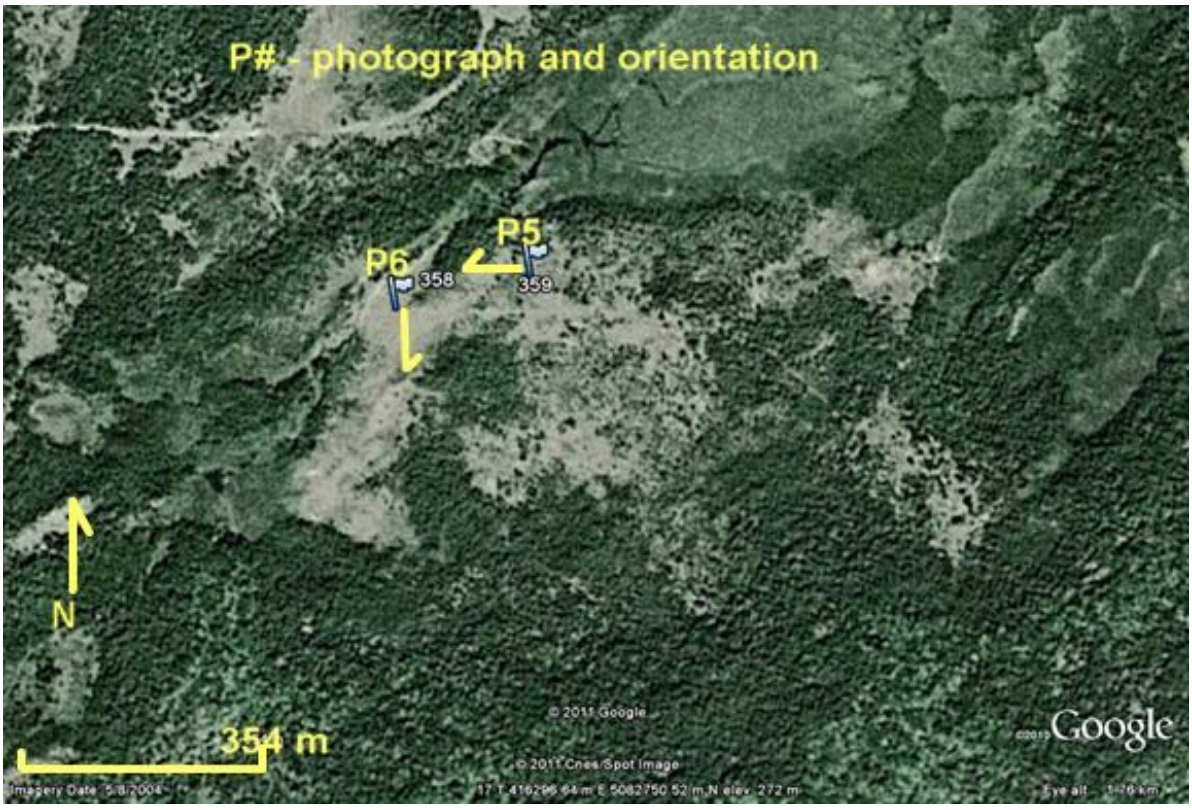


Figure 8
Location of Photographs on Goat Island

Figures 9-11 illustrate the assessment methodology for each of the assessment areas.

Figure 9
Assessment Methodology Access Road North of Perch Lake

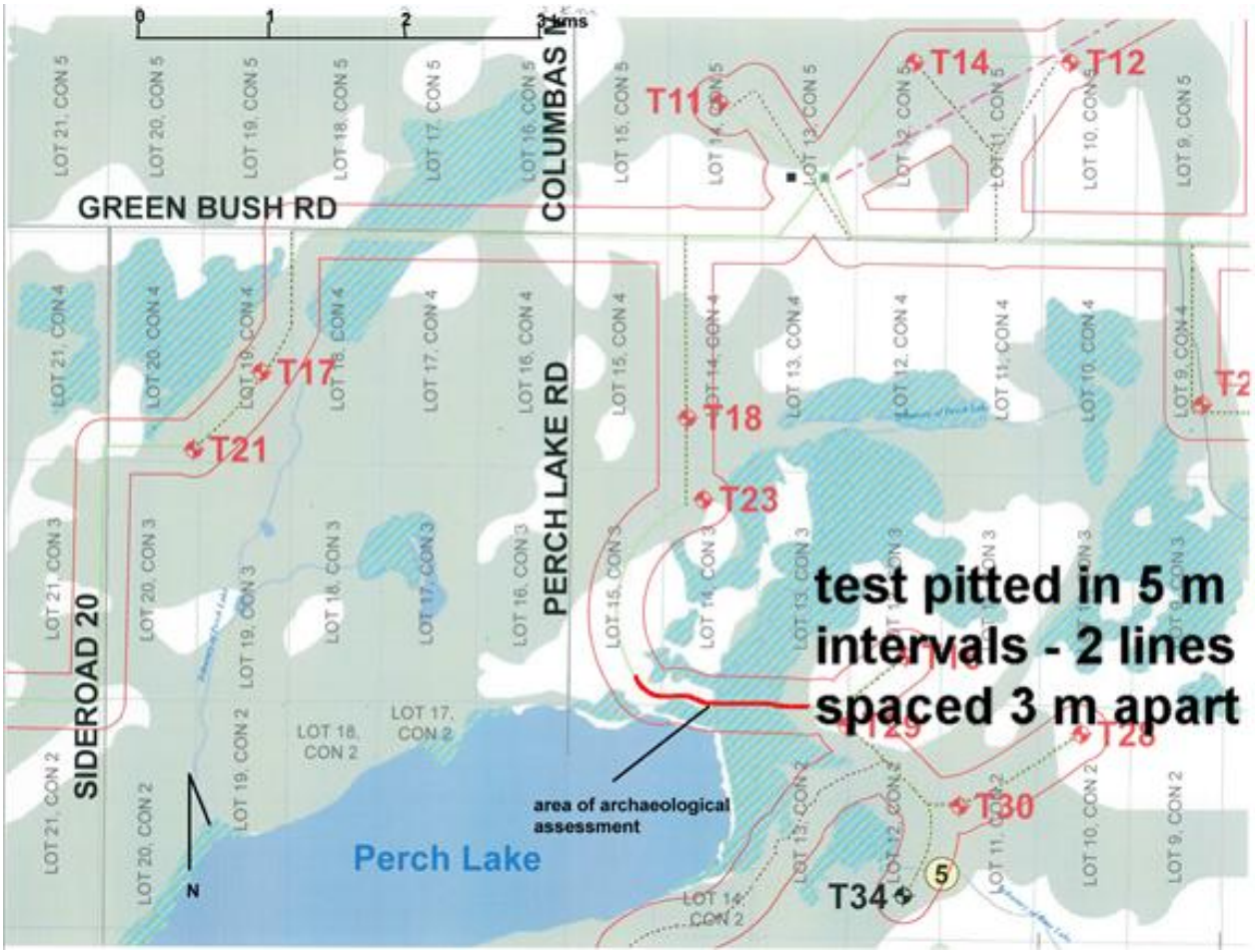


Figure 10
Assessment Methodology Access Roads East of Perch Creek

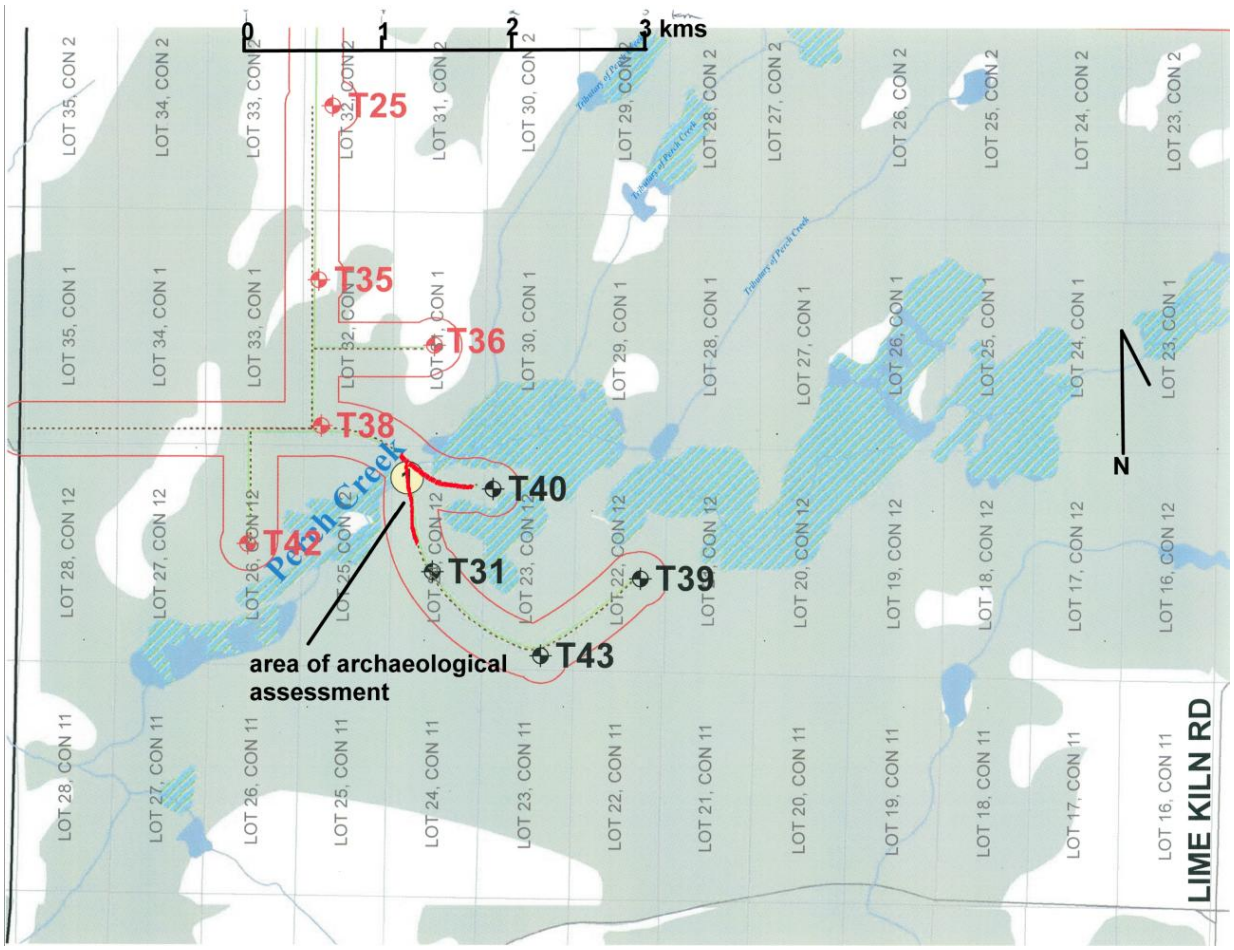
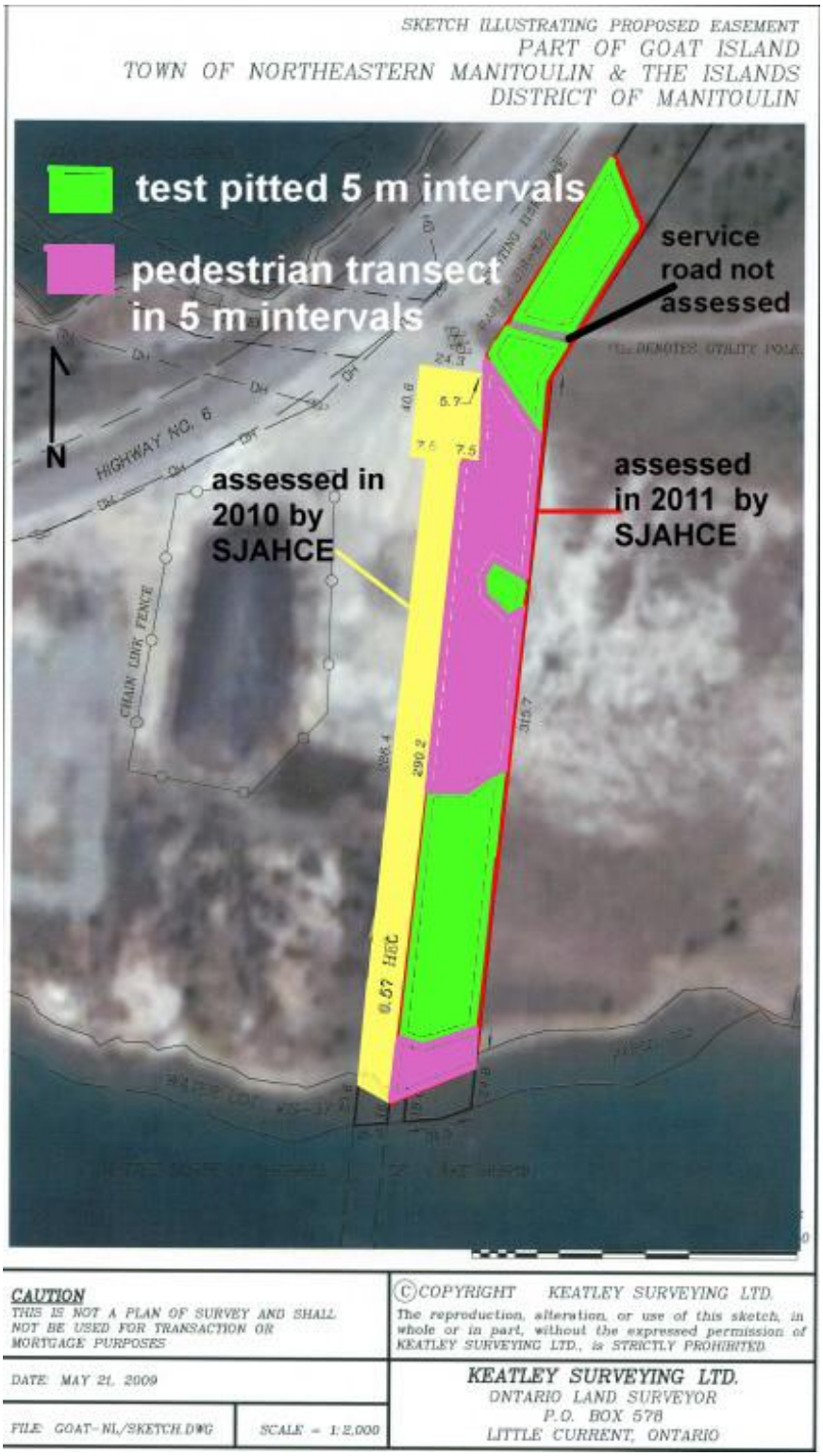


Figure 11
Assessment Methodology Proposed Easement on Goat Island



4.0 RECOMMENDATIONS

No cultural material was located during the Stage 2 archaeological assessment.

The following is therefore recommended:

- With respect to this specific study area related to the access to, and construction of the access roads north of Perch Lake and east and south of Perch Creek (refer to Figure 3 and 4 for location details), and for the proposed easement (refer to Figure 5), no further archaeological assessment is required.
- It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Registry or Archaeology Reports referred to in Section 65.1 of the Ontario Heritage Act.
- Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.
- The Cemeteries Act, R.S.O. 1990 c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism and Culture, 2011).

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

5.0 REFERENCES CITED AND CONSULTED

Archaeological Survey of Laurentian University
2009 Report on Stage 1 Archaeological Assessment of the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Island. P-100-016-2009. On file with the Ministry of Tourism and Culture, Public Registry.

Government of Ontario
2009 **The Green Energy Act.**

1990a **The Ontario Heritage Act R.S.O. 1990.** Ontario Regulation 9/06, made under the Ontario Heritage Act. Criteria for Determining Cultural Heritage Value or Interest. Queen's Printer, Toronto.

1990b **The Environmental Assessment Act. R.S.O. 1990, C. E18.**

1990c **The Planning Act. R.S.O. 1990.**

Ministry of Culture
2004 Draft Standards and Guidelines for Consulting Archaeologists. Ministry of Culture.

Ministry of Tourism and Culture
2011a **Standards and Guidelines for Consulting Archaeologists.** Ministry of Tourism and Culture.

2011b Archaeological Data Base Files. Heritage Branch, Ministry of Tourism and Culture, Toronto.

Scarlett Janusas Archaeological and Heritage Consulting and Education
2010 Stage 2 Archaeological Resource Assessment McLean's Mountain Wind Farm, Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8, Part of Lot 20, Concession 11; Part of Lo t9, Concession 6; Part of Lots 7-8, Concession 5; Part of Lot 7, Concession 4; Part of Lot s11-13, Concession 2; Part of Lot 14, Concession 3; Part of lot 19-20, Concession 4; Part of Lot 31, Concession 1; Part of Lots 22,-23,25-26, Concession 12, Geographic Township of Howland, Northeastern Manitoulin and the Islands (NEMI), District of Manitoulin. P027-093-2010

2011 Stage 2 Archaeological Resource Assessment McLean's Mountain Wind Farm Addendum. Received by MTC January 26, 2011.

Stage 2 Archaeological Resource Assessment
McLean's Mountain Wind Farm

Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8;
Part of Lot 20, Concession 11; Part of Lot 9, Concession 6;
Part of Lots 7-8, Concession 5, Part of Lot 7, Concession 4;
Part of Lots 11-13, Concession 2; Part of Lot 14, Concession 3;
Part of Lot 19-20, Concession 4; Part of Lot 31, Concession 1;
Part of Lots 22-23, 25-26, Concession 12
Geographic Township of Howland
Northeastern Manitoulin and the Islands (NEMI)
District of Manitoulin
F-000522-WIN-130-601
F-000520-WIN-130-601

Prepared for

Dillon Consulting Ltd.
and
Ministry of Tourism and Culture

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Licence #P027, CIF # P027-093-2010
Stage 1 CIF P100-016-2009

July 23, 2010

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Project Personnel

Project Manager Principal Archaeologist, And Report Preparation	Scarlett Janusas
Field Assistants	Patrick Folkes Carter Healy Jeffrey Martin Chelsea Robert Amelia Sweiger

Acknowledgments

Scarlett Janusas Archaeological & Heritage Consulting and Education extend our heartfelt thanks to Mr. Rick Martin, Project Manager, McLean Mountain Wind Farm, for guiding us to remote areas of the project, and for providing much needed support, access to the properties, information and general enthusiasm for our work. We would also like to thank his assistant Kirsten for assisting with the project needs. Thanks are also extended to the survey crew who flagged areas of archaeological potential prior to the assessment of the property. And, finally a thank you to Mr. Don McKinnon of Dillon Consulting Ltd. for coordinating the project and providing appropriate mapping and arranging for a survey team to flag areas of archaeological potential prior to assessment.

Executive Summary

The Stage 1 archaeological resource assessment report was completed by Archaeological Survey of Laurentian University in June 2009 for the entire proposed area of McLean's Wind farm (part of 66 Lots within Howland Township, District of Manitoulin). The conclusions of the 2009 report indicate that the majority of the property exhibits low archaeological potential. Areas that were identified as exhibiting archaeological potential include the stream areas draining Perch Lake to Honora Bay, and the transmission line crossing east of Little Current. SJAHCE reviewed the Stage 1 report and added additional areas located within 200 metres of streams/wetlands as part of the Stage 2 archaeological assessment to ensure complete coverage of areas of archaeological potential.

Scarlett Janusas Archaeological and Heritage Consulting and Education (SJAHCE) was retained by the proponent to conduct the Stage 2 archaeological assessment of the areas exhibiting archaeological potential.

None of the areas of archaeological potential could be ploughed based on woodlot or rocky pasture/open meadow conditions. All archaeological survey was conducted using the test pitting methodology. Turbine areas were tested at five metre intervals (75 x 75 m area). Access roads had a proposed width of 10 metres and were tested in two lines, three metres apart, in five metre intervals.

The Stage 2 archaeological assessment of the study property was conducted under licence P027 (Scarlett Janusas, CIF #P027-093- 2010) over a two week period beginning July 5th to the 16th, 2010. Weather conditions were generally sunny or overcast, with highs ranging from 22 to 30 degrees C. The assessment was conducted as required by provincial standards under the Environmental Assessment Act, the Green Energy Act and the Ontario Heritage Act. The Stage 2 archaeological resource assessment is conducted under the regulations prescribed by the 1993 Technical Guidelines for Consulting Archaeologists (Government of Ontario 1993), as these are the current guidelines in place.

No cultural materials were located during the Stage 2 assessment of the subject lands.

Based upon the background research of past and present conditions and the archaeological assessment of the property, the following is recommended:

- It is recommended that the property be cleared of archaeological concerns; however,
- Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act;

- The Cemeteries Act requires that any person discovering human remains must notify the police or coroner and the Registrar of cemeteries, Ministry of Small Business and Consumer Services.

This archaeological assessment has been conducted under the 1993 Archaeological Assessment Technical Guidelines (Government of Ontario, Ministry of Culture, Tourism and Recreation 1993).

This report is submitted to the Minister of Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that the licensed consultant archaeologist has met the terms and conditions of their archaeological licence, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario (Government of Ontario, Ministry of Tourism and Culture 2009:73).

Stage 2 Archaeological Resource Assessment
McLean's Mountain Wind Farm
Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8; Part of Lot 20, Concession 11; Part of Lot 9, Concession 6; Part of Lots 7-8, Concession 5, Part of Lot 7, Concession 4; Part of Lots 11-13, Concession 2; Part of Lot 14, Concession 3; Part of Lot 19-20, Concession 4; Part of Lot 31, Concession 1; Part of Lots 22-23, 25-26, Concession 12
Geographic Township of Howland
Northeastern Manitoulin and the Islands (NEMI)
District of Manitoulin

1.0 PURPOSE

The Stage 1 archaeological resource assessment report was completed by Archaeological Survey of Laurentian University in June 2009 for the entire proposed area of McLean's Wind farm (part of 66 Lots within Howland Township, District of Manitoulin). The final layout, at the time of this archaeological assessment, is depicted in Figure 1. The conclusions of the Stage 1 report indicate that the majority of the property exhibits low archaeological potential. Areas that were identified as exhibiting archaeological potential include the stream areas draining Perch Lake to Honora Bay, and the transmission line crossing east of Little Current.

SJAHCE reviewed the Stage 1 report and added additional areas located within 200 metres of streams/wetlands as part of the Stage 2 archaeological assessment to ensure complete coverage of areas of archaeological potential. Some of these areas were eliminated from field assessment upon visual inspection of the area, after determination of low archaeological potential.

The Stage 2 archaeological assessment of the study property was conducted under licence P027 (Scarlett Janusas, CIF #P027-093- 2010) over a two week period beginning July 5th to the 16th, 2010. Weather conditions were generally sunny or overcast, with highs ranging from 22 to 30 degrees C. The assessment was conducted as required by provincial standards under the Environmental Assessment Act, the Green Energy Act and the Ontario Heritage Act. The Stage 2 archaeological resource assessment is conducted under the regulations prescribed by the 1993 Technical Guidelines for Consulting Archaeologists (Government of Ontario 1993), as these are the current guidelines in place.

This report details the observations and results of the Stage 2 archaeological resource assessment of transmission lines running across Lot 21, Concession 12 (400 m), and Lot 3, Concession 8 and Lot 20, Concession 11 (400 metres). In addition, the transmission line to the east of the bridge at Little Current on either side of the water (300 metres on either side) (Lot 21/22, Concession 12) are illustrated in Figure 2. Figure 3 illustrates

Turbine 6, a section of access roads and Turbine 19. These are located on Lot 9, Concession 6, and Lots 7 and 8, Concession 5, and Lot 7, Concession 4. Figure 4 illustrates Turbines 23, 29, and 30 and access roads. These are located on Lot 14, Concession 3; and Lots11- 13, Concession 2. Figure 5 illustrates Turbines 17 and 21, and associated access roads. These are located on Lot 19 and 20, Concession 4. Figure 6 illustrates Turbines 36, 39, 40 and 42, and associated portions of access roads. These areas of archaeological potential are located on Lot 31, Concession 1; Lots 22 and 23, Lots 25-26, Concession 12.

SJAHCE was retained by the proponent to conduct the Stage 2 archaeological resource assessment of the areas of archaeological potential. These areas are depicted in Figures 2 – 6. Permission to access and assess the property was provided by Project Manager, Mr. Rick Martin.

The Stage 2 archaeological assessment was conducted under the regulations prescribed in the 1993 Technical Guidelines for consulting archaeologists (Government of Ontario 1993), as they are the current guidelines by which reports are reviewed by the Ministry of Tourism and Culture.

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that the licensed consultant archaeologist has met the terms and conditions of their archaeological licence, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario.

Figure 1
Location of Study Area

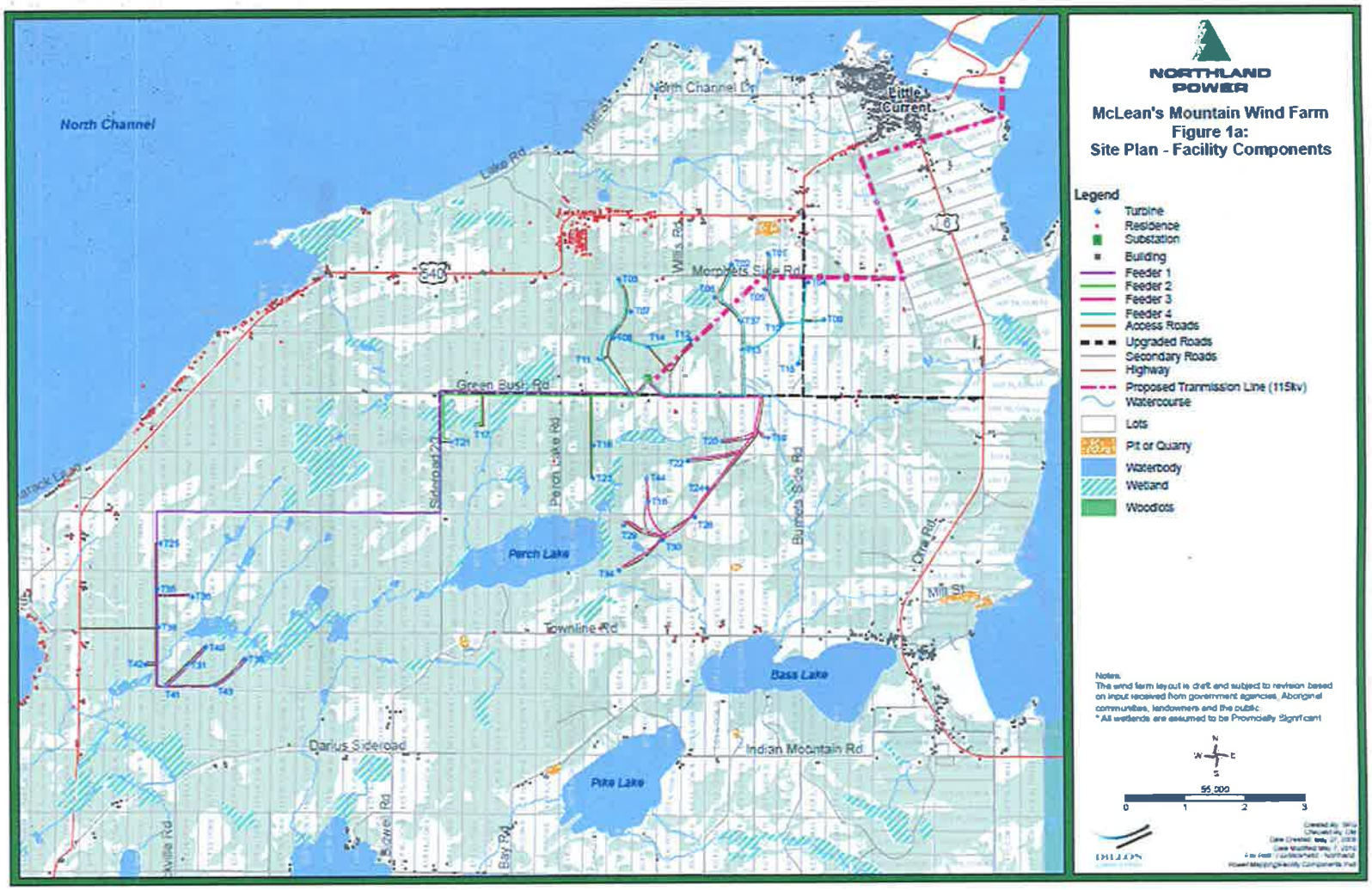
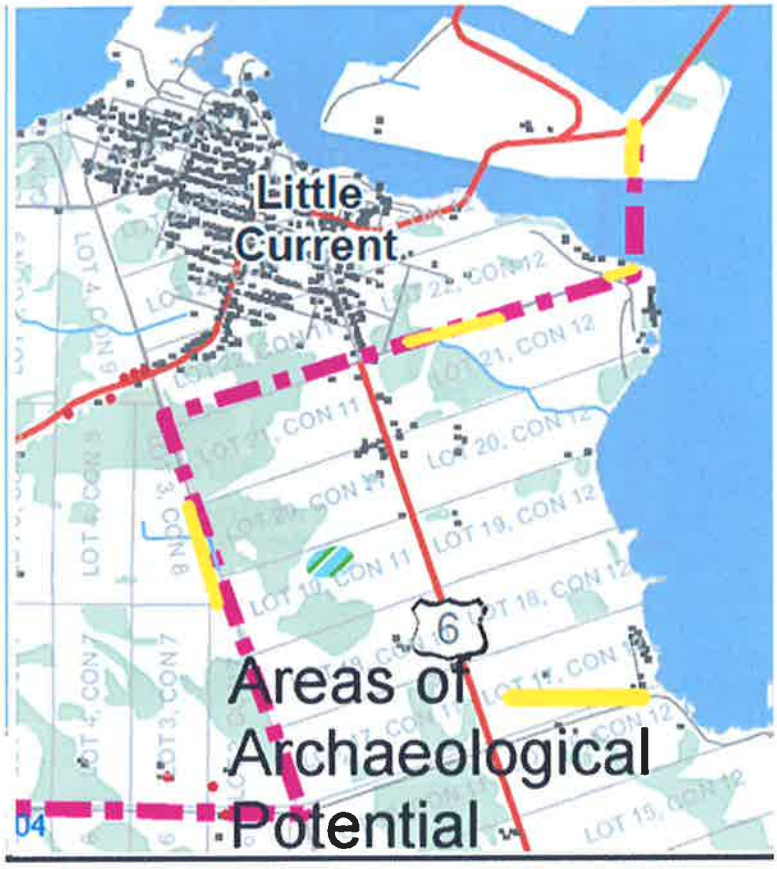


Figure 2
Study Areas Subject to Stage 2 ARA
Transmission Lines



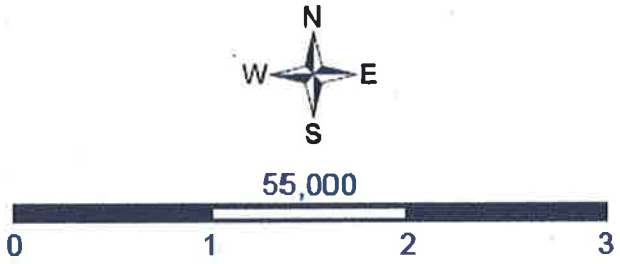
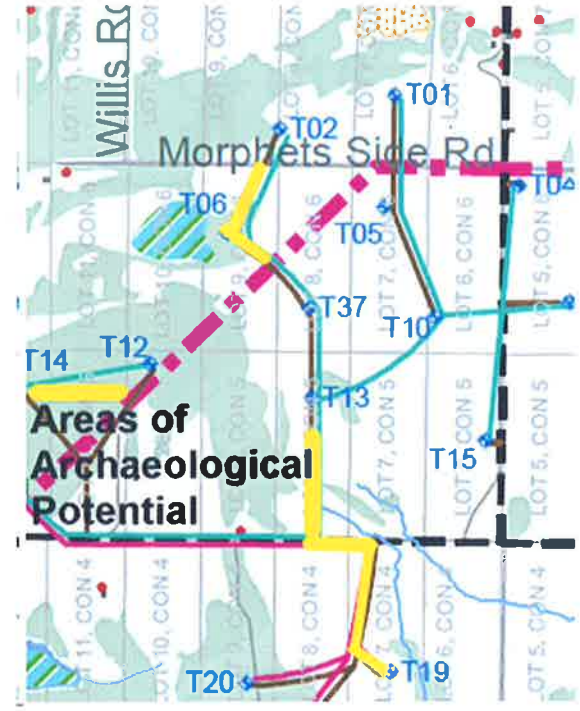


Figure 3
Study Areas Subject to Stage 2 ARA
T06, Access Roads and T19



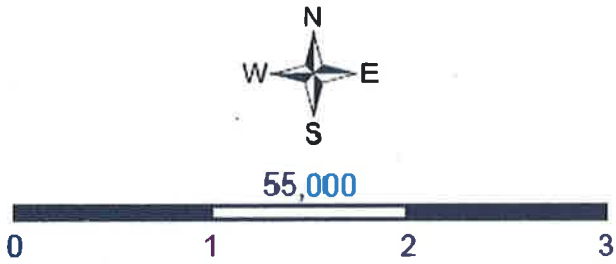


Figure 4
Study Areas Subject to Stage 2 ARA
T23, T29, T30 and Access Roads

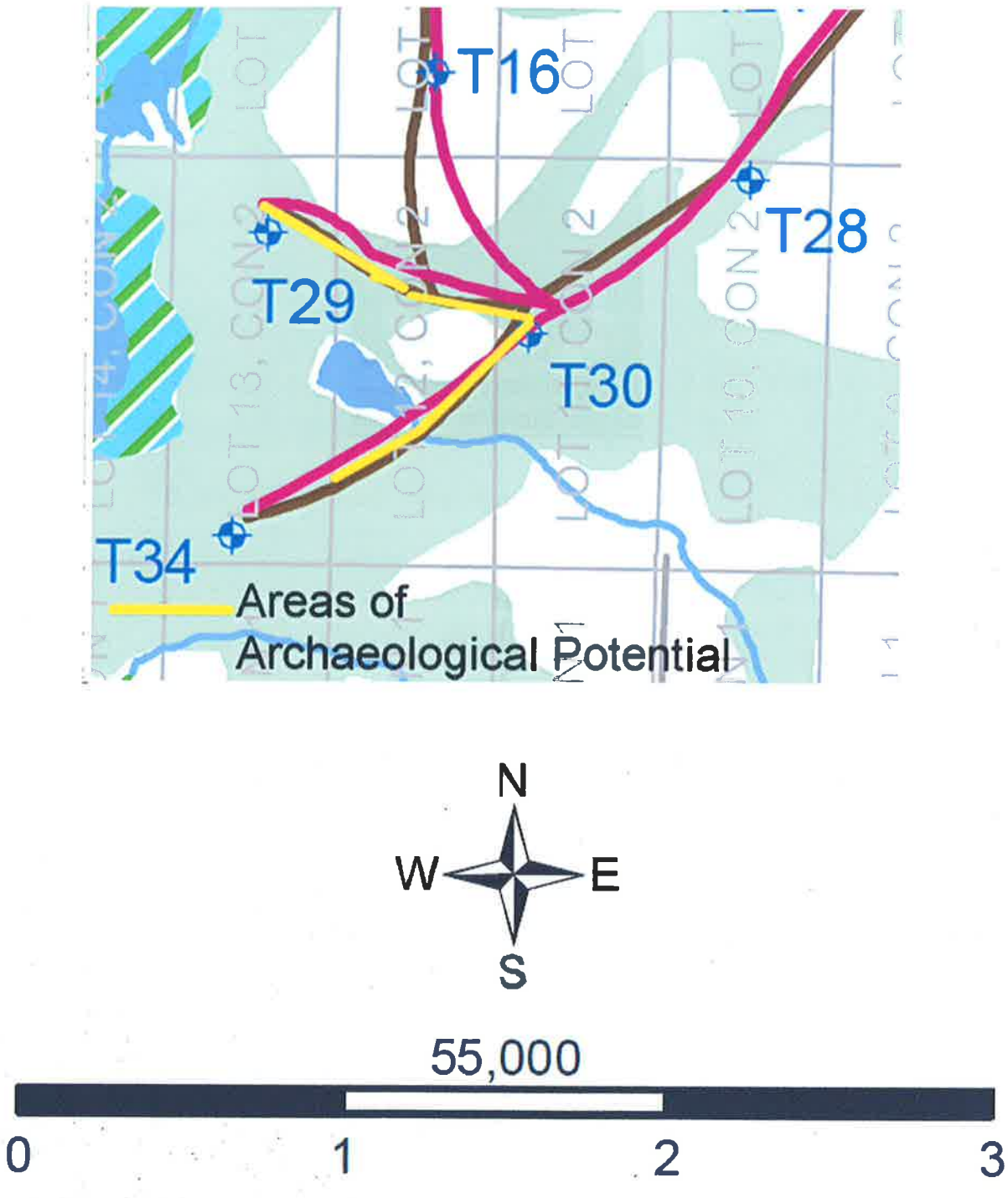
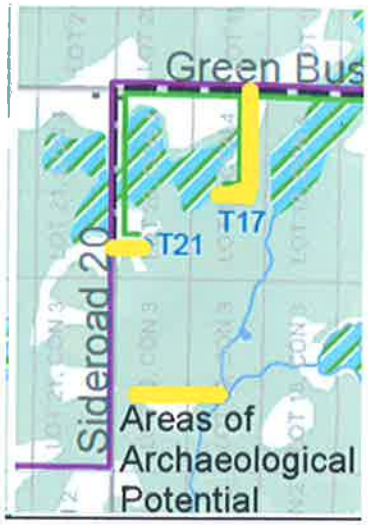


Figure 5
Study Areas Subject to Stage 2 ARA
T21, T17 and Access Roads



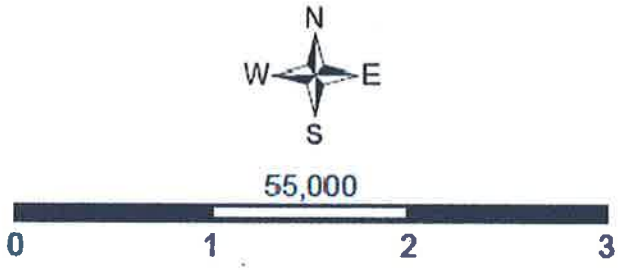
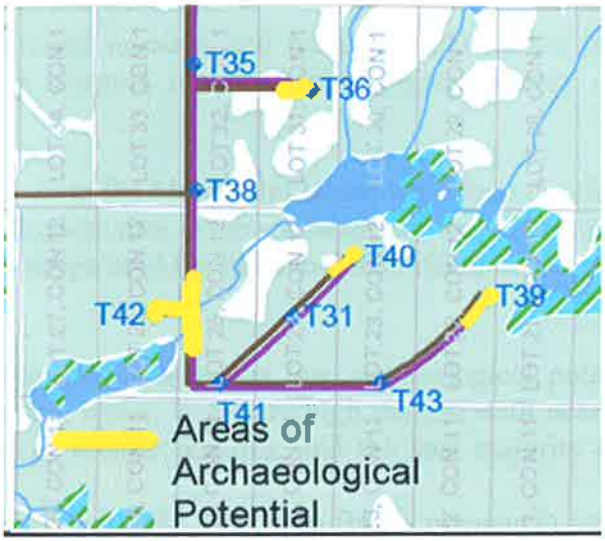
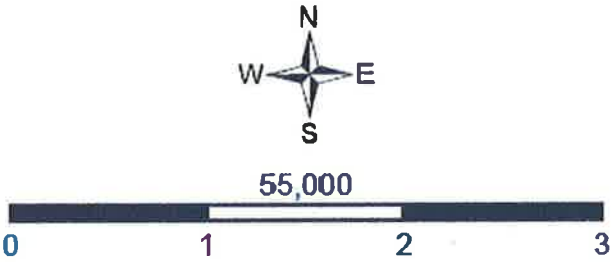


Figure 6
Study Areas Subject to Stage 2 ARA
T36, 42, 40, 39 and Access Roads





2.0 Study Methods

2.1 Stage 1 (Background Research) Summary

A summary of the background research and recommendations are presented below from the 2009 Stage 1 background research report (Archaeological Survey of Laurentian University 2009:21):

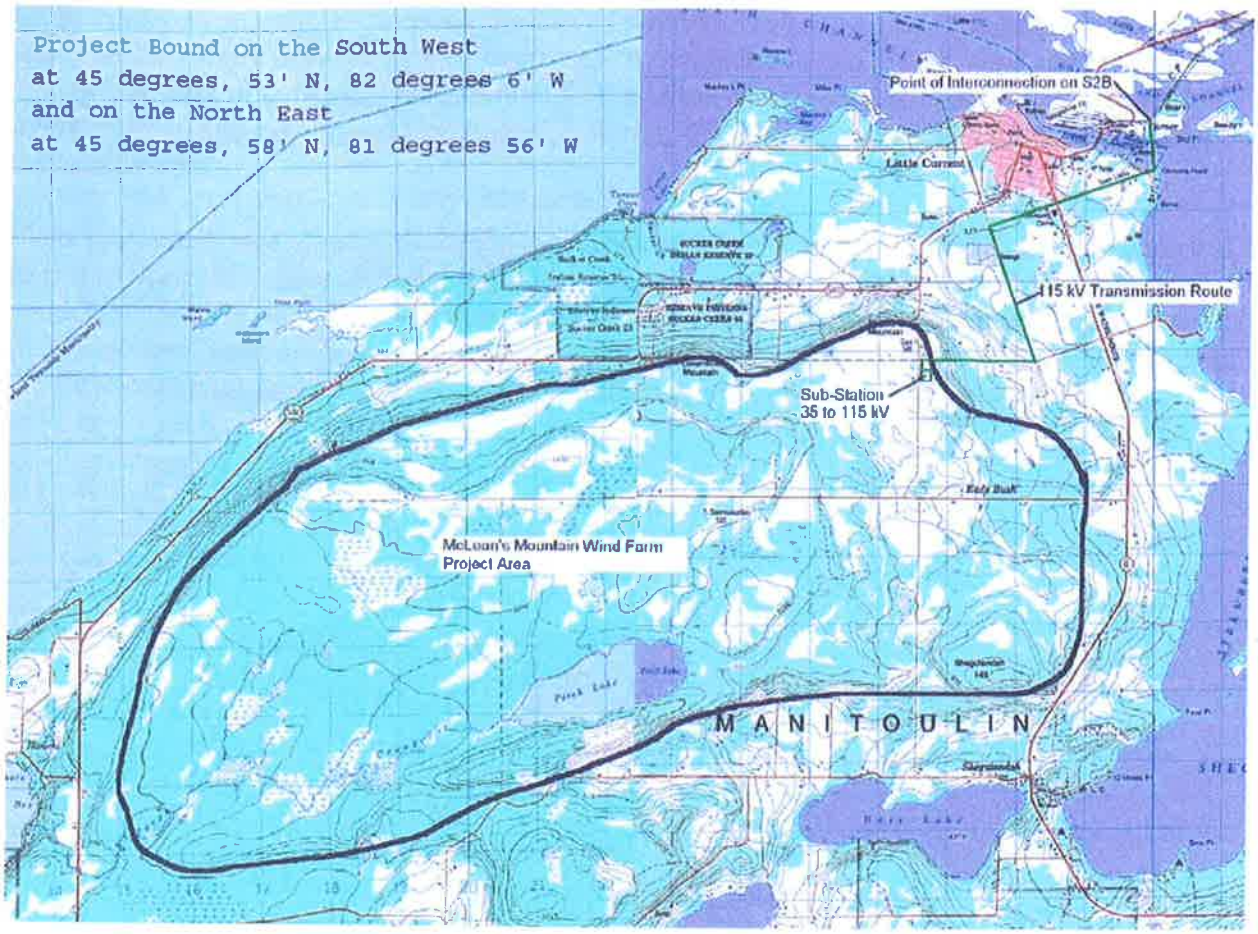
"...the only confirmed factors to the Manitoulin Island wind farm development site is proximity to several existing archaeological sites in the southeast portion, near Burnett's Side Road, the white quartzite bedrock outcrops used for stone tool manufacture, and several water crossing locations.

1. The majority of the project area has low archaeological potential, and well removed above most permanent water, is mostly high plateau with near surface bedrock, has no evidence of eskers or similar features, and the vast majority does not contain useable toolstone.
2. The stream draining Perch Lake to Honora Bay is permanent water, has moderate to high archaeological potential, and if an access road is built across, a Stage 2 survey and test-pitting is required.
3. The transmission line crossing east of Little Current may require excavation for transmission towers, and Stage 2 survey, as noted above.
4. In conclusion, because Stage 2 assessment has indicated that three predictors for high potential for archaeological sites are present, namely proximity to several existing sites and suitable toolstone deposits, and two locations with permanent water, some Stage 2 investigations of those areas are recommend [sic] if development proceeds."

Figure 7 illustrates the area of investigation conducted for the Stage 1 archaeological assessment.

Unfortunately, the Stage 1 report did not have a map showing areas of archaeological potential, and SJAHCE produced one based on the above data (as depicted in Figures 2 – 6).

Figure 7
Area of Stage 1 Archaeological Assessment
(Archaeological Survey of Laurentian University 2009: 5)



2.2 Stage 2 (Field Assessment)

There are two basic methodologies employed when conducting a Stage 2 archaeological assessment. If a property is, or has previously been, used for agricultural purposes, and can be ploughed, the Ministry of Tourism and Culture requires that the property be ploughed and allowed to weather prior to archaeological assessment using a pedestrian transect strategy. The other assessment strategy is test pitting, used for areas that cannot be ploughed. The majority of the property to be assessed for this project was woodlot, or pasture/meadow with rock close to the surface, making it unploughable.

The study property was assessed by test pitting methodology in intervals of five metres for the turbine areas of 75 by 75 metres. The access roads are proposed to be 10 metres in width. Two lines of test pits, spaced three metres apart across the width, were surveyed in five metre intervals. All test pits were screened through 6 mm mesh. In instances of exposed bedrock, where test pitting was prohibited, visual assessment of exposed surfaces was conducted.

Transmission line corridors were surveyed in two lines, spaced three metres apart, in five metre intervals. In cases of exposed bedrock, assessment was conducted in three metre intervals across the width of the transmission line/access road by pedestrian transect.

Upon discovery of cultural material, the survey would be halted, the find marked with a coloured flag, and the survey intervals further decreased to one metre. In the case of pedestrian transect strategy; an area of approximately 20 metres in all directions would be surveyed in one metre intervals in an attempt to locate associated material. No cultural materials were located during the assessment.

Field assessment was conducted during the weeks of July 5th to the 16th, 2010 under licence P027 issued to Scarlett Janusas and working under contract number P027-093-2010. Weather was conducive to the assessment, with sunny or alternately overcast skies and a high ranging from 22 to 30 degrees Celsius. The assessment was conducted as required by provincial standards under the Environmental Assessment Act, the Green Energy Act, and the Ontario Heritage Act.

3.0 RESULTS

3.1 Conditions of the Property

Bedrock was very close to the surface in most parts of the survey area, and in some cases, totally exposed (transmission line on north side of North Channel). These areas were subject to both test pitting (where feasible) and visual assessment in three to five metre intervals. Soil tended to be largely a loam in meadow areas, and in forested areas, was covered with a layer of organic mat. Average depth of test pits was eight cms, but there were occasional deeper holes which had a depth of 20 cms. Some areas also proved to be wet, and given the general dry conditions, and absence of rain during the assessment, it is believed that these areas are perpetually wet. No test pitting was conducted in these areas.

3.2 Location Information

Prior to assessment, the areas of archaeological potential were surveyed and flagged by Keatley Surveying Ltd. Only those areas of archaeological potential were flagged. For example, if an access road was located within 200 metres of a wetland, only that portion of the access road in an area of archaeological potential was flagged. This method ensured that the correct areas were archaeological assessed.

The McLean Mountain Wind Farm turbine locations (with archaeological potential) are presented below in Table 1 in UTM coordinates.

Table 1
Wind Turbine Generators UTM Locations

Turbine Number	Northing	Easting
6	5088724	425119
17	5086575	421071
19	5086354	423054
21	5086297	420658
23	5085673	423048
29	5084877	423558
30	5084627	424211
36	5083707	426261
39	5082650	417155
40	5082856	416485
42	5082563	415462

3.3 Description of Areas

3.3.1 Transmission Lines

Figure 2 depicts the area of transmission lines running across Lot 21, Concession 12 (400 m), and Lot 3, Concession 8 and Lot 20, Concession 11 (400 metres). In addition, the transmission line to the east of the swing bridge at Little Current on either side of the water (300 metres on either side) (Lot 21/22, Concession 12) are illustrated in Figure 2.

The area on the south side of the water, east of the swing bridge, followed an existing unopened road allowance to the water's edge. This area was surveyed in two lines, spaced three metres apart, in five metre intervals (Photograph 1, Figure 8). Topography was level, and ground cover was wooded areas, low growth (poison ivy), and bedrock at the surface. An unauthorized cabin was located to the north of the access road. No cultural material was located.

Photograph 1
Transmission Corridor at South End of Water East of Swing Bridge Channel, facing east

Figure 8
Transmission Line along Harbour View Road to Water's Edge
(from Google Earth, image date July 30, 2007)

The north side of the water, east of the Little Current Swing Bridge, was largely exposed bedrock. This area was subject to pedestrian survey conducted in two metre intervals (Photograph 2). Closer to the shore, the area also had some bedrock, and small amounts of soil (less than 3 cms), and vegetation (Photograph 3, Figure 9). Wherever feasible, test pits were excavated and screened. Topography was level. The soil/overburden was deepest at the water's edge overlying limestone pavement. The soils were organic over sand. All of the stone cobbles were angular, and non-cultural.

The transmission lines located along Harbour View Road, immediately south of Little Current, will run along a currently established utility corridor that is already in existence. The area is comprised of a ditch and utility poles, and is considered to have low archaeological potential, and have low development impact.

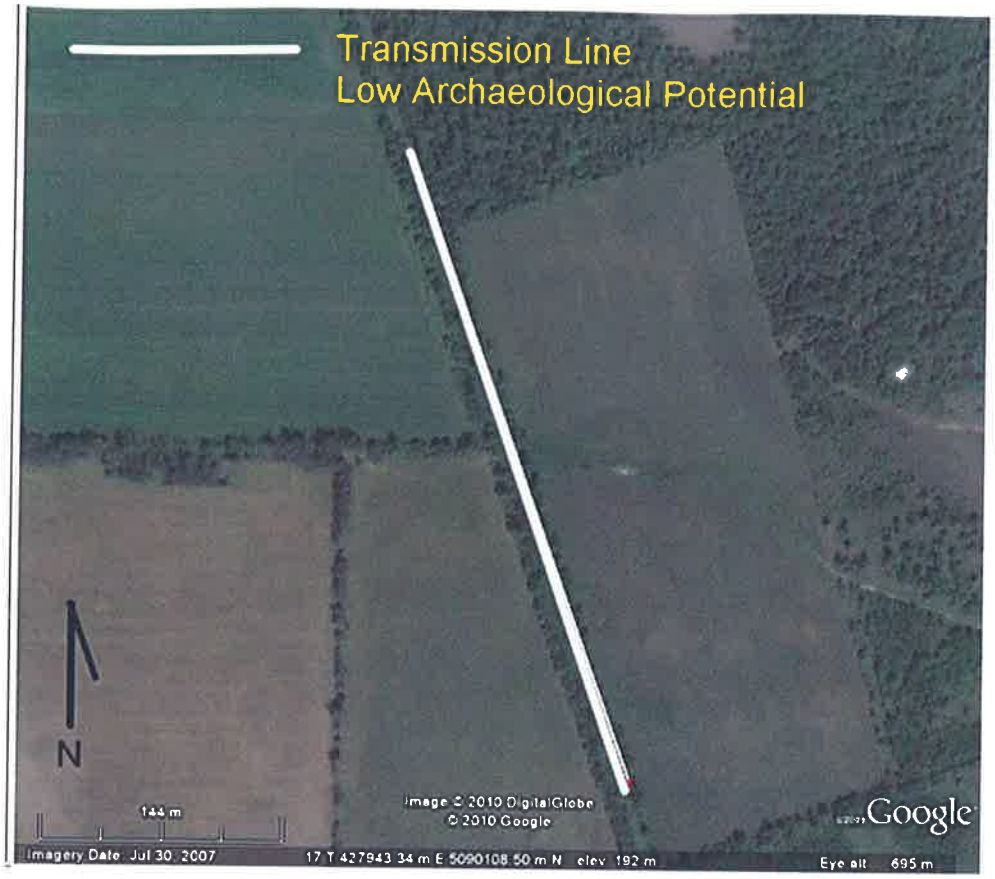
Photograph 2
North Side of Water, East of Swing Bridge facing South

Photograph 3
North Side of Water, East of Swing Bridge facing South near Water's Edge

Figure 9
North Side of Water, East of Swing Bridge

The transmission line that crosses a stream at Lot 3, Concession 8/Lot 20, Concession 11 is illustrated in Figure 10. This is an unopened road allowance that is an established agricultural roadway. Given that that roadway is established, and that the limestone pavement is at the surface in this area, and the minimal proposed development disturbance, no archaeological assessment was conducted.

Figure 10
Transmission Corridor
(from Google Earth, image date July 30, 2007)



3.3.2 Turbine 6, Access Roads, and Turbine 19

Figure 3 illustrates Turbine 6, a section of access roads and Turbine 19. These are located on Lot 9, Concession 6, and Lots 7 and 8, Concession 5, and Lot 7, Concession 4.

The area of Turbine 6 and its associated 400 metres of access road are located on level topography. The northeast corner of the juncture of the access road and the unopened Morphets Side Road (allowance) is a wet area and was not archaeologically assessed. The remainder of the access road and the turbine area itself exhibited soils ranging in depth from 15 to 20 cms. Topsoil overlay a yellow, and in some areas, a grey clay subsoil. No cultural materials were located for Turbine 6 or its access roads. An area of 75 by 75 metres was tested for the turbine site, and the access roads were tested in two swaths, three metres apart, in five metre intervals. Photographs 4 and 5 depict assessment conditions. Figure 11 illustrates archaeological methodology employed in the area.

Photograph 4
T06 Access Road facing Northwest

Photograph 5
T06 facing North

Figure 11
Archaeological Methodology
Turbine 6, Access Roads, and Turbine 19

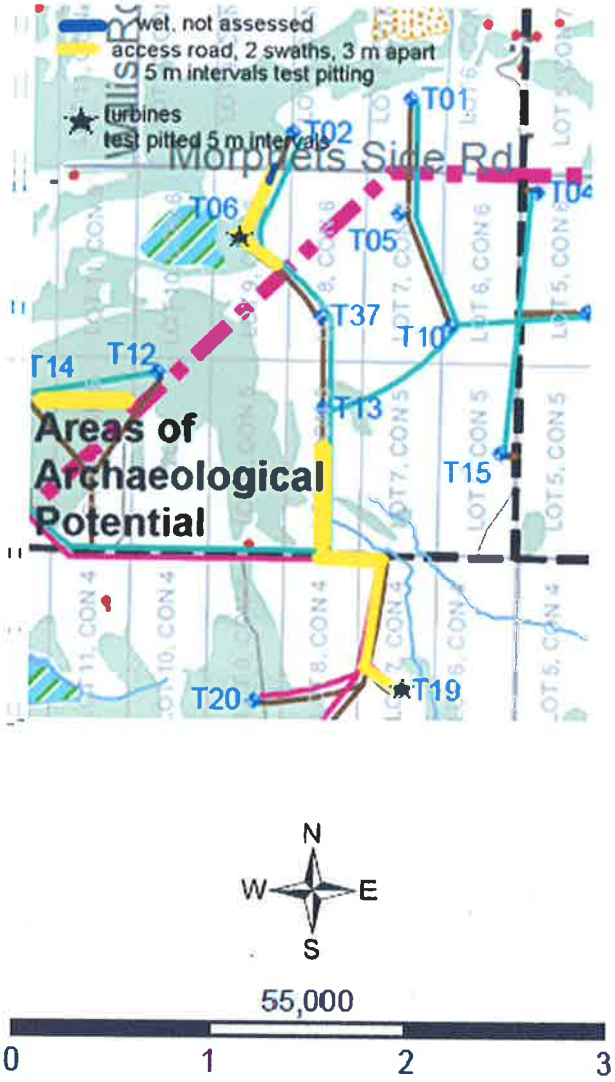


Figure 3 illustrates the section of access road (leading to Turbine 13) that was subject to archaeological assessment. This area had a level topography, and there were only a couple of deep holes (about 16 cms) located closest to Green Bush Road. The remaining test pits were shallow, dry loam, on a limestone pavement. Two swaths, three metres apart, were subject to test pitting in five metre intervals. No cultural materials were located. Photograph 6 depicts the access road to Turbine 13.

Photograph 6
Access Road to Turbine 13 facing North

The access road leading to Turbine 19 is located along Green Bush Road. The area is pasture/open meadow crossing a small plateau area. Bedrock is close to the surface and the area could not be ploughed for assessment purposes. Photographs 7 – 9 illustrate the access road. The access road was test pitted in two swaths, three metres apart, in five metre intervals.

Photograph 7
Access Road for Turbine 19 at Junction of Green Bush Road facing south

Photograph 8
Access Road for Turbine 19 facing south on Top of Plateau

Photograph 9
Access Road to T19 facing South, steep slope to south

The area of Turbine 19 was in a wooded area. This area was test pitted in five metre intervals over an area measuring 75 by 75 m. This turbine lies the closest to the Burnet Side Road, an area identified by the Stage 1 archaeological assessment as exhibiting archaeological potential.

All test pits were shallow. Along the access road, there were occasional test pits with a depth of 15 cms, but the majority of test pits had a depth of 8 cms or less. In the wooded areas, test pits had a vegetation mat, and a very small amount of black topsoil over a limestone pavement. No cultural materials were located.

3.3.3 Turbines 23, 29, 30 and Access Roads

Figure 4 illustrates Turbines 23, 29- 30 and access roads. These are located on Lot 14, Concession 3; and Lots11- 13, Concession 2.

Turbine 23 is located northwest of a wetland area and considered to exhibit archaeological potential. The turbine location sits in an open area, surrounded by wet meadow/woodlot on the north and east sides. Photograph 10 illustrates the wet area of Turbine 23 facing west. Test pitting was conducted on those areas of the 75 x 75 metre turbine area where dry conditions prevailed. There is no associated access road with archaeological potential. No cultural materials were located during the assessment.

Photograph 10
Turbine 23 facing West

The access roads to Turbines 29 (500 metres) and 30 (400 metres), and leading to Turbine 34 are all in woodlot. The access road from Turbine 30 to Turbine 34 crosses a creek and is very wet for the first thirty metres on either side of the creek area. The wet areas were not subject to test pitting. The remaining access roads were all similar in condition, that is, woodlot, with surface stone and a very small amount of soil over top of the stone. Photograph 11 depicts the conditions of the non-wet areas of the access roads. Access roads were test pitted in two swaths,

three metres apart, in five metre intervals. No cultural materials were located during the assessment of the access roads.

Photograph 11
Access Road Conditions for Turbines 29 and 30 facing west

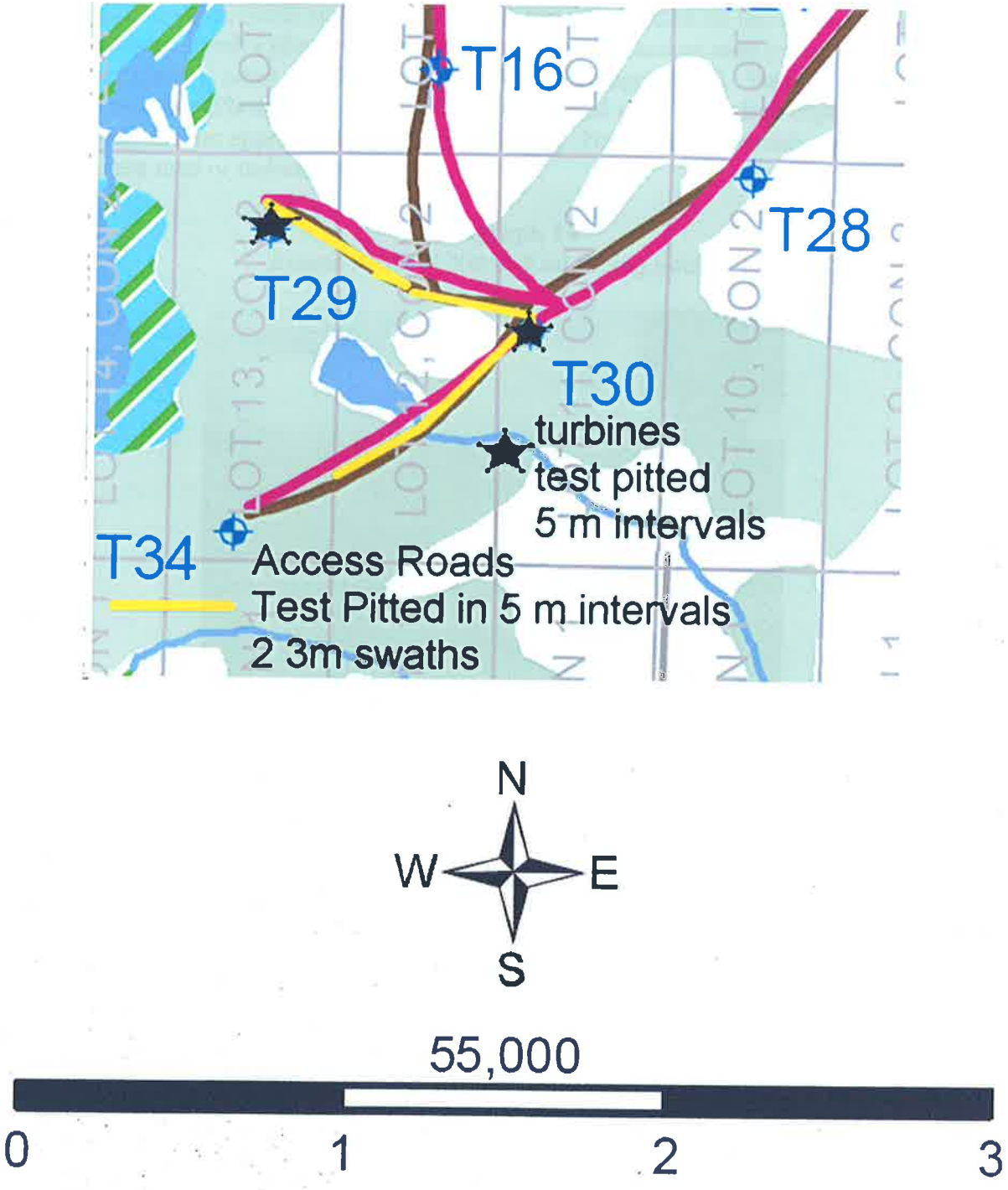
The two turbines areas tested were Turbine 29 and 30. These areas were tested in five metre intervals over an area of 75 x 75 metres. Photographs 12 and 13 illustrate conditions at these two turbine sites. The area of Turbine 29 has a maximum test pit depth of 12 cms, and most is 6 cms or less. The area of Turbine 30 has a maximum test pit depth of 10 cms on bedrock pavement. No material cultural was located at either turbine location or assessed access road.

Photograph 12
Turbine 30 facing north from Centre

Photograph 13
Turbine 29 facing north

Figure 12 illustrates the archaeological methodology employed in this area.

Figure 12
Archaeological Methodology
Turbines 29 and 30 and Access Roads



3.3.4 Turbines 17 and 21, and Access Roads

Turbines 17 and 21, and associated access roads are located on Lot 19 and 20, Concession 4.

Turbine 17 and its north-south access road (300 metres) are located on the south side of Green Bush road between Perch Lake Road and Side Road 20. The access road crosses through pasture/open meadow, scrub and then enters woodlot (Photograph 14). Turbine 17 is totally situated in a woodlot (Photograph 15). Test pits in wooded areas have dark organic soil under a vegetation mat, and are approximately 15 cms in depth. No cultural materials were located at either the access road or turbine site.

Photograph 14
Access Road at North End facing South

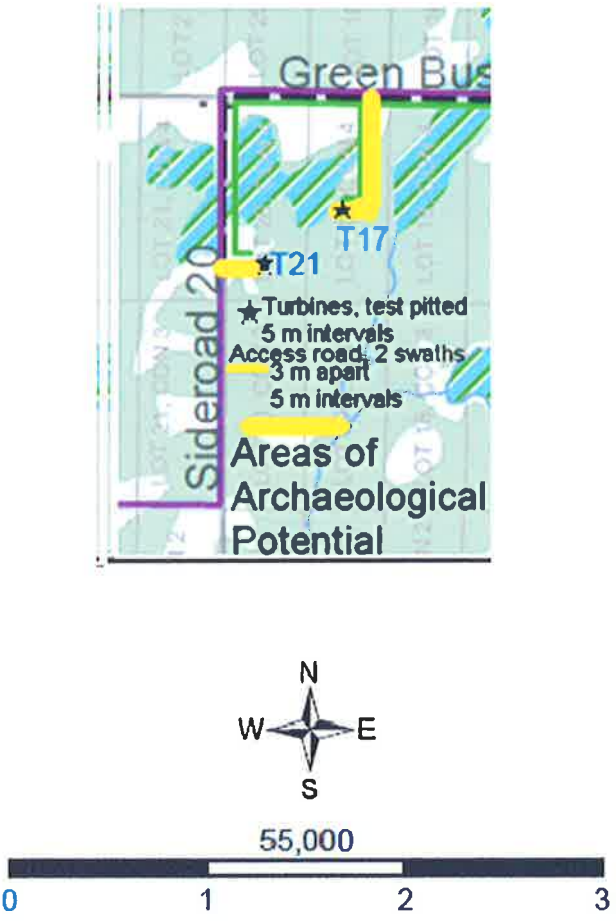
Photograph 15
Turbine 17 facing North from East End

Turbine 21 and its access road (75 metres) are located west of Side Road 20. Photographs 16 and 17 illustrate assessment conditions. There is a small wet area at the northeast end of the access road, and a small rise at the northwest corner of the turbine area. Test pitted areas in the pasture area, in the wet areas, are clay and about 20 cms of organic material. Non-wet areas are loam on top of rock and/or yellow subsoil. No cultural materials were located in either the access road or turbine site.

Photograph 16
Turbine 21 Access Road facing West

Photograph 17
Turbine 21 Access Road facing East

Figure 13
Archaeological Methodology
Turbines 17, 21 and Access Roads



3.3.5 Turbines 36, 39-40, 42 and Access Roads

Figure 6 illustrates Turbines 36, 39, 40 and 42, and associated portions of access roads. These areas of archaeological potential are located on Lot 31, Concession 1; Lots 22 and 23, Lots 25-26, Concession 12.

Turbine 36 and the associated 100 metres of access road were located primarily on exposed limestone pavement, and areas not exposed were covered by a thin sheet of moss/vegetation. No actual test pitting could take place on the turbine site because of the limestone pavement, but the area of Turbine 36 was surveyed and tested for possible areas of soil deposition and/or surface cultural features by assessing the area in five metre pedestrian intervals. The 100 metres of access road that were tested lay in an area of transition between forest and pasture/open meadow. Soil deposition did occur along the access road and test pits had an average depth of 14 cms, in the transition area, and then shallowed out in the open areas to a depth of about 10 cms. No

photographs are available for this area due to a technical problem. No material culture was located at either the turbine site or access road.

Test pitting of Turbine 39 exhibited sandy soil with a maximum depth of 8 cms over bedrock. Photographs 18 and 19 depict the assessment conditions of the turbine area and 200 metres of access road. No cultural materials were located along the access road or on the turbine site.

Photograph 18
Turbine 39 Access Road facing southeast

Photograph 19
Turbine 39 facing East

Turbine 40 and 100 metres of access road were assessed during the Stage 2. The access road was located in open meadow with large rocks protruding from the ground surface and very little soil. Turbine 40 is located in the woodlot, on limestone pavement, with occasional pockets of soil. Photographs 20 and 21 depict assessment conditions. Neither the access road or turbine areas assessed produced any cultural material.

Photograph 20
Turbine 40 Access Road facing Northeast

Photograph 21
Turbine 40, Southcentral Boundary, facing Northeast

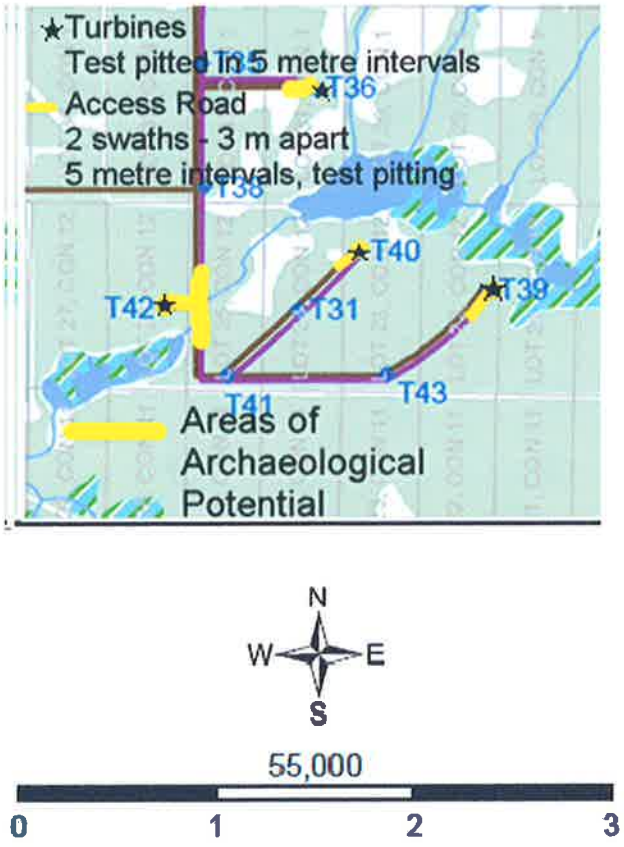
Turbine 42 and 600 metres of access road were assessed for the Stage 2 ARA. The major area of archaeological concern was the creek that the access road crossed over. In addition to the active creek, there were several "dry" creek beds running parallel to the shallow creek. The area was very stoney but there were areas of soil deposition that reached a depth of approximately 14 cms. The turbine site itself, was also very stoney, but again, with pockets of soil with a depth of approximately 10 cms. Photographs 22 and 23 depict assessment conditions. No cultural materials were located in either the access roads or turbine areas.

Photograph 22
T42 Access Road facing north away from Creek Area

Photograph 23
T42 facing West

Figure 14 illustrates the areas surveyed. The entire area was surveyed using a test pitting methodology.

Figure 14
Archaeological Methodology
T36, 39, 40, 42 and Access Roads



3.4 Results

Each turbine area was approximately 75 by 75 metres in size, and access roads were 10 metres in width. All areas were included in the archaeological field assessment. Despite good to excellent coverage of the areas of archaeological potential, no cultural materials were located during the Stage 2 archaeological field assessment.

4.0 RECOMMENDATIONS

Based upon the background research of past and present conditions and the archaeological assessment of the property, the following is recommended:

- It is recommended that the property be cleared of archaeological concerns; however,
- Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act;
- The Cemeteries Act requires that any person discovering human remains must notify the police or coroner and the Registrar of cemeteries, Ministry of Small Business and Consumer Services.

This archaeological assessment has been conducted under the 1993 Archaeological Assessment Technical Guidelines (Government of Ontario, Ministry of Culture, Tourism and Recreation 1993).

This report is submitted to the Minister of Culture as a condition of licensing in accordance with part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that the licensed consultant archaeologist has met the terms and conditions of their archaeological licence, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario (Government of Ontario, Ministry of Tourism and Culture 2009:73).

5.0 References Cited and Consulted

Archaeological Survey of Laurentian University
2009 Report on Stage 1 Archaeological Assessment of the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Islands. P-100-016-2009. On file with the Ministry of Tourism and Culture.

Government of Ontario
1990 ***The Heritage Act R.S.O. 1990***. Queen's Printer, Toronto.

1990 ***The Environmental Assessment*** Act R.S.O. 1990. Queen's Printer, Toronto.

1993 ***Archaeological Assessment Technical Guidelines***. Archaeology & Heritage Planning Unit, Cultural Programs Branch, Ministry of Citizenship, Culture, and Recreation.

1998 ***Conserving a Future for Our Past: Archaeology, Land-Use Planning & Development in Ontario. An Educational Primer and Comprehensive Guide for Non-Specialists.*** Ministry of Citizenship, Culture and Recreation, Cultural Programs Branch, Archaeology & Heritage Planning Unit.

APPENDIX F
Cultural Heritage Self-Assessment

SELF-ASSESSMENT OF CULTURAL HERITAGE
MCLEAN'S MOUNTAIN
RENEWABLE ENERGY PROJECT
MANITOULIN ISLAND

F-000522-WIN-130-601
F-000520-WIN-130-601

Prepared for

Dillon Consulting Ltd.
And
Northland Power

for submission to
Ministry of the Environment

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April 4, 2011

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4.0	Archaeological Potential	6
5.0	Built Heritage Resources and Cultural Heritage Landscapes Assessment Checklist	7
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Figure

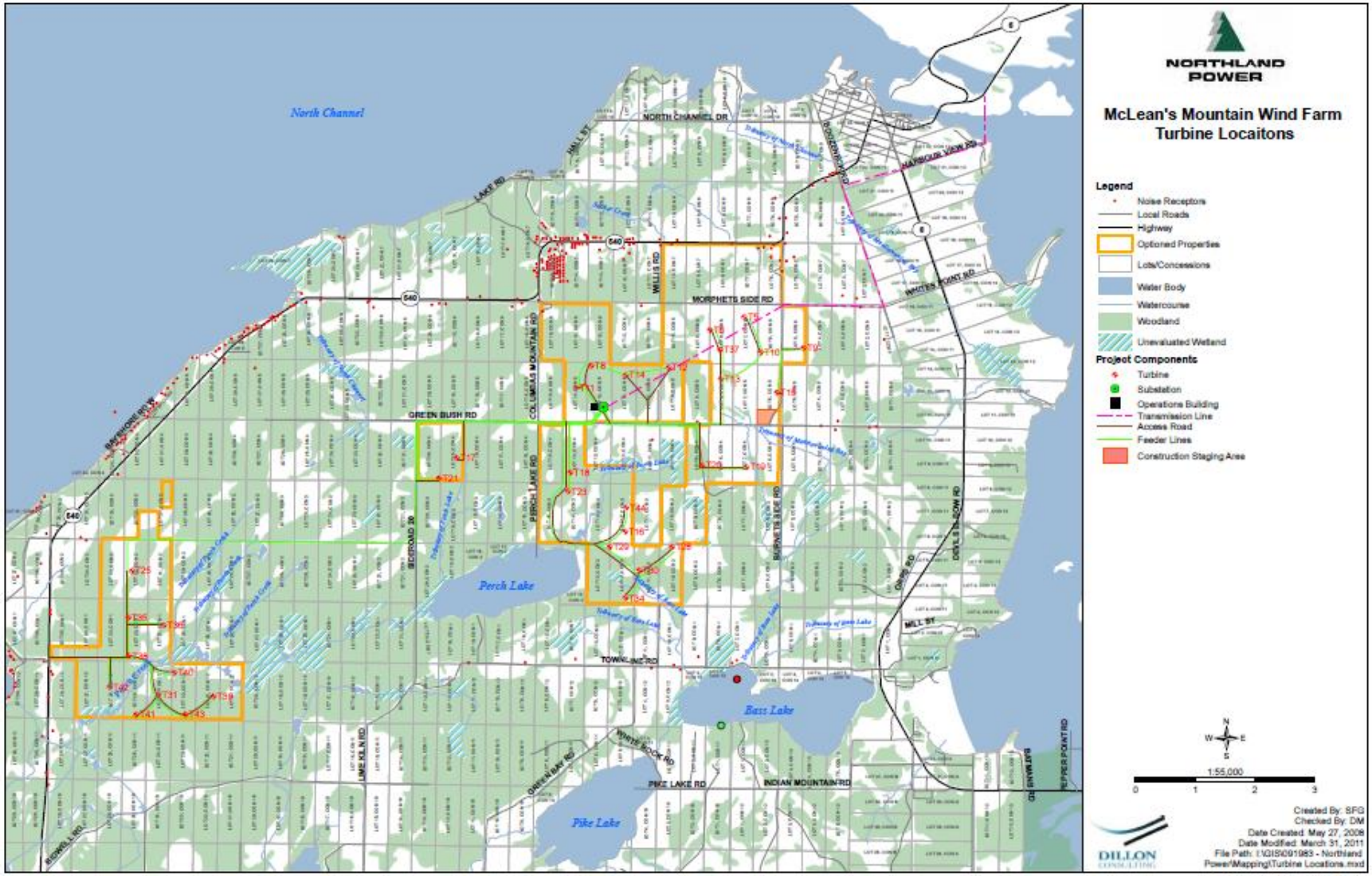
McLean's Mountain Wind Farm Turbine Locations 2

Appendix A

MTC Letters of Concurrence – Archaeology 11

1.0 Description of Project

Northland Power Inc. (NPI) proposes to develop the McLean's Mountain Wind Farm located south of the community of Little Current, in the Municipality of Northeastern Manitoulin and the Islands; geographic Township of Howland, and the geographic Township of Bidwell in the District of Manitoulin, Ontario. NPI intends to develop approximately 33 turbines (82 MW of electricity). Figure 1 presents the layout of the proposed wind energy project.


NORTHLAND POWER
McLean's Mountain Wind Farm
Turbine Locaitons
Legend
Noise Receptors
Local Roads
Highway
Optioned Properties
Lots/Concessions
Water Body
Watercourse
Woodland
Unevaluated Wetland
Project Components
Turbine
Substation
Operations Building
Transmission Line
Access Road
Feeder Lines
Construction Staging Area
North Channel
Perch Lake
Bass Lake
Pike Lake
LAKE RD
NORTH CHANNEL DR
MORPHETS SIDE RD
GREEN BUSH RD
BIRCH LAKE RD
BURNTSIDE RD
TOWNLINE RD
MILL ST
PIKE LAKE RD
INDIAN MOUNTAIN RD
WHITES POINT RD
HARBOUR VIEW RD
1:55,000
DILLON CONSULTING
Created By: SFG
Checked By: DM
Date Created: May 27, 2008
Date Modified: March 31, 2011
File Path: I:\GIS\091983 - Northland Power\Mapping\Turbine Locations.mxd

2.0 Qualifications

The self assessment of cultural heritage aspects of the McLean's Mountain Wind Farm was conducted by Scarlett Janusas of Scarlett Janusas Archaeological and Heritage Consulting and Education and by Dillon Consulting Ltd.

Scarlett Janusas holds a B.A., and M.A. in anthropology/archaeology, holds a current archaeological licence (P027), and is a member in good standing of the Association of Professional Archaeologists (currently holds position of President), the Canadian Association of Professional Heritage Consultants (CAPHC), the Council for Northeastern Archaeology, the Ontario Archaeological Society, and the Ontario Marine Heritage Committee. Ms. Janusas has over 30 years experience in the heritage field in Ontario.

3.0 Applicable Legislation

There are two pieces of applicable legislation: the **Ontario Heritage Act** – Ontario Regulation 9/06 – Criteria for Determining Cultural Heritage Value or Interest; and the **Environmental Protection Act** – Ontario Regulation 359/09, Part IV, Renewable Energy Approvals, Section 19.

Under Section 19 (1) of the Environmental Protection Act – O. Reg. 359/09 (Government of Ontario 2009:19), the following table is to be used with respect to determining if the project location is located on a protected property. Based on this table, it has been determined that the study area is not located on any of the identified types of protected properties.

Table 1 – Protected Properties

Item	Column 1	Column 2
	Description of property.	Project location
1.	A property that is the subject of an agreement, covenant or easement entered into under clause 10 (1) (b) of the *Ontario Heritage Act*.	NO
2.	A property in respect of which a notice of intention to designate the property to be of cultural heritage value or interest has been given in accordance with section 29 of the *Ontario Heritage Act*.	NO
3.	A property designated by a municipal by-law made under section 29 of the *Ontario Heritage Act* as a property of cultural heritage value or interest.	NO
4.	A property designated by order of the Minister of Culture made under section 34.5 of the *Ontario Heritage Act* as a property of cultural heritage value or interest of provincial significance.	NO
5.	A property in respect of which a notice of intention to designate the property as property of cultural heritage value or interest of provincial significance has been given in accordance with section 34.6 of the *Ontario Heritage Act*.	NO
6.	A property that is the subject of an easement or a covenant entered into under section 37 of the *Ontario Heritage Act*.	NO
7.	A property that is part of an area designated by a municipal by-law made under section 41 of the *Ontario*	NO

Item	Column 1	Column 2
	Heritage Act as a heritage conservation district.	
8.	A property designated as a historic site under Regulation 880 of the Revised Regulations of Ontario, 1990 (Historic Sites) made under the *Ontario Heritage Act*.	NO

4.0 Archaeological Potential

A Stage 1 archaeological resource assessment (background research and field visit) was conducted by Dr. P. Julig, Archaeological Survey of Laurentian University in 2009. Areas of archaeological potential were identified in the report.

A Stage 2 archaeological resource assessment (field assessment) re-evaluated the identified areas of archaeological potential, and added some additional areas based on proximity to water sources. The Stage 2 archaeological resource assessment was conducted in the summer of 2010 by Scarlett Janusas Archaeological and Heritage Consulting and Education. No archaeological or cultural heritage resources were located during the Stage 2 assessment.

The McLean Mountain Wind Farm layout was modified in the late fall of 2010. A modified Stage 2 (an addendum to the Stage 2 report) was conducted that identified areas of archaeological potential based on proximity to water sources. These areas have been identified by Northland Power as having been subject to development disturbance. The Ministry of Tourism and Culture requires verification of this disturbance in relation to the areas of archaeological potential. A Stage 2 field assessment will be conducted in 2011 to meet this requirement.

Julig, Patrick
2009 Report on Stage 1 Archaeological Assessment of the Manitoulin Island Wind Farm, by Northland Power, in Northeast Manitoulin and the Islands. Report on file with the Ministry of Tourism and Culture.

Scarlett Janusas Archaeological and Heritage Consulting and Education
2010 Stage 2 Archaeological Resource Assessment, McLean's Mountain Wind Farm (Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8; Part of Lot 20, Concession 11; Part of Lot 9, Concession 6; Part of Lots 7-8, Concession 5; Part of Lot 7, Concession 4; Part of Lots 11-13, Concession 2; Part of Lot 14, Concession 3; Part of Lot 19-20, Concession 4; Part of Lot 31, Concession 1; part of Lots 22-23, 25-26, Concession 12), Geographic Township of Howland, Northeastern Manitoulin and the Islands (NEMI), District of Manitoulin. On file with the Ministry of Tourism and Culture.

Scarlett Janusas Archaeological and Heritage Consulting and Education
2011 Stage 2 Archaeological Resource Assessment, McLean's Mountain Wind Farm: Addendum. On file with the Ministry of Tourism and Culture.

5.0 Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This check list will help identify potential cultural heritage resources, determine how important they are and indicate whether a cultural heritage impact assessment is needed.

Step 1 – Screening Potential Resources		
		Built heritage resources
YES	**NO**	Does the property contain any built structures, such as:
☐	☒	▪ Residential structures (e.g. house, apartment building, trap line shelter)
☐	☒	▪ Agricultural (e.g. barns, outbuildings, silos, windmills)
☐	☒	▪ Industrial (e.g. factories, complexes)
☒	☐	▪ Engineering works (e.g. bridges, roads, water/sewer systems) existing roads/laneways
		Cultural heritage landscapes
YES	**NO**	Does the property contain landscapes such as:
☐	☒	▪ Burial sites and/or cemeteries
☐	☒	▪ Parks
☐	☒	▪ Quarries or mining operations
☐	☒	▪ Canals
☐	☒	▪ Other human-made alterations to the natural landscape

Step 2 – Screening for Potential Significance		
YES	**NO**	**A property's heritage significance may be identified through the following:**
☐	☒	1. Is it designated or adjacent to a property designated under the Ontario Heritage Act?
☐	☒	2. Is it listed on the municipal heritage register or provincial register (e.g. Ontario Heritage Bridge List)?
☐	☒	3. Is it within or adjacent to a Heritage Conservation District?
☐	☒	4. Does it have an Ontario Heritage Trust easement or is it adjacent to such a property?
☐	☒	5. Is there a provincial or federal plaque?
☐	☒	6. Is it a National Historic Site?
☐	☒	7. Does documentation exist to suggest built heritage or cultural heritage landscape potential? (eg. research studies, heritage impact assessment reports, etc.)
☐	☒	8. Was the municipality contacted regarding potential cultural heritage value? Were any concerns expressed?
☐	☒	9. What are the dates of construction? Are the buildings and/or structures over 40 years old? Is it within a Canadian Heritage River watershed?
☐	☒	10. Is a renowned architect or builder associated with the property?

Note: If you answer "yes" to any of the questions in Step 2, a heritage impact assessment is required.

Step 3 – Screening for Potential Impacts		
YES	NO	
❑	☒	**Destruction** of any, or part of any, significant heritage attribute or feature.
❑	☒	**Alteration** that is not sympathetic, or is incompatible, with the historic fabric or appearance.
❑	☒	**Shadows** created that alter the appearance of a heritage attribute or change the visibility of a natural feature or plantings, such as a garden.
❑	☒	**Isolation** of a heritage attribute from its surrounding environment, context or a significant relationship.
❑	☒	**Direct or indirect obstruction** of significant views or vistas from, within, or to a built and natural feature.
❑	☒	**A change in land use** such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces.
❑	☒	**Land disturbances** such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource.

The checklist was verified by employees of Dillon Consulting, and for some areas, by employees of SJAHCE.

6.0 Agency Consultation

Ministry of Tourism and Culture, Alejandro Cifuentes, July 12th, 2010.

Renewable Energy Facilitation Office, Petra Fisher, July 14, 2010.

Ontario Heritage Trust – email August 9 – 10, 2010 re: conservation easements.

Town of Northeastern Manitoulin and the Islands (NEMI), Ms. Kristin Luoma, Economic Development Officer re: heritage properties.

7.0 Summary

Archaeology – A Stage 1 archaeological resource assessment was completed in 2009. A Stage 2 archaeological resource assessment was completed in 2010. Modifications to parts of the layout will be subject to a Stage 2 archaeological resource assessment in 2011. No archaeological resources were located during the Stage 2 (2010) archaeological assessment.

Cultural Heritage – the screening for impacts to the built heritage and cultural heritage landscape indicate that there are no heritage concerns.

Appendix A – MTC Letters of Concurrence (Stage 2 ARA)

Ministry of Tourism and Culture

Culture Programs Unit
Programs and Services Branch
Culture Division
435 S. James St., Suite 334
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Ministère du Tourisme et de la Culture

Unité des programmes culturels
Direction des programmes et des services
Division de culture
Bureau 334, 435 rue James sud
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Téléc.: 807 475-1297

Ontario

February 1, 2011

Don McKinnon
Dillon Consulting Ltd.
235 Yorkland Blvd., Suite 800
Toronto, ON M2J 4Y8

RE: McLean's Mountain Wind Farm

Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8; Part of Lot 20, Concession 11; Part of Lot 9,oncession 6; Part of Lots 7-8, Concession 5; Part of Lot 7, Concession 4; Part of Lots 11-13, Concession 2; Part of Lot 14, Concession 3; Part of Lot 19-20, Concession 4; Part of Lot 31, Concession 1; Part of Lots 22-23, 25-26, Concession 12, Geographic Township of Howland, Northeastern Manitoulin and the Islands (NEMI), District of Manitoulin

FIT#: F-000522-WIN-130-601 and F-000520-WIN-130-601

IRIMS: HD00045
PIF: P027-093-2010

Dear Proponent:

This letter constitutes the Ministry of Tourism and Culture's written comments as required by s. 22(3)(a) of O. Reg. 359/09 under the *Environmental Protection Act* regarding archaeological assessments undertaken for the above project.

Based on the information contained in the report(s) you have submitted for this project, the Ministry believes the archaeological assessment complies with the *Ontario Heritage Act's* licensing requirements, including the licence terms and conditions and the Ministry's 1993 Archaeological Assessment Technical Guidelines. Please note that the Ministry makes no representation or warranty as to the completeness, accuracy or quality of the Report(s).*

The report(s) recommends the following:

- It is recommended that the property be cleared of archaeological concerns; however,
- Should previously undocumented archaeological resources be discovered, they may be an archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48(1) of the Ontario Heritage Act.;
- The Cemeteries Act requires that any person discovering human remains must notify the police or coroner and the Registrar of cemeteries, Ministry of Small Business and Consumer Services.

Further, an amendment to the report received January 26, 2011 and concerning two realigned access roads recommends the following:

- During construction of these areas for use as access roads, archaeological supervision of the construction (ground disturbance) be conducted.

The Ministry is satisfied with these recommendations.

This letter does not waive any requirements which you may have under the Ontario *Heritage Act*. A separate letter addressing archaeological licensing obligations under the Act will be sent to the archaeologist who completed the assessment and will be copied to you.

This letter does not constitute approval of the renewable energy project. Approvals of the project may be required under other statutes and regulations. It is your responsibility to obtain any necessary approvals or licences.

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

Sincerely,

A Hinshelwood.

Andrew Hinshelwood
Archaeology Review Officer

cc. Scarlett Janusas
SJAHCE
269 Cameron Lake Road
Tobermory, ON N0H 2R0

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

Ministry of Tourism and Culture

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Ontario

February 1, 2011

Scarlett Janusas
Scarlett Janusas Archaeological and Heritage Consulting
269 Cameron Lake Road
Tobermory, ON N0H 2R0

Dear Scarlett,

Re: Review and acceptance into the provincial register of reports the archaeological assessment report entitled "Stage 2 Archaeological Resource Assessment McLean's Mountain Wind Farm Part of Lots 21 and 22, Concession 12; Part of Lot 3, Concession 8; Part of Lot 20, Concession 11; Part of Lot 9,oncession 6; Part of Lots 7-8, Concession 5; Part of Lot 7, Concession 4; Part of Lots 11-13, Concession 2; Part of Lot 14, Concession 3; Part of Lot 19-20, Concession 4; Part of Lot 31, Concession 1; Part of Lots 22-23, 25-26, Concession 12, Geographic Township of Howland, Northeastern Manitoulin and the Islands (NEMI), District of Manitoulin" written on July 23, 2010, received on July 28, 2010. Includes Addendum report entitled "Stage 2 Archaeological Resource Assessment McLean's Mountain Wind Farm Addendum" written on January 26, 2011, received January 26, 2011.

PIF: P027-093-2010

MTC: HD00045

FIT File#: F-000522-WIN-130-601 and F-000520-WIN-130-601

This office has reviewed the above-mentioned report, which has been submitted to this Ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c. 18). This review is to ensure that the licensed professional archaeological consultant has met the terms and conditions of their archaeological license, that archaeological sites have been identified and documented according to the 1993 technical guidelines set by the Ministry, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario.

The report recommends that the subject property, specifically the locations subject to Stage 2 archaeological assessment, as illustrated in the map, Figure 1 and in detailed maps found throughout the report, be cleared of archaeological concerns. The Ministry of Tourism and Culture concurs with these recommendations and accepts this report into the provincial register of archaeological reports.

The addendum further recommends that the initial (ground disturbance) phase of road construction for the two alignments revised since the initial report was reviewed (Figure 1 and Figure 2 of the addendum report) be monitored by a licensed archaeologist to confirm the extent and depth of existing disturbance, and to carry out necessary assessment of undisturbed portions.

Please feel free to contact me with any concerns of questions regarding this letter.

Yours,

Andrew Hinshelwood
Archaeology Review Officer

cc. D. McKinnon, Dillon Consulting Ltd. (416) 229-4692