September 2011

NORTHLAND POWER

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*

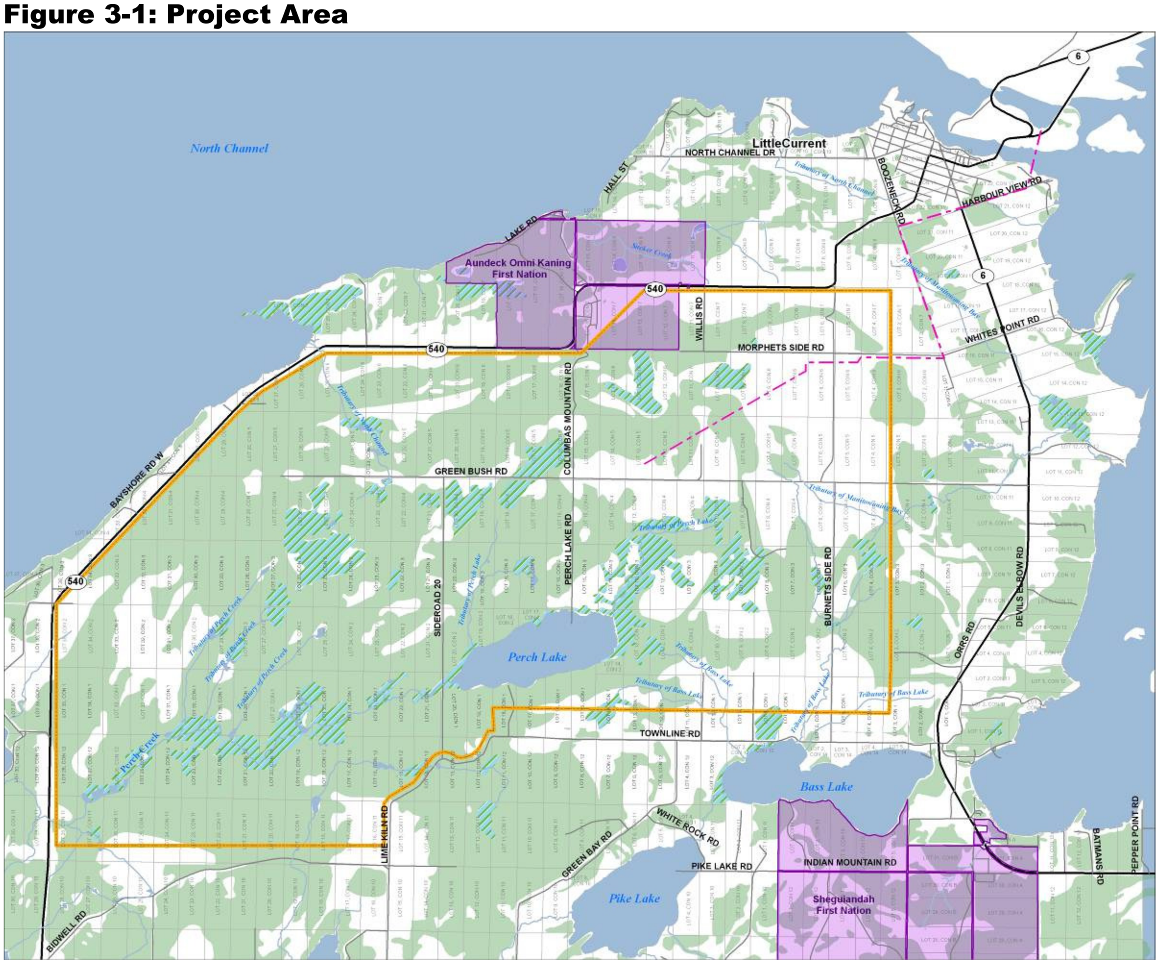
Dillon Consulting Limited is the prime consultant for the preparation of this *Construction Plan Report*. The Dillon contact is:

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
	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.	machines • 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*.

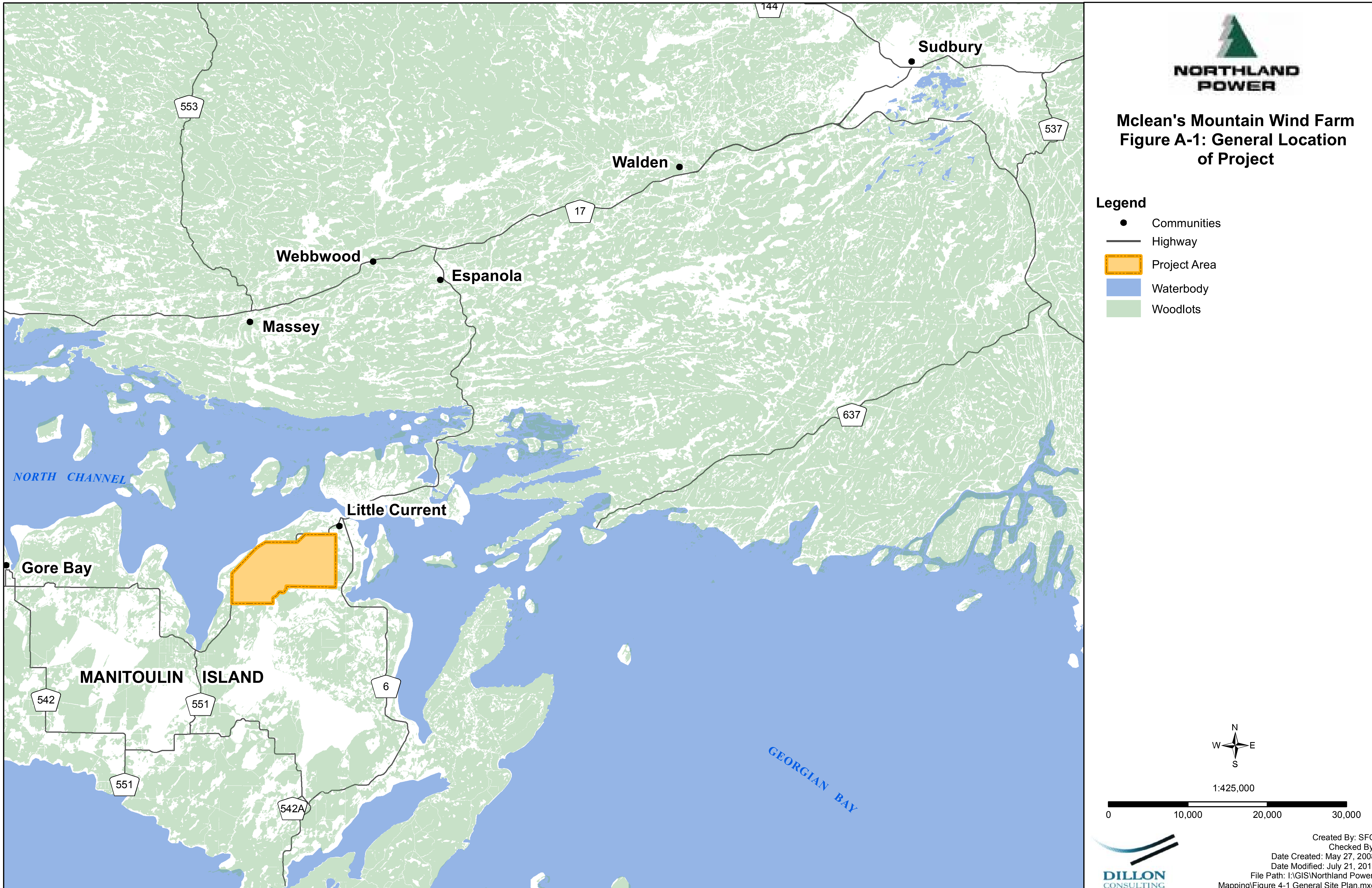
Sufficient fieldwork and data collection was performed to assist in the determination of potential effects to the various environmental and social features that may be affected by this project during the construction phase. Various mitigation measures to manage these potential effects have been identified.

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


Sudbury
Walden
Webbwood
Espanola
Massey
NORTH CHANNEL
Little Current
Gore Bay
MANITOULIN ISLAND
GEORGIAN BAY
144
553
537
17
637
6
542
551
551
542A
NORTHLAND POWER
Mclean's Mountain Wind Farm
Figure A-1: General Location of Project
Legend
Communities
Highway
Project Area
Waterbody
Woodlots
N
W
E
S
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0
10,000
20,000
30,000
DILLON CONSULTING
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Checked By:
Date Created: May 27, 2008
Date Modified: July 21, 2011
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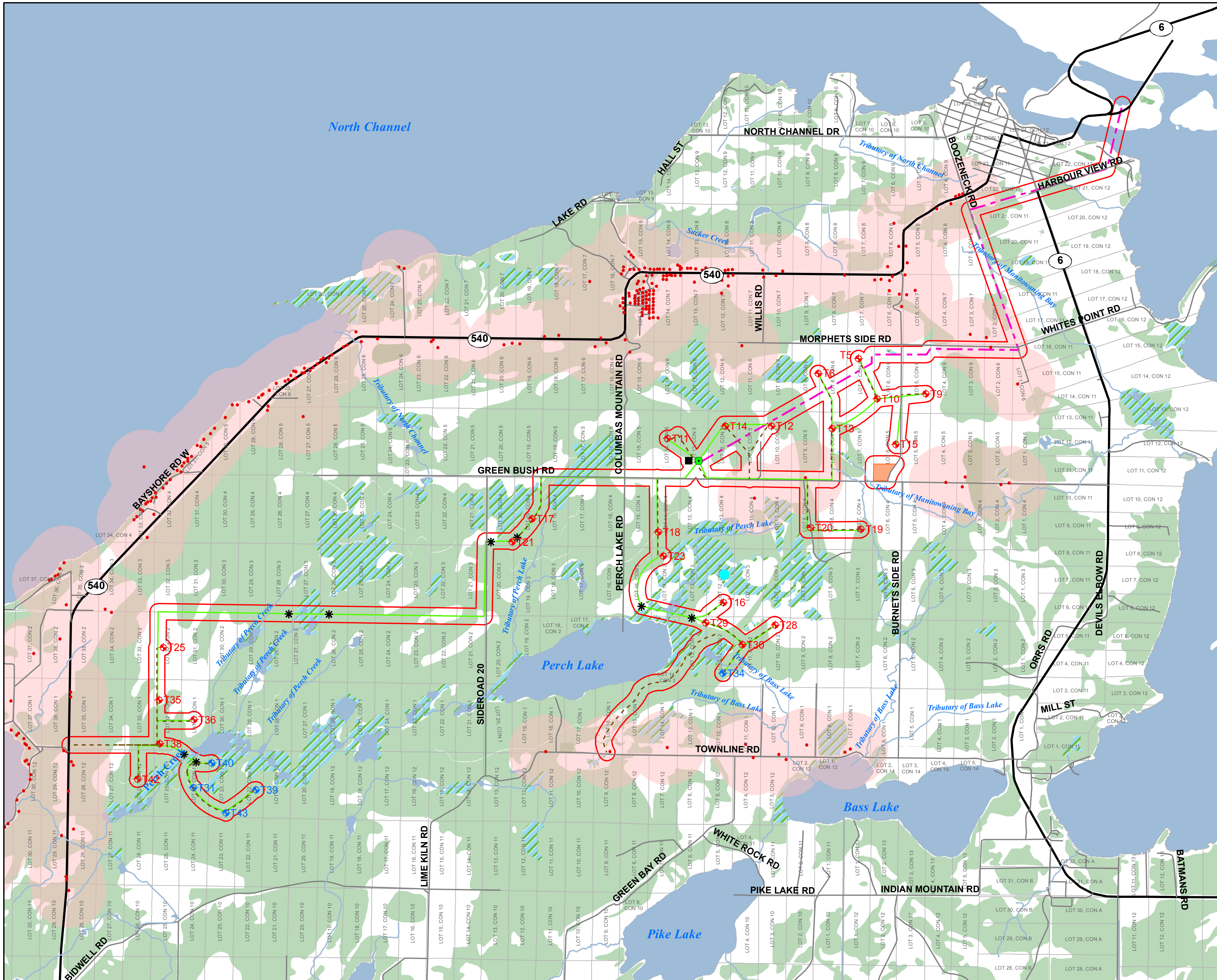
McLean's Mountain Wind Farm
Figure A-2: Project Components Site Plan



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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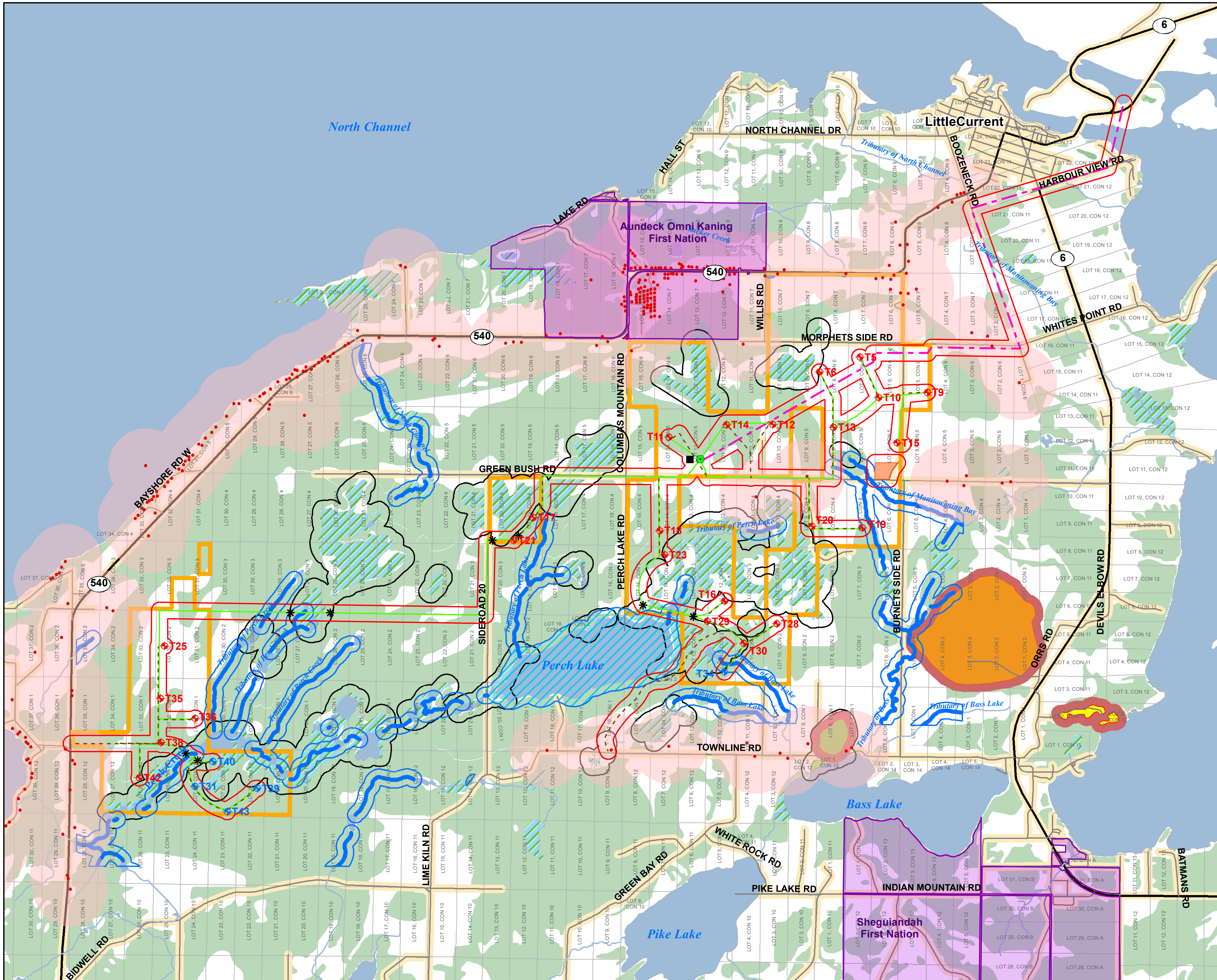

NORTHLAND POWER

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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DILLON CONSULTING

Created By: KWR
Checked By: DM
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Date Modified: July 6, 2011
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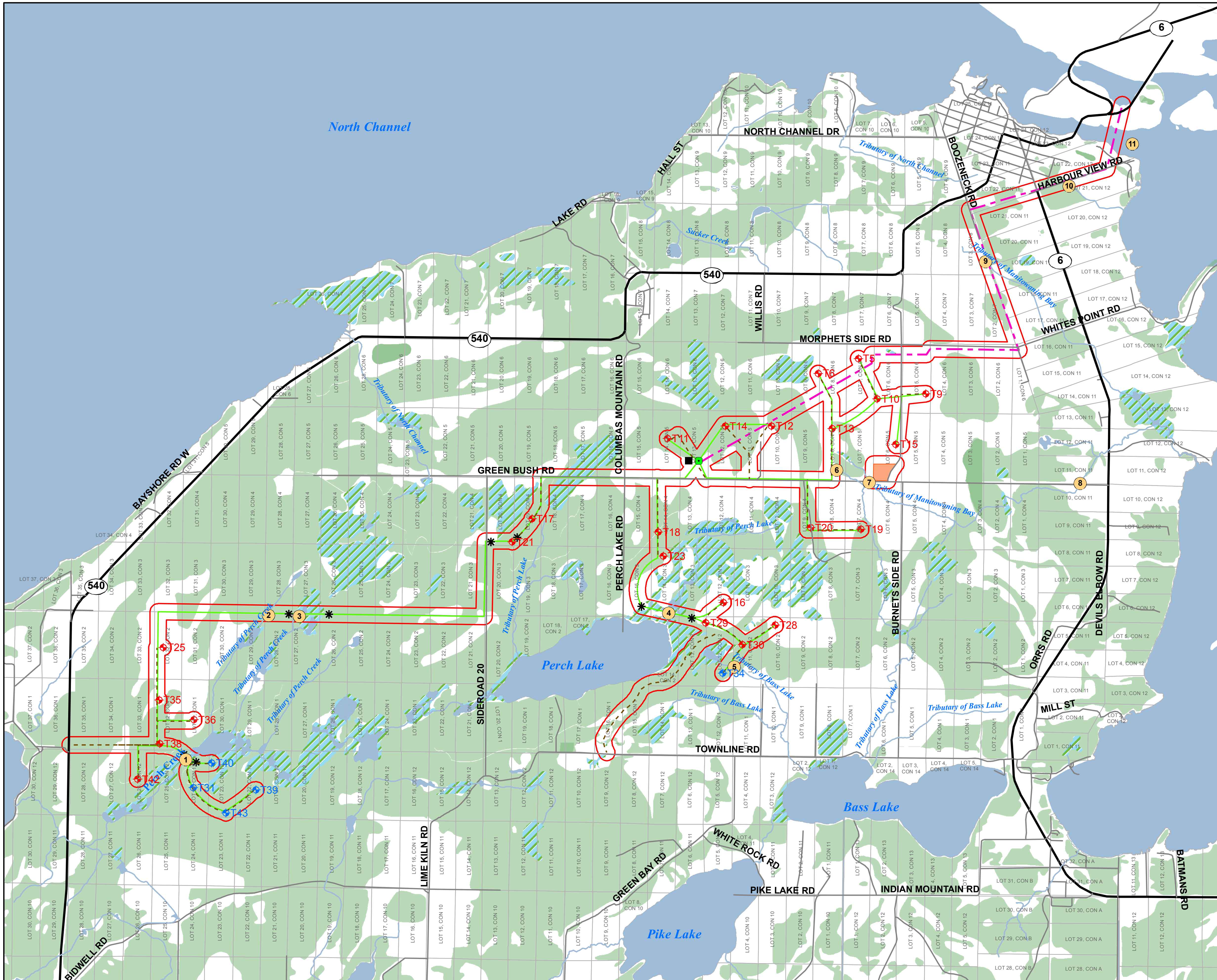

NORTHLAND POWER

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

Created By: SFG
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Date Modified: July 21, 2011
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DILLON CONSULTING

APPENDIX B
GE Specification Report on Site Roads and Crane Pads

Secured Document from General Electric – Available for download at:

http://mcleansmountain.northlandpower.ca

Under the 'Reports' Link

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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MANITOULIN ISLAND, ONTARIO

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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.

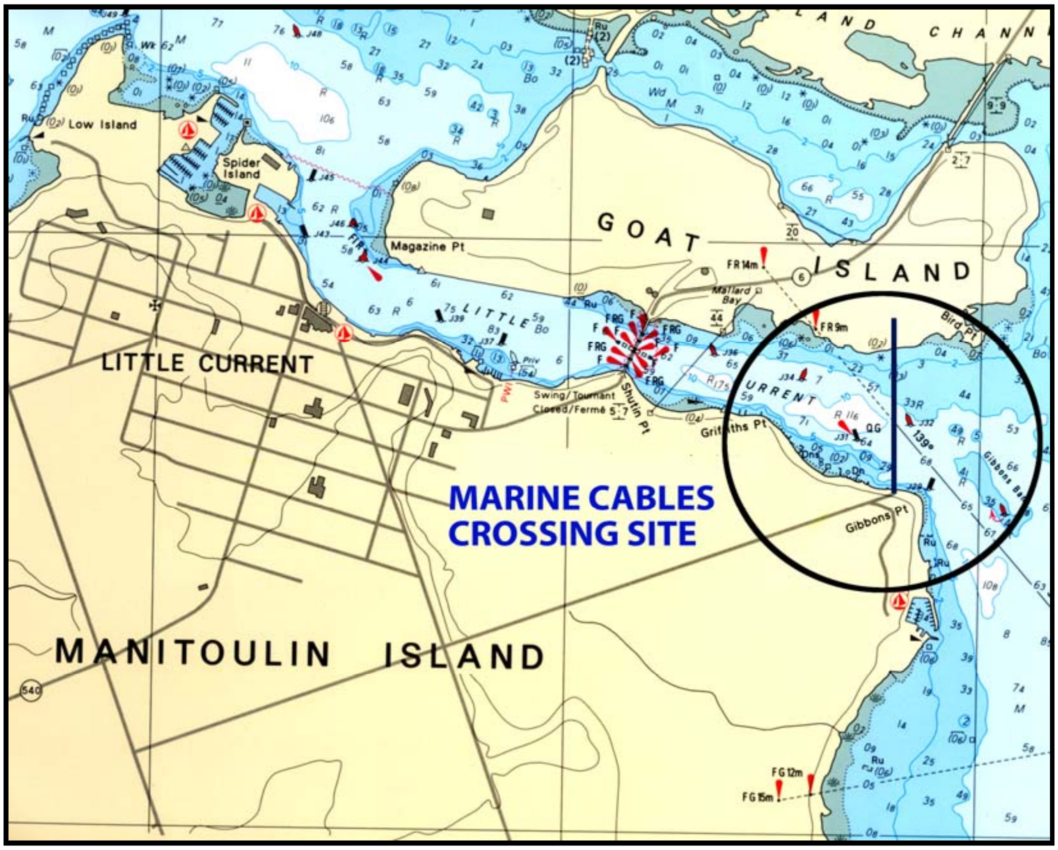


Figure 1: Location of MMWF marine cables crossing site.

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.

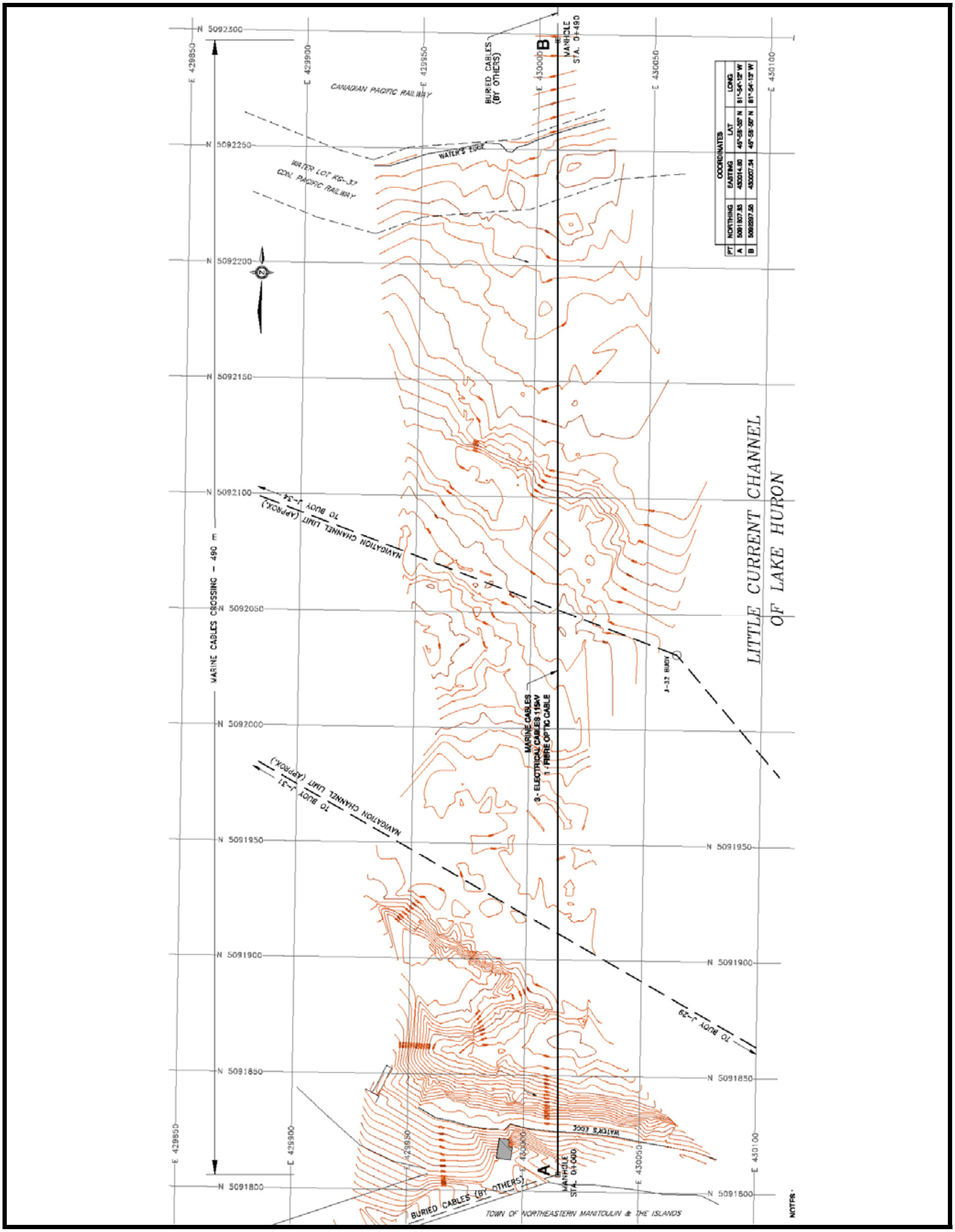


Figure 2 : General Plan – MMWF Marine Cables Crossing

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.

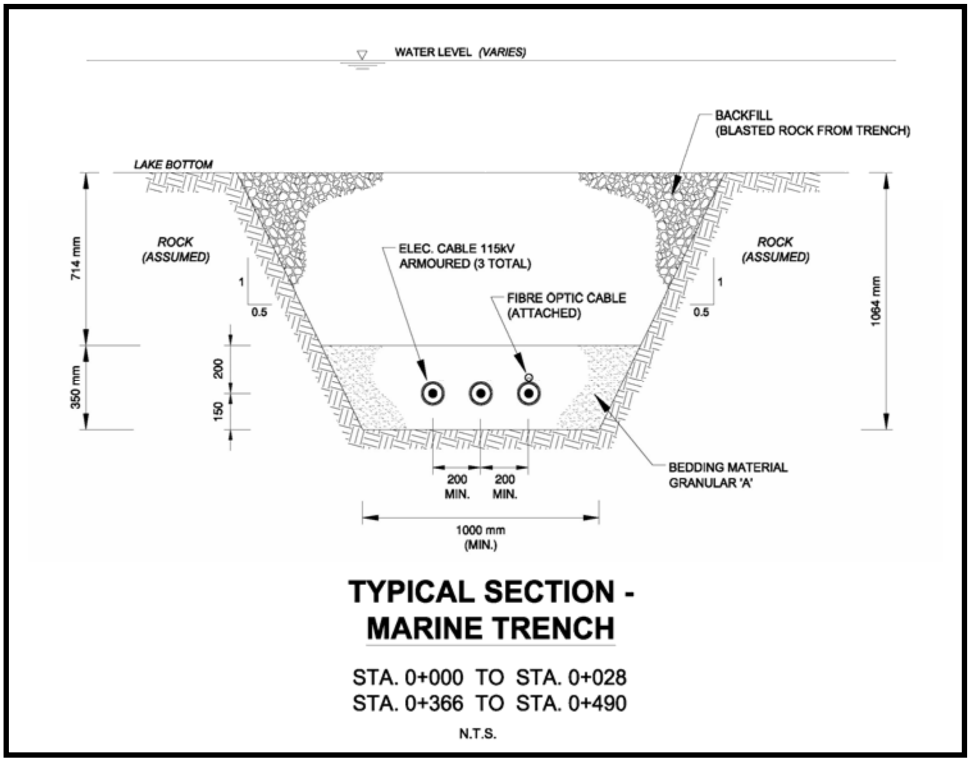


Figure 3: Typical Section – Cables in Marine Trench

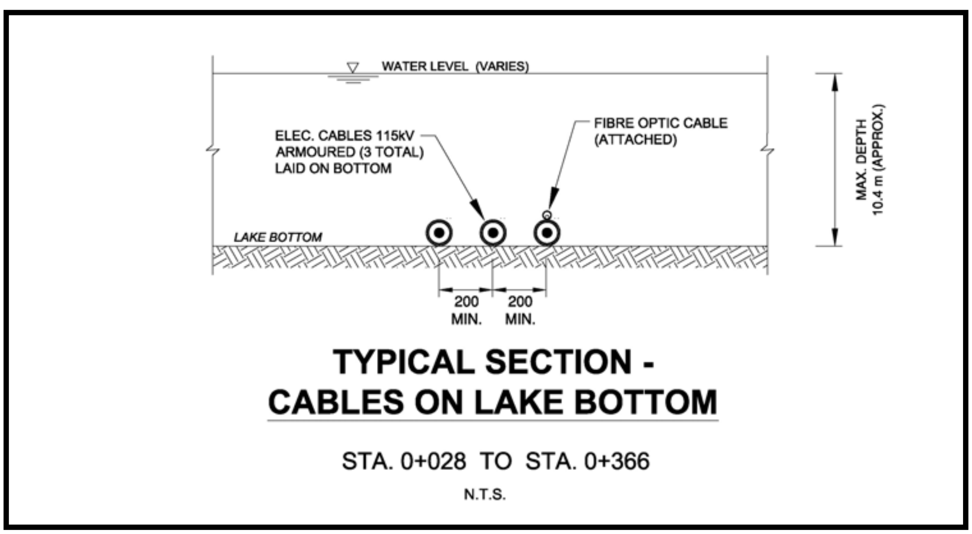


Figure 4: Typical Section – Cables Laid on Channel Bottom

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

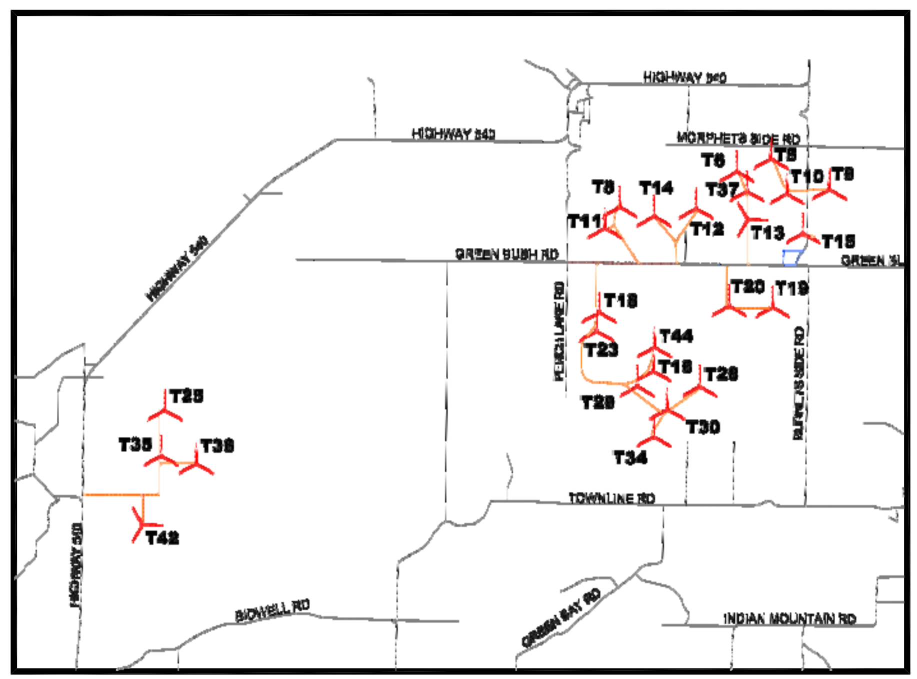
MCLEANS MOUNTAIN
WIND FARM

PRELIMINARY ROAD DESIGN

MANITOULIN ISLAND
LITTLE CURRENT, ONTARIO

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: ______________



PROJECT MAP

AREA MAP

PLAN PREPARED FOR:

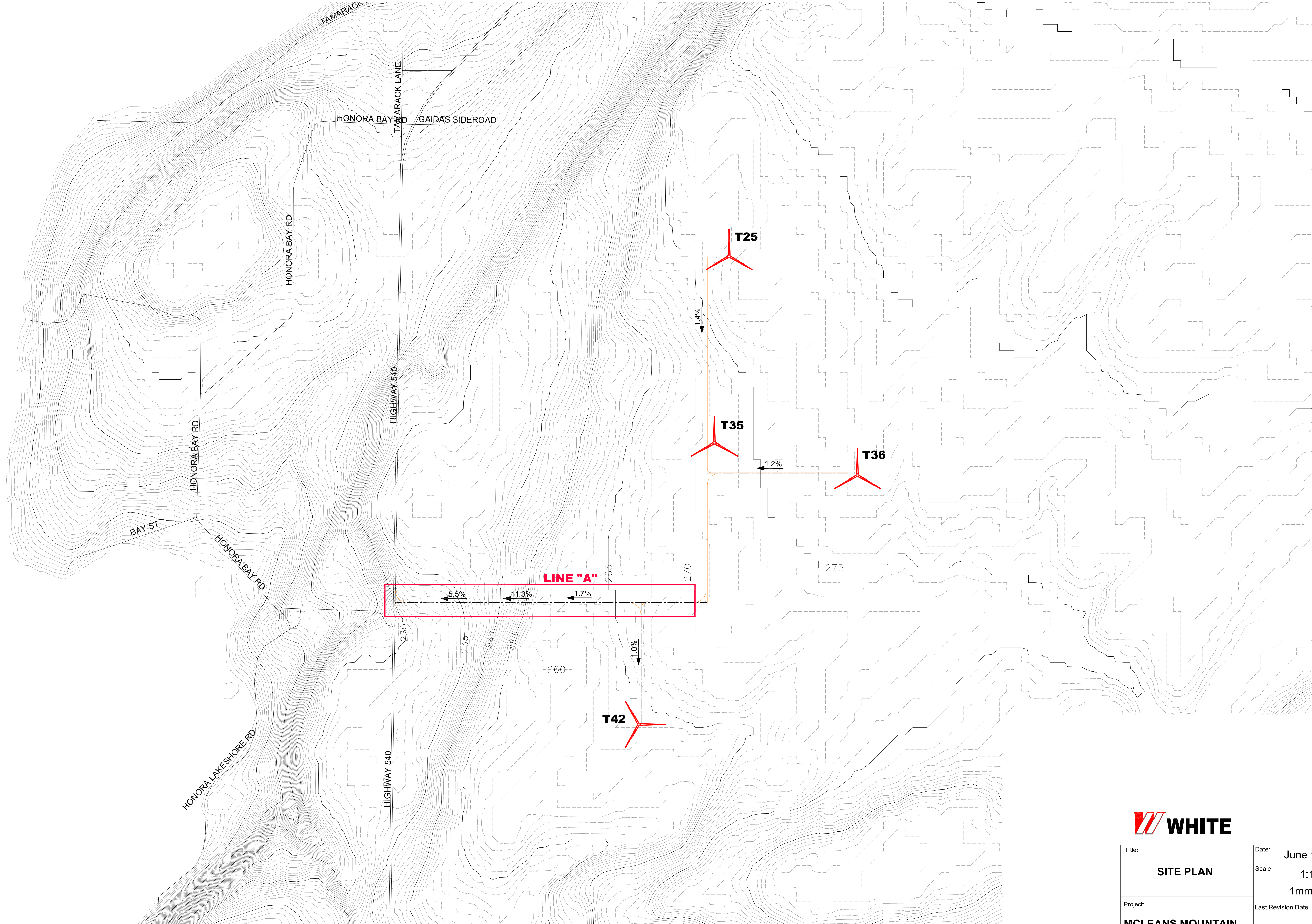
NORTHLAND POWER

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

PLAN PREPARED BY:

WHITE

11993 South State Road 63
Clinton, Indiana



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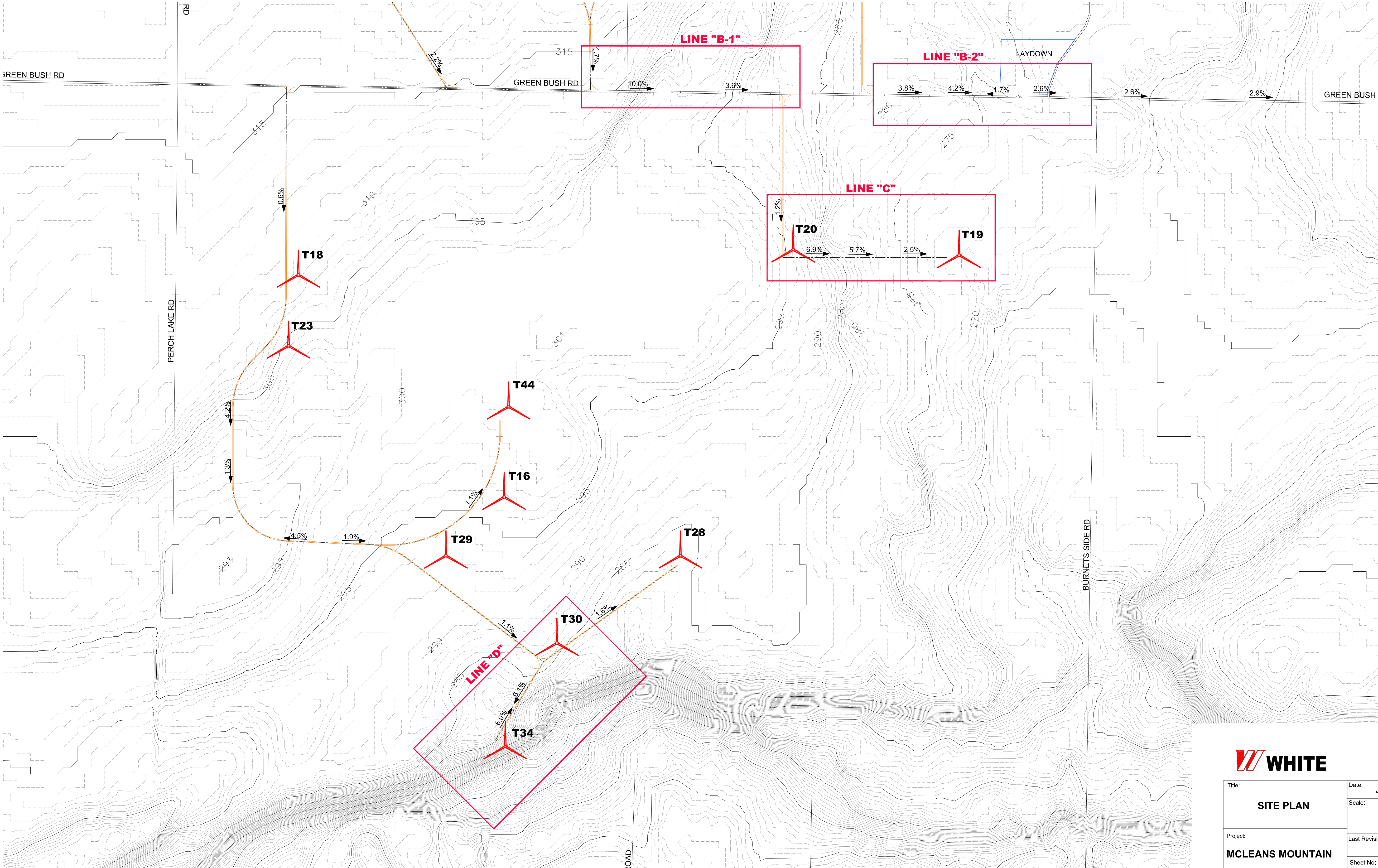

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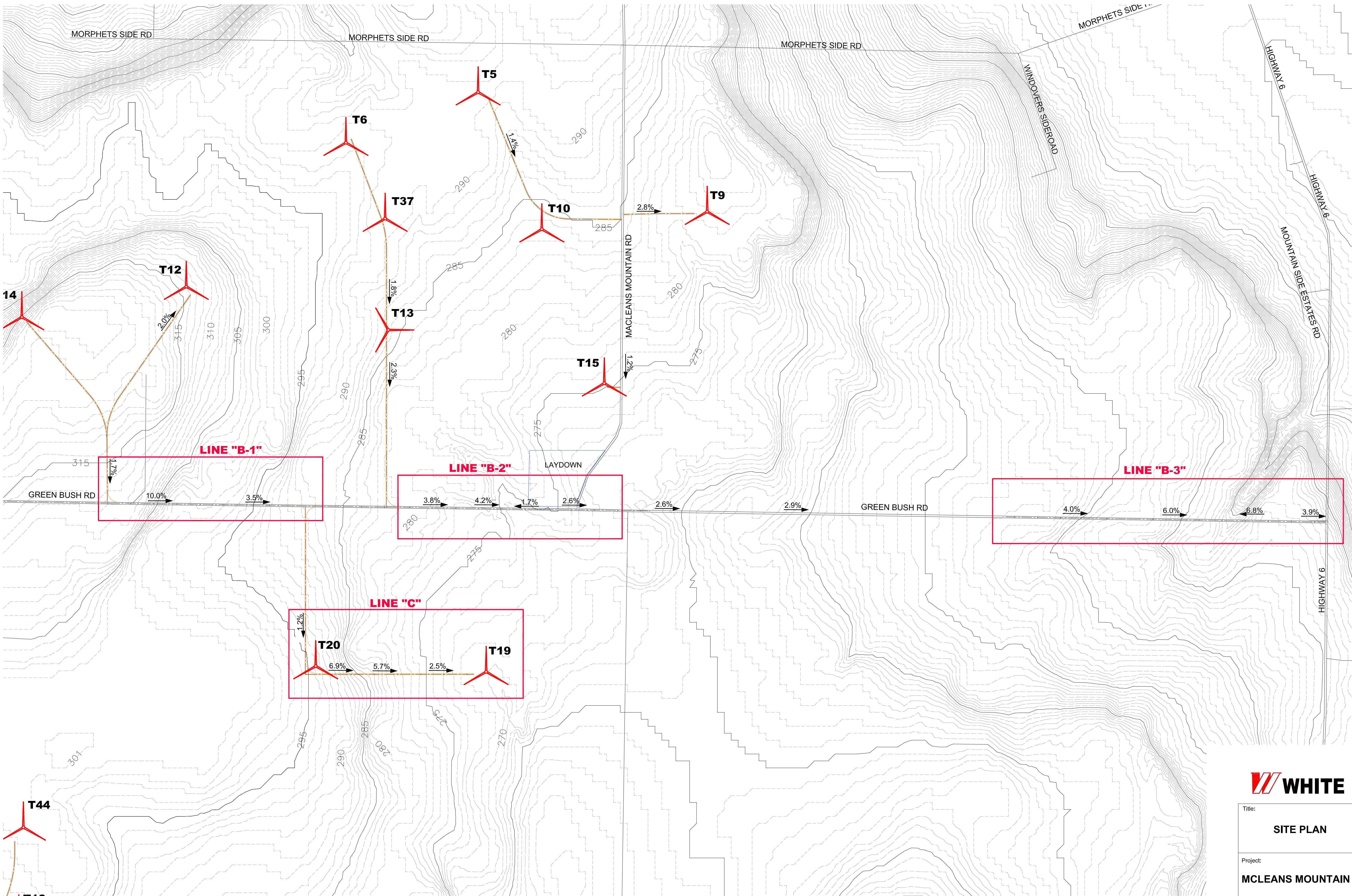

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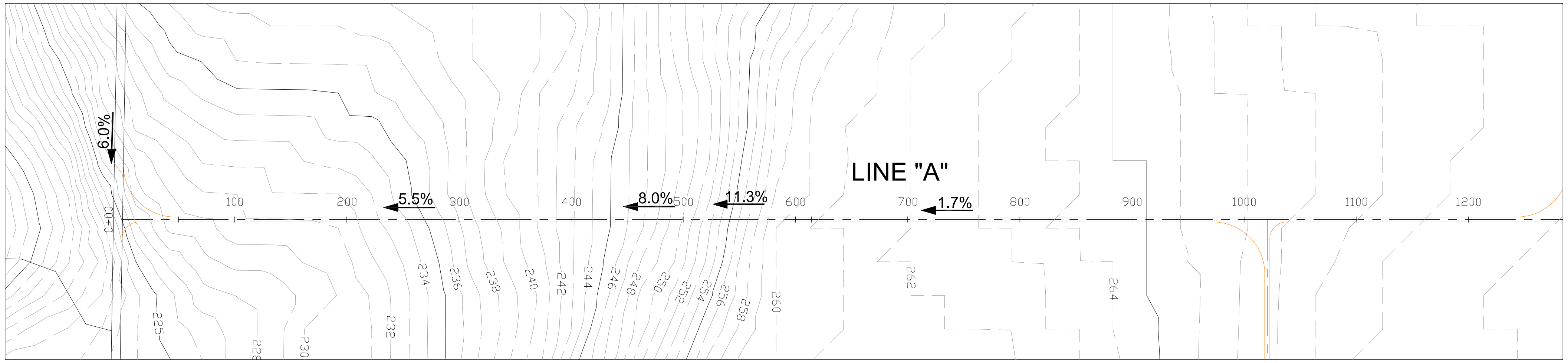

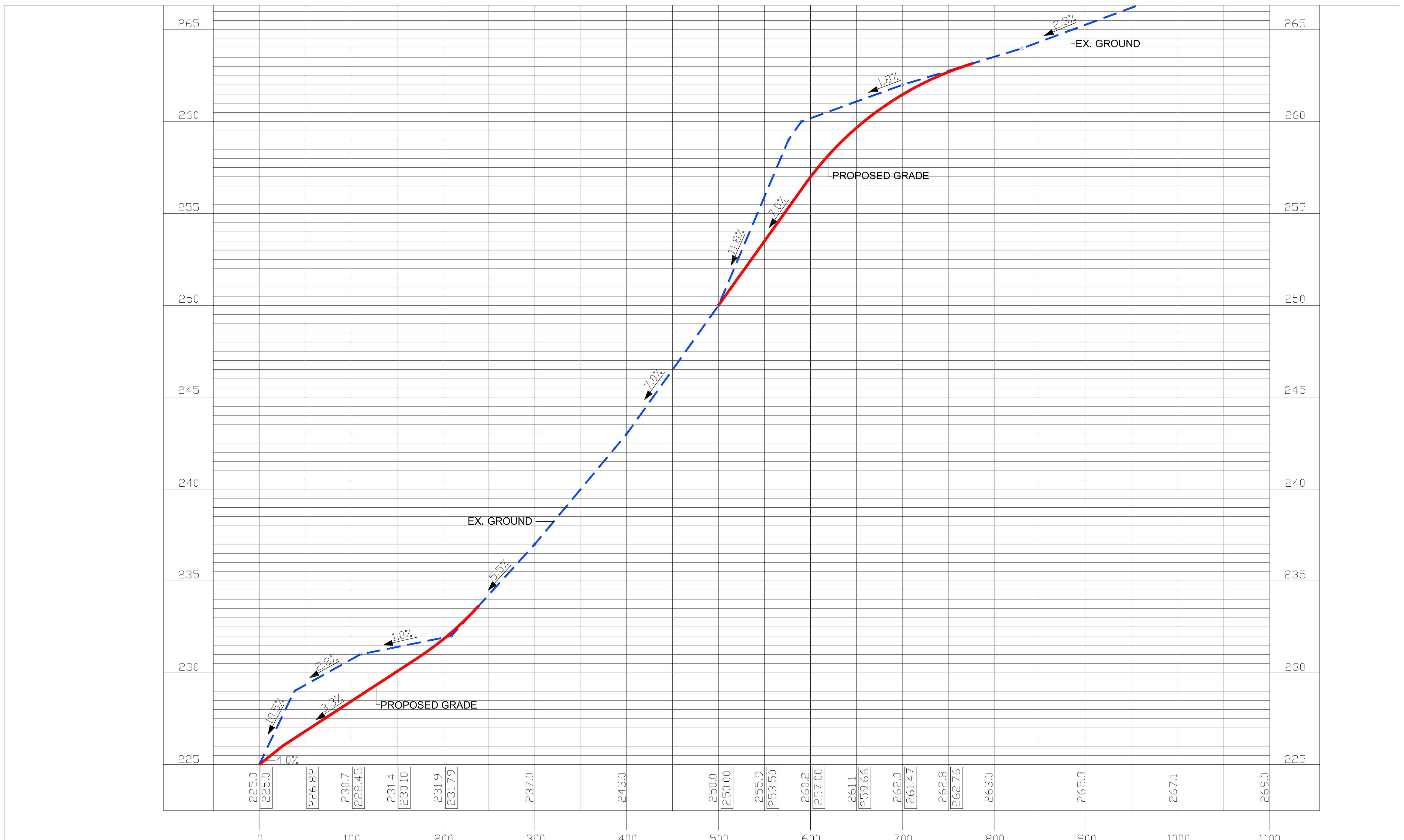

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Last Revision Date:

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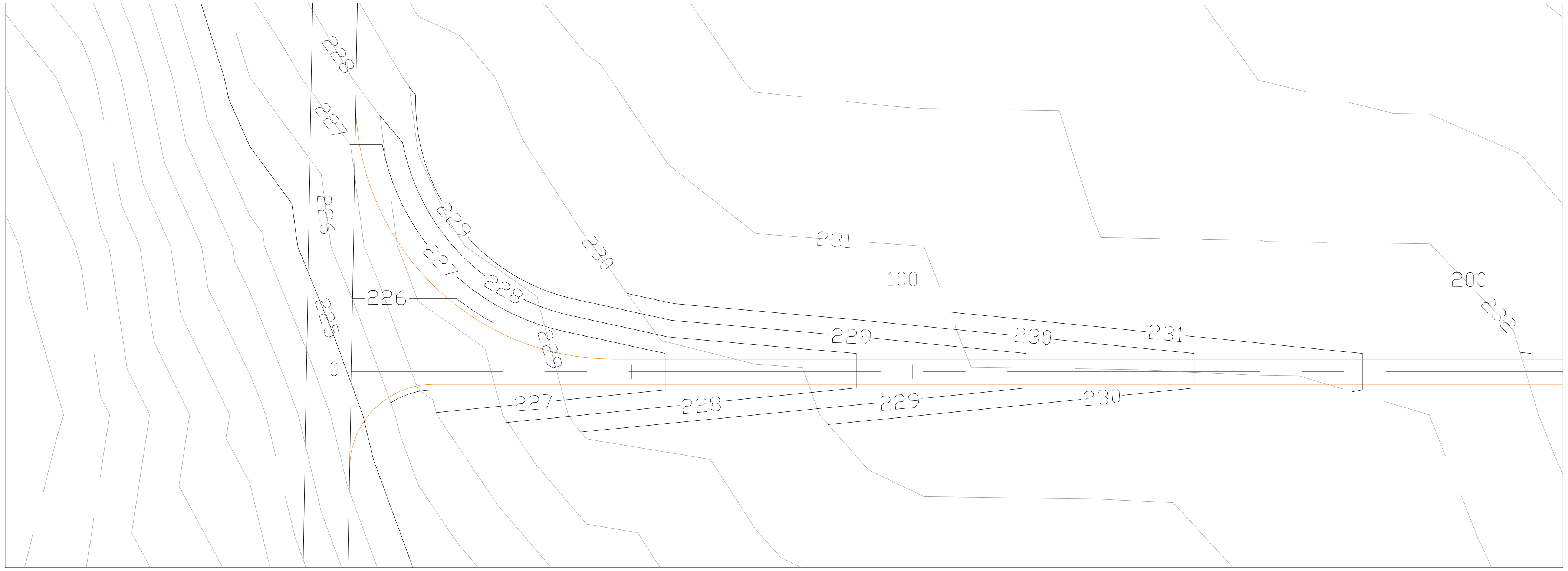

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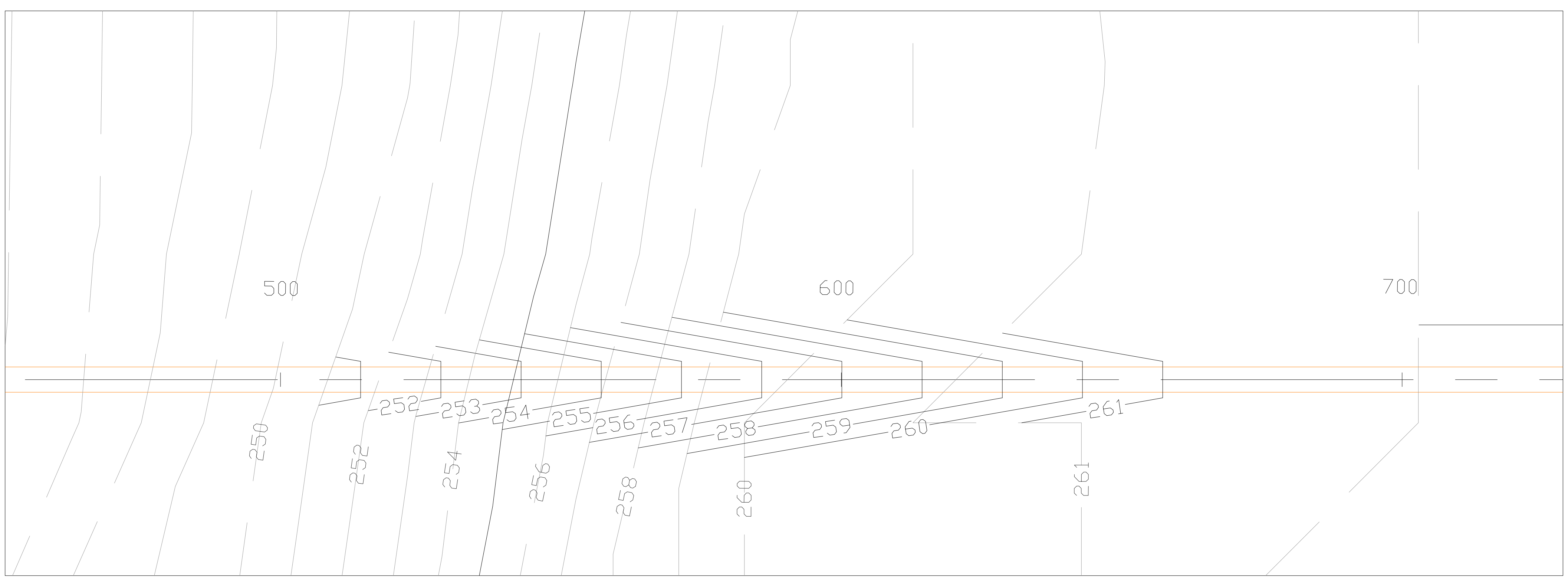

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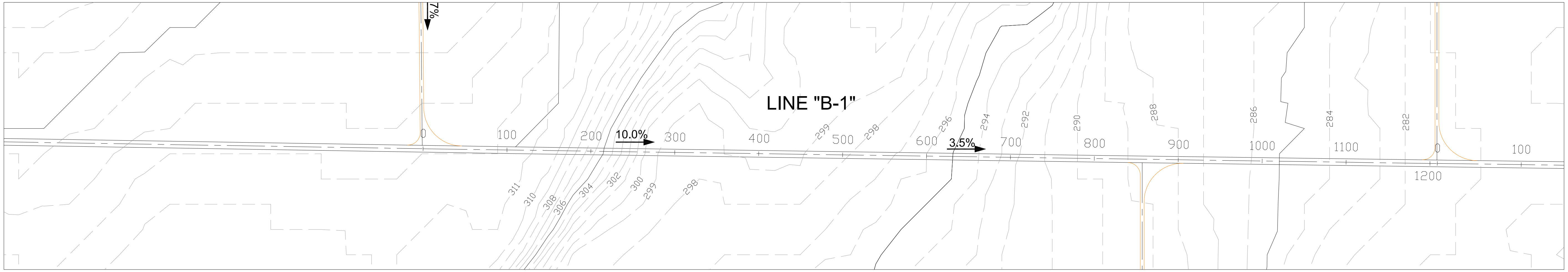

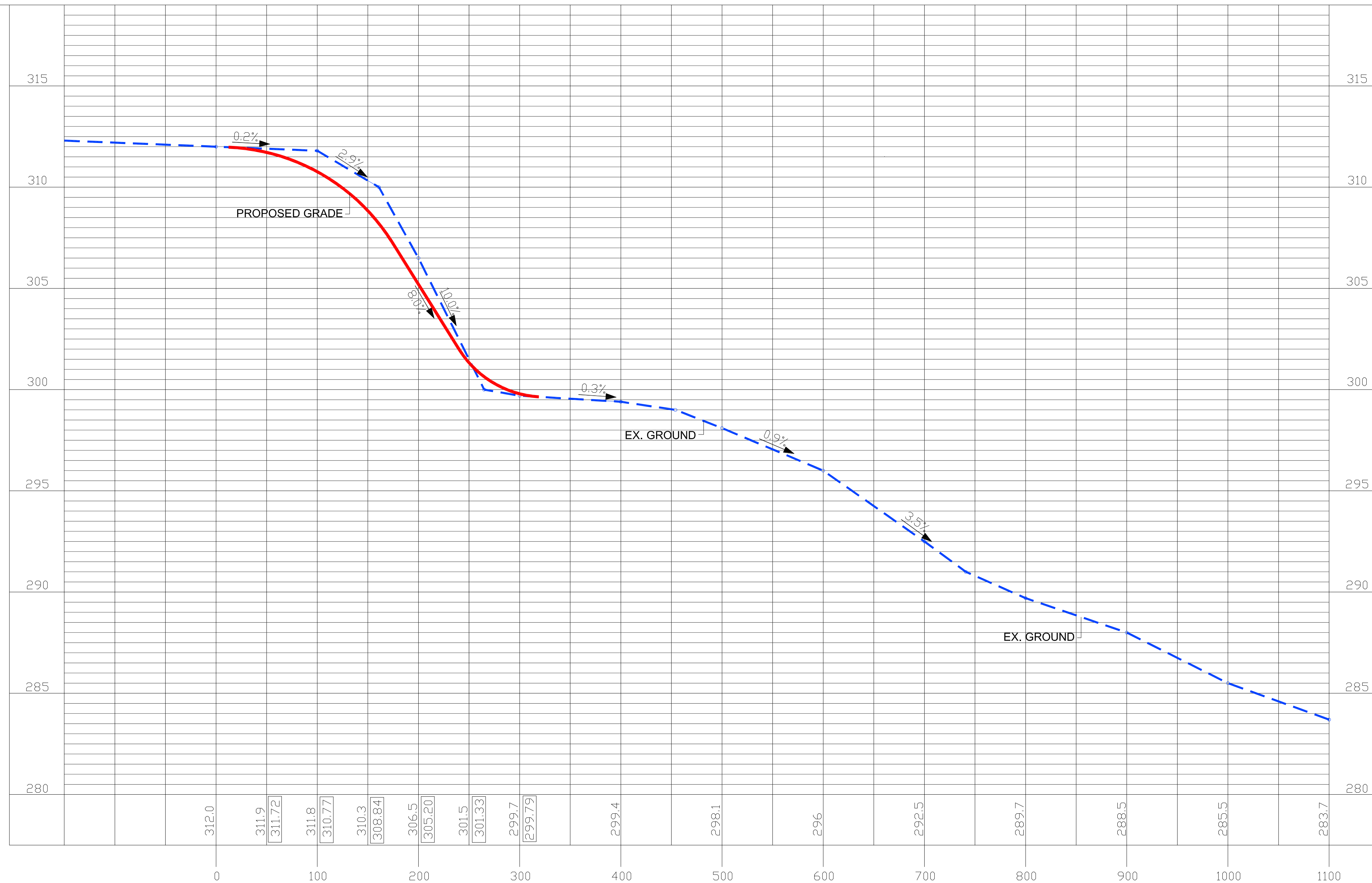

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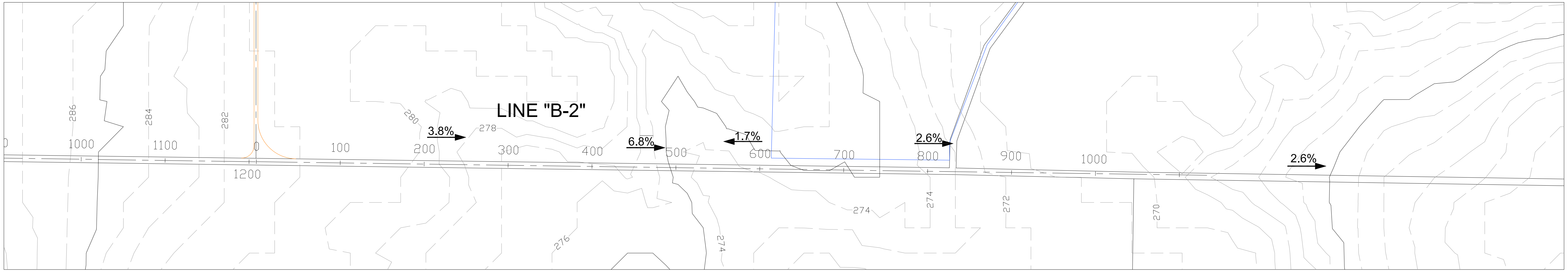

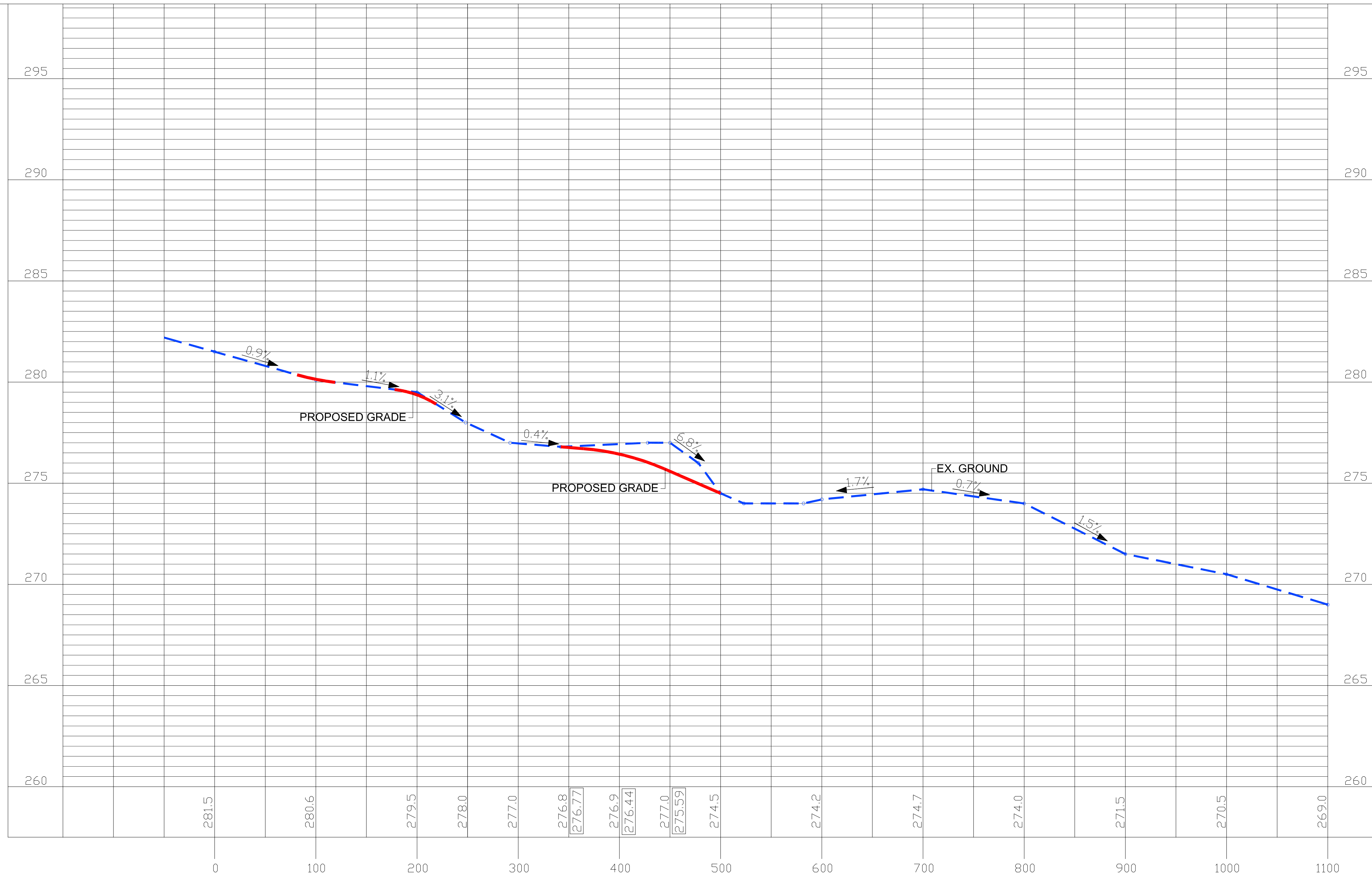

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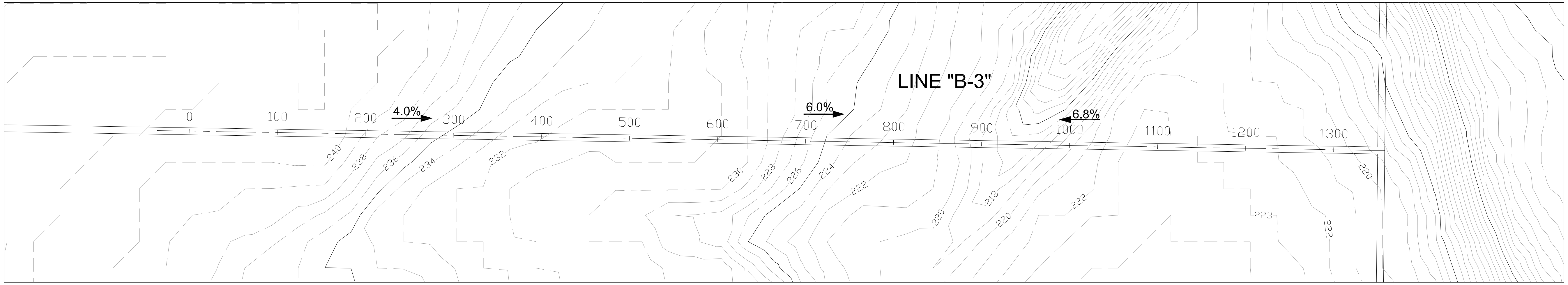

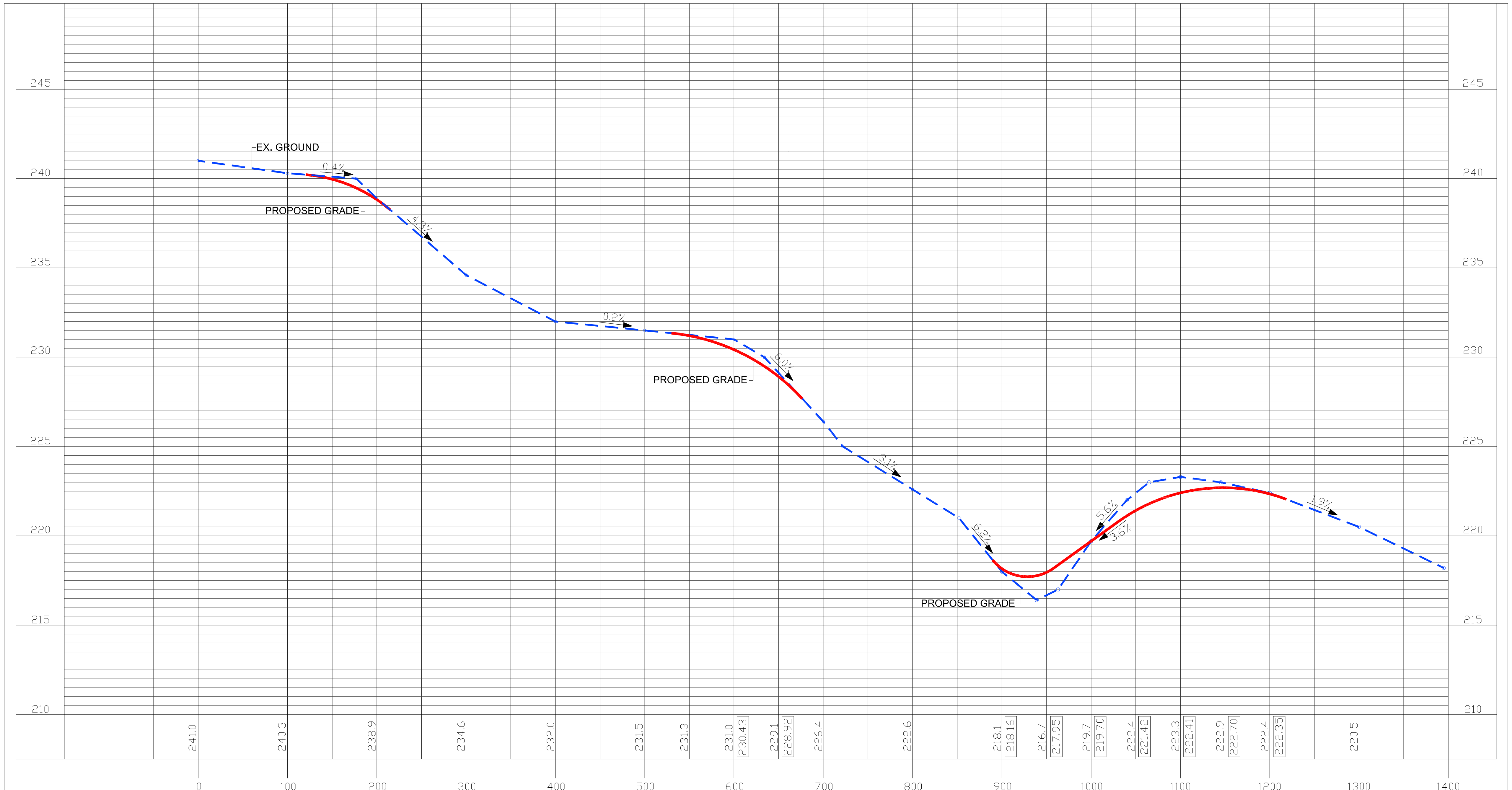

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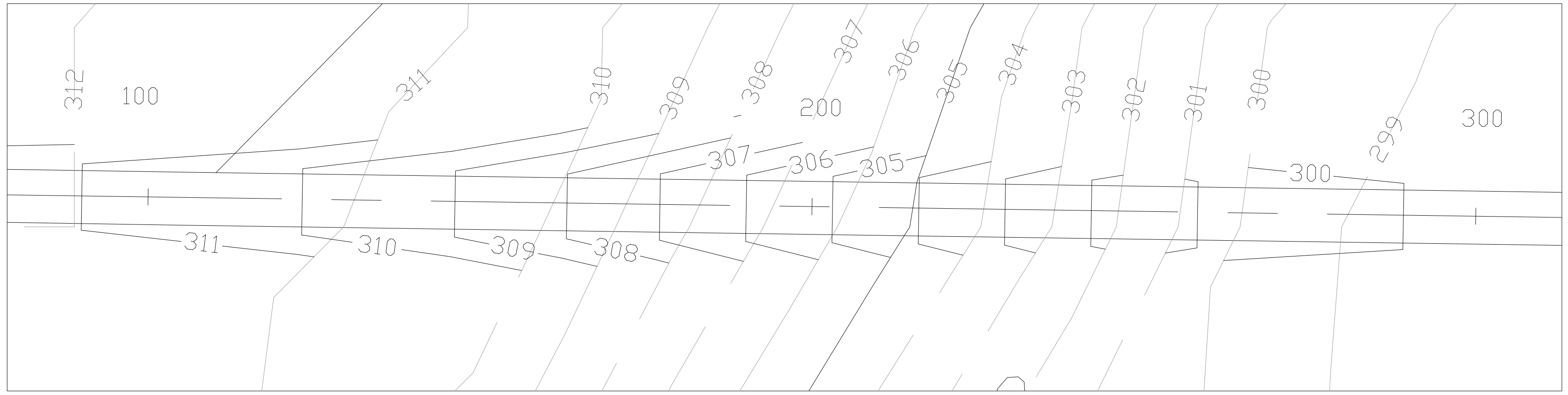
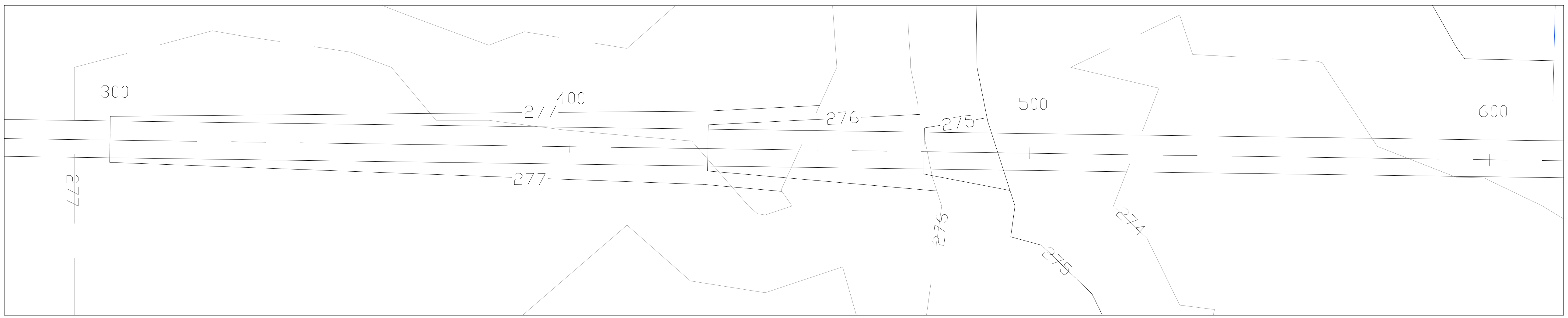
Project: MCLEANS MOUNTAIN	Last Revision Date:
Client: NORTHLAND POWER	Sheet No: 9 of 13



LINE "B-1"-STA. 100 TO 300

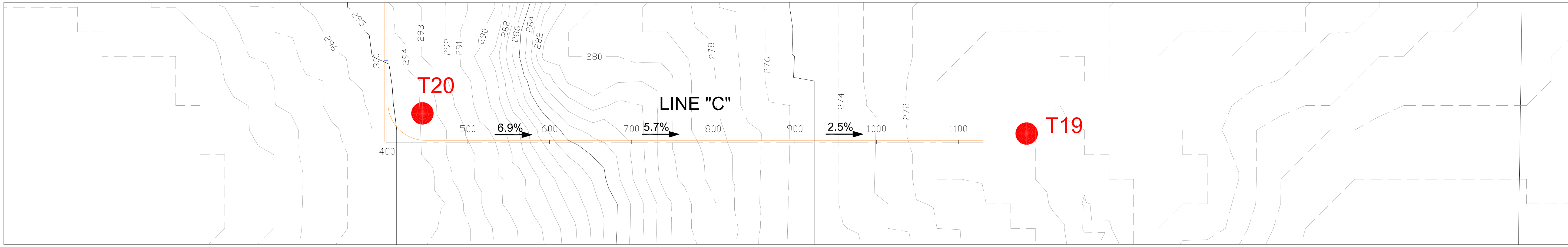


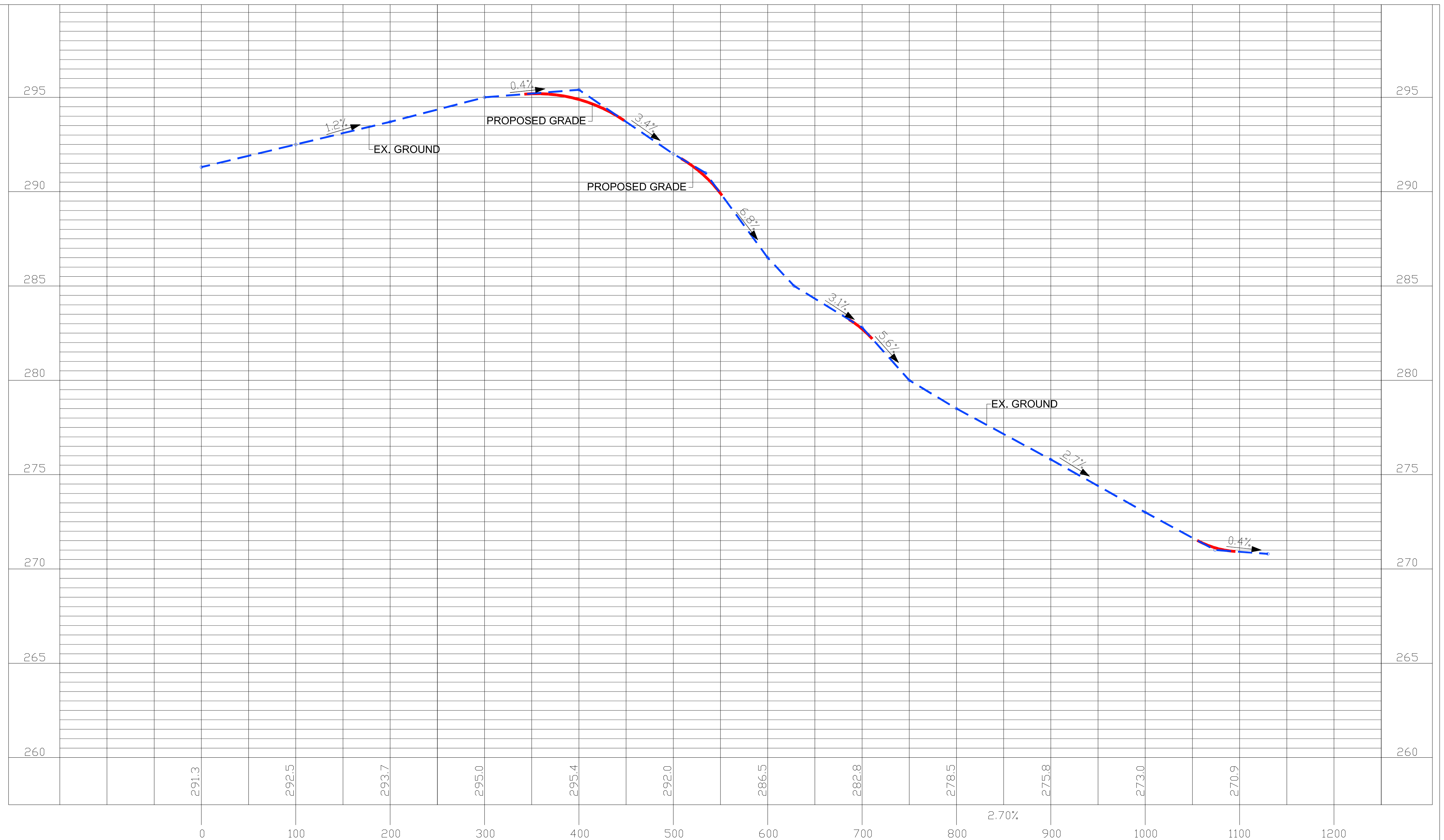
LINE "B-2"-STA. 300 TO 600

LINE "B-3"-STA. 900 TO 1200

WHITE

Title: GRADING DETAIL LINE "B"	Date: June 16, 2011
	Scale: 1:1000 1mm = 1 m
Project: MCLEANS MOUNTAIN	Last Revision Date:
Client: NORTHLAND POWER	Sheet No: 10 of 13

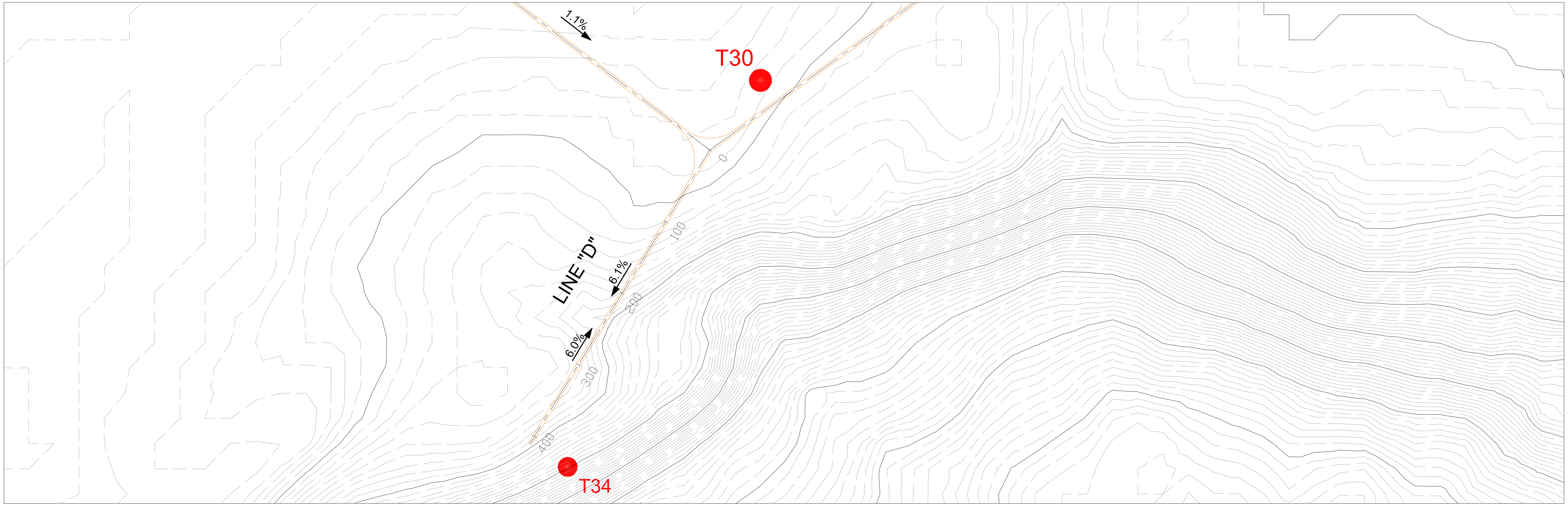


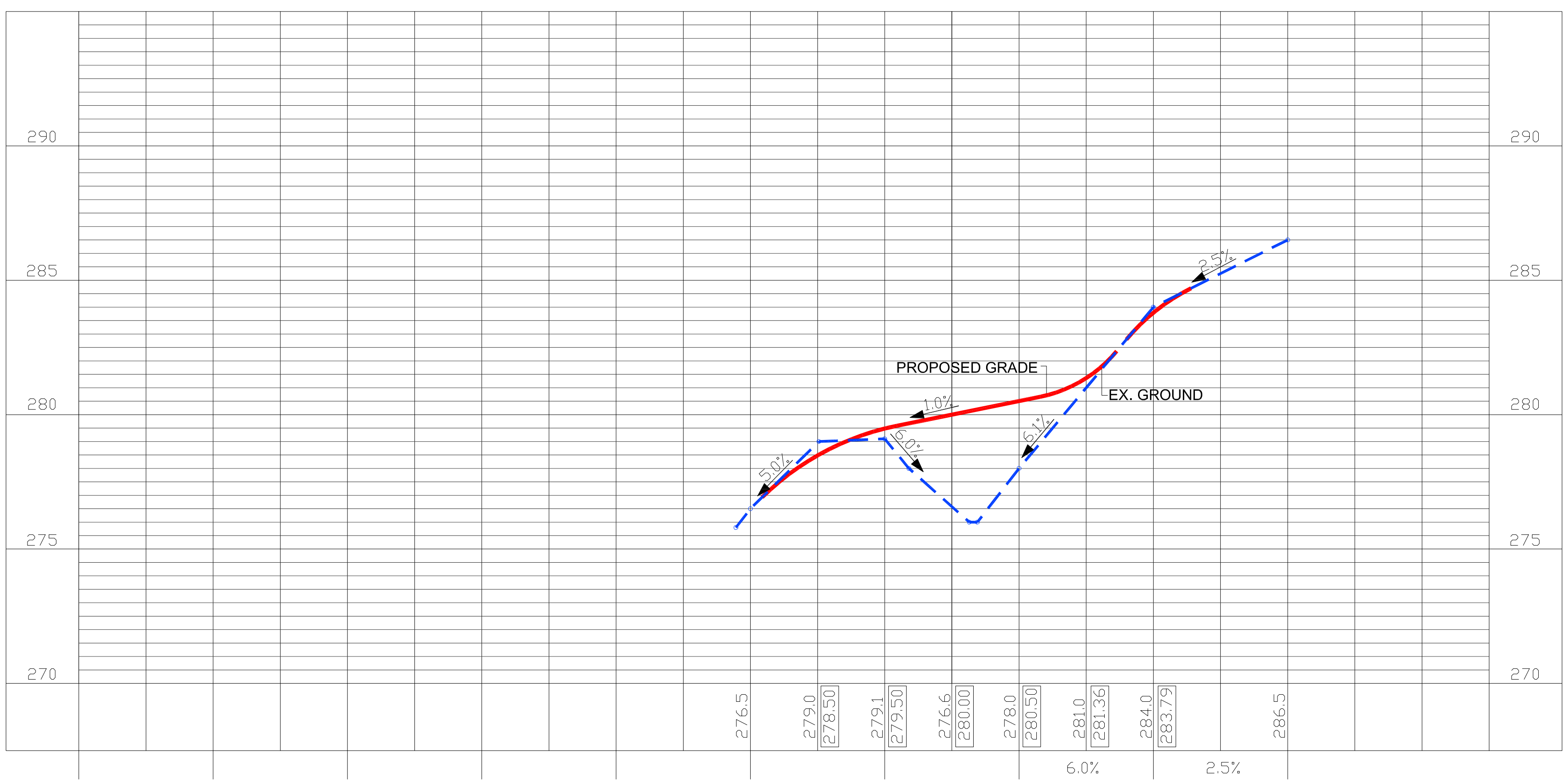


LINE "C" PROFILE

WHITE

Title: PROFILE LINE "C"	Date: June 16, 2011
	Scale: 1:10000 1mm = 10 m
Project: MCLEANS MOUNTAIN	Last Revision Date:
	Sheet No: 11 of 13
Client: NORTHLAND POWER	

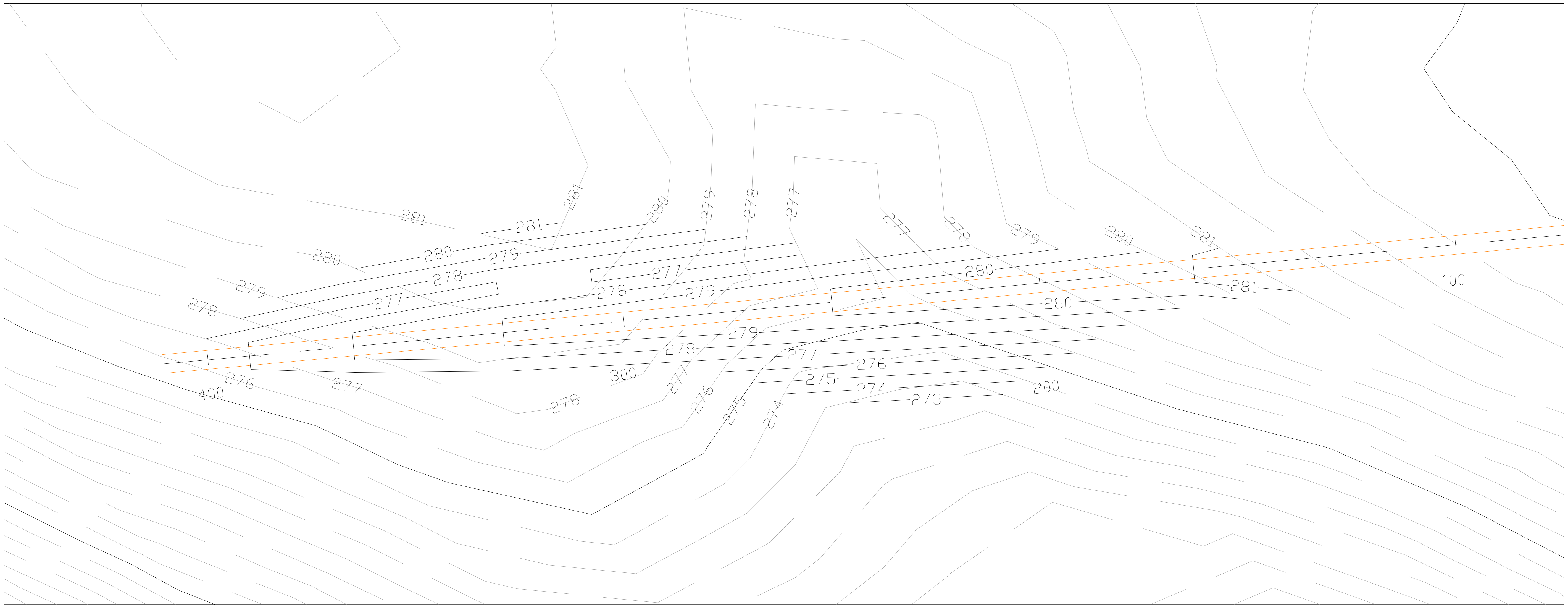




LINE "D" PROFILE

WHITE

Title: PROFILE LINE "D"	Date: June 16, 2011
	Scale: 1:10000 1mm = 10 m
Project: MCLEANS MOUNTAIN	Last Revision Date:
	Sheet No: 12 of 13
Client: NORTHLAND POWER	



LINE "D"-STA. 100 TO 400

WHITE

Title: GRADING DETAIL LINE "D"	Date: June 16, 2011
	Scale: 1:1000 1mm = 1 m
Project: MCLEANS MOUNTAIN	Last Revision Date:
	Sheet No: 13 of 13
Client: NORTHLAND POWER	