Department of Municipal Affairs and Environment
PO Box 8700
St. John's NL A1B 4J6
Attention: Director of Environmental Assessment

Re: Nain Wind Micro-Grid Project

Dear Joanna Sweeney,

Natural Forces is pleased to submit an Environmental Registration Document, for the proposed Nain Wind Micro-Grid Project, located near the community of Nain, Labrador on behalf of the Nunatsiavut Government. Through an open tender process, the Nunatsiavut Government selected Natural Forces as a development partner for the Nain Wind Micro Grid Project.

The *Environmental Assessment… A Guide to the Process* has been followed in the development of this document. Natural Forces and the Nunatsiavut Government are confident that the registration document sufficiently addresses the requirements.

Attached to this cover letter is a Table of Concordance demonstrating how the Environmental Registration document has met the requirements for specific project information to be included for registration.

Natural Forces and the Nunatsiavut Government are eager to work with Provincial regulators to provide any additional information about the Nain Wind Micro-Grid Project that may be requested.

At this point of the process, there are no expected significant residual environmental effects for the proposed Nain Wind Micro-Grid Project on the surrounding environment.

Should there be any questions regarding this letter and the responses, please do not hesitate to contact either Nick Mercer or me at (709) 899-0041 or via email at nick.mercer@nunatsiavut.com or (902) 422-9663 or via email at apellerin@naturalforces.ca, respectively.

Sincerely,

Amy Pellerin, P.Eng | Senior Development Manager
natural forces
1801 Hollis Street | Suite 1205 | Halifax | NS | B3J 3N4
t: +1 902 422 9663 x 210 | f: +1 902 422 9780 | m: +1 902 818 2542

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Requirements in accordance with *Environmental Assessment… A Guide to the Process*	Section Addressing Requirements
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Name of Corporate Body	2.1 Name of Corporate Body
Address	2.2 Proponent Address
(i) Chief Executive Officer: Name Official Title Address Telephone Number (i) Email Address	2.2 Chief Executive Officer
(ii) Principal Contact Person for purposes of environmental assessment: Name Official Title Address Telephone Number (ii) Email Address	2.4 Principal Contact Persons for Purposes of Environmental Assessment
(iii) The Undertaking	3 The Undertaking
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Purpose/Rationale/Need for the Undertaking	3.2 Purpose/Rationale/Need for the Undertaking
Description of the Undertaking	4 Description of the Undertaking
(i) Geographical Location	4.1 Geographic Location
(ii) Physical Features	4.2 Physical Features 5.1 Physical
(iii) Construction	4.3 Construction
(iv) Operation	4.4 Operation

(v) Occupations	4.5 Occupations
(vi) Project Related Documents	4.6 Project Related Documents
Approval of the Undertaking	7 Approval of the Undertaking
Schedule	8 Schedule
Funding	9 Funding

NAIN WIND MICRO-GRID PROJECT

Environmental Registration Document

January 2021

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List of Acronyms

NG	Nunatsiavut Government
SAR	Species at Risk
SARA	Species at Risk Act
IEC	International Electrotechnical Commission

1 Name of the Undertaking

Nain Wind Micro-Grid

2 Proponent

2.1 Name of Corporate Body

To reduce reliance on diesel fuel as well as to pursue the opportunity to promote economic development, the Nunatsiavut Government (NG) has been pursuing a wind project in Nain. Through an open tender process, the NG selected Natural Forces Development Limited Partnership (Natural Forces) as a development partner for the Nain Wind Micro Grid project.

2.1.1 *Development Partner Qualifications*

Natural Forces is an independent power producer and project developer headquartered in Halifax, NS with a breadth of experience with renewable energy projects

Natural Forces was established in 2001, and has offices located in Halifax, Nova Scotia, Quispamsis, New Brunswick and Dublin, Ireland. Natural Forces has over 75 years of combined local, national, and international experience in the renewable energy sector. Natural Forces is a renewable energy developer, constructor, operator, and long-term asset owner. Currently active in many of the major Canadian renewable energy markets, Natural Forces specifically focuses on wind, solar and small hydro technologies.

Natural Forces has a long and successful history of delivering permitted wind farms to a construction ready stage. By utilizing both third-party professional environmental consultants, and in-house environmental and engineering teams, projects are permitted and delivered on schedule while maintaining an economic competitiveness.

Natural Forces, in partnership with TransAlta Renewables developed, constructed, and co-owns New Brunswick's first wind farm: the Kent Hills Wind Farm which has an installed capacity of 167 MW. As well, Natural Forces, acting on behalf of the Oinpegitjoig Wind Limited Partnership, have commissioned the 3.8 MW Richibucto Wind Project in partnership with Pabineau First Nation and the 20 MW Wocawson Energy Project, developed and owned in partnership with Tobique First Nation.

In addition to these New Brunswick Projects, Natural Forces developed, constructed, owns and operates ten wind farms in the Maritimes in partnership with community groups or stakeholders as shown in Table 2-1.

Table 2-1: Natural Forces operational wind energy projects.

Project Name	Partnerships	Number of turbines	Rated Capacity
Fairmont Wind Farm	Wind4All – a CEDC	2	4.6 MW
Hillside Boularderie Wind Farm	Wind4All Communities – a CEDC	2	4 MW
Pictou Landing Wind Farm	Pictou Landing First nation and Wind4All Communities lll – a CEDC	1	1.6 MW
Gardiner Mines Wind Farm	Cape Breton University	3	5.4 MW
Gaetz Brook Wind Farm	Wind4All Communities – a CEDC	1	2.3 MW
Barrachois Wind Farm	Wind4All Communities IV	2	4 MW
Aulds Mountain Wind Farm	Wind4All Communities ll	2	4.6 MW
Amherst Community Wind Farm	The Assembly of Nova Scotia Mi'Kmaq Chiefs and Wind4AllCommunities lll	2	6 MW
Oinpegitjoig Wind Project	Oinpegitjoig Wind Limited Partnership	1	3.8 MW

Wocawson Energy Project	Wocawson Energy Limited Partnership	5	20 MW
Kent Hills Wind Farm	TransAlata Renewables	55	167 MW

Natural Forces has successfully permitted all their wind projects in both Nova Scotia and New Brunswick. Nine of the sites were required to follow provincially legislated Environmental Impact Assessment processes under their respective provincial *Environmental Assessment Acts*. Natural Forces has worked closely with Provincial regulators, stakeholders, and First Nations on all previously approved projects, and are well versed in existing Environmental Impact Assessment legislation and guidelines. In addition to environmental and engineering teams, Natural Forces also possesses construction management, and operation teams who carry projects through to completion.

2.2 Proponent Address

Nunatsiavut Government
25 Ikajuktauvik Road
P.O. Box 70
Nain, NL
A0P 1L0

Natural Forces Development Limited Partnership
1205-1801 Hollis Street
Halifax, Nova Scotia
B3J 3N4

2.3 Chief Executive Officer

Johannes Lampe
President of Nunatsiavut Secretariat
Nunatsiavut Government

John Brereton
President of Natural Forces
Natural Forces Development Limited Partnership

2.4 Principal Contact Persons for Purposes of Environmental Assessment

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(902) 422 9663 x 210

3 The Undertaking

3.1 Name of the Undertaking

Nain Wind Micro Grid Project

3.2 Purpose/Rationale/Need for the Undertaking

The people of Nunatsiavut are deeply connected to their environment and rely heavily on the resources of land and sea for survival. However, Nunatsiavut's energy situation is precarious, with complete reliance on diesel generators; these generators are becoming increasingly undesirable due to their polluting nature and greenhouse gas emissions, primarily in the forms of nitrous oxide and sulfur oxide, in addition to the release of carbon monoxide and hydrocarbons. Airborne emissions from diesel generators have potential impacts on human health and the integrity of the environment. While some of the health impacts of climate change have been documented globally, some populations have been identified as particularly vulnerable to health-related climate change impacts, including Indigenous Peoples and communities in Canada (Ford *et al*. 2012). Diesel emissions can irritate the eyes, throat, and bronchial tubes and may cause neurophysiological symptoms and respiratory symptoms. Chronic exposure to diesel exhaust may pose a variety of lung and respiratory illnesses. Given the above impacts on communities and the environment, the NG intends to reduce some of the dependence on diesel generators in Nain by constructing an environmentally friendly wind power project.

The increasing power demand, the deleterious effects of diesel systems, and rising energy costs throughout Nunatsiavut are stressors on families, Elders in particular, and communities, adding leverage to the need for this proposed wind power project, the Nain Wind Micro Grid (the "Project"). There are many cultural, economic, and environmental benefits to be attained by supplementing diesel power with electricity from more Earth-friendly wind turbines. Optimizing the power system through the integration of wind power with the diesel system will reduce Nain's dependency on diesel, reducing their greenhouse gas emissions.

In 2015, in preparation for this Project, Newfoundland and Labrador Hydro (NL Hydro) contracted Hatch Ltd (Hatch) to complete a wind resource assessment to record wind data with meteorological masts in five Labrador coastal communities. The conclusion from those studies was that Nain had good potential for wind power with an average wind speed of 6.5 m/s. Table 3-1 below summarizes some important features regarding the placement of the meteorological mast.

Table 3-1 Nain Wind Resource Assessment Summary

Nain Wind Resource Assessment Summary	
Meteorological Mast Size	36 m
Elevation	165 m
Relative Elevation	240 m tall mountains (2) to the W and SW, 250 m tall mountain NE (600 m, 1500 m, and 1300 m away, respectively)
No. of Anemometers	5
Data Availability	97.8% Recovery Rate
No. of Instruments	5 Anemometers, 3 Wind Vanes, 1 Temperature Sensor

4 Description of the Undertaking

The following sections describe the preferred choice of location, design details for the project, and alternatives considered.

4.1 Geographic Location

The proposed location for this wind power microgrid will be atop a rocky ridge to the west of Nain, as indicated by the yellow shaded area in Figure 1. The approximate center of the area is (56.542, -61.738). These coordinates are based on the World Geodetic System (WGS) 1984 geographic coordinate system. The site can be accessed by an existing road which leads to Nain's water tower. An access road will be constructed north of the water tower to access the turbine area. The project will be approximately 2 km from the center of the Town of Nain, and greater than 1 km from the nearest dwellings. The turbines will likely be visible to some residences in Nain. The vegetation in the Project area includes lichens, mosses, and other small vegetation.

This proposed area was selected after a feasibility study conducted by Hatch in 2015 (Nunatsiavut Government, 2019). During that study, several communities were considered for a wind power project, with Nain selected as the candidate community with favorable conditions for wind development.

The overall conditions that were considered to select the final locations for the battery and turbines include:

- Adequate wind resource
- Distance to the existing electrical grid
- Distance to residential areas
- Current and future land use
- Electromagnetic inference with communication towers

Hatch proposed several alternative locations for the turbines to those presented in this registration document. However, those locations were eliminated from consideration due to inadequate conditions and/or potential conflicts with existing radio tower infrastructure. Those alternative locations can be found in NG's "Nain Wind Turbine Siting" document in Appendix A.

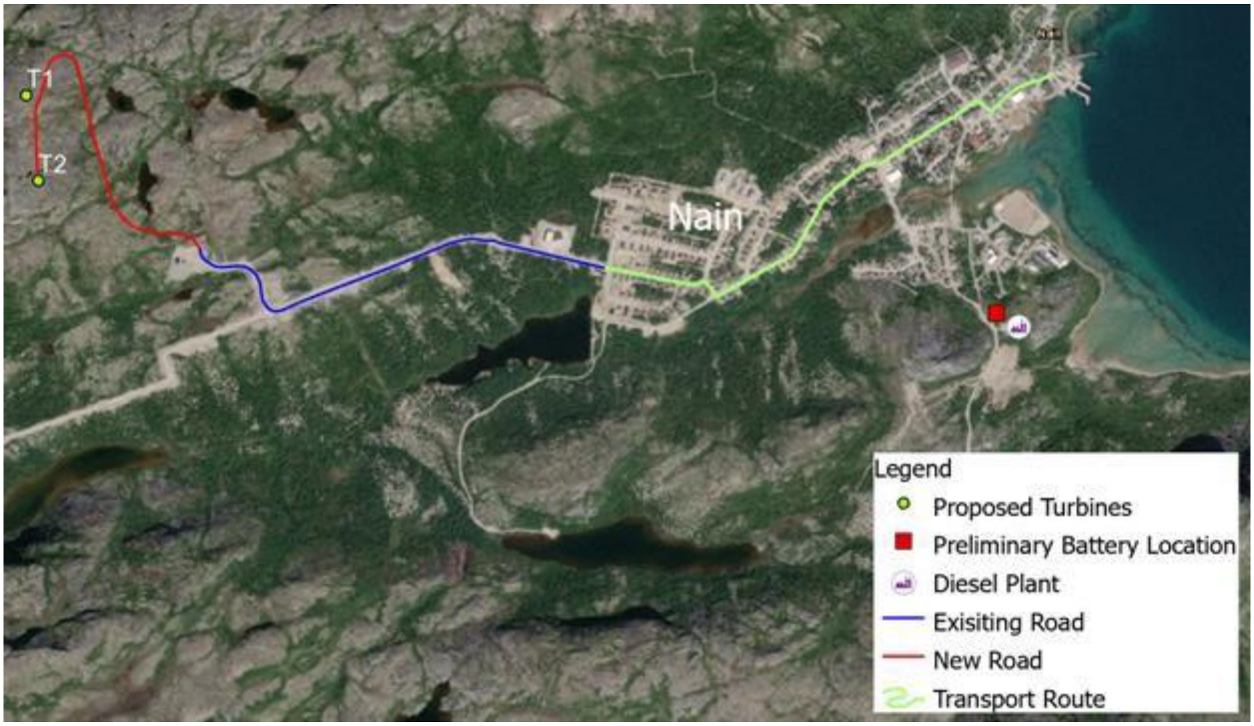

Figure 4-1 Proposed Wind Turbine, Meteorological Mast, and Road Access Locations

4.2 Project Physical Features

4.2.1 *Project Footprint*

The Project Footprint, or principal physical features, will consist of:

- One or two wind turbine generators;
- Turbine foundations;
- Battery system and the foundation for the battery;
- New access road to the turbines;
- Crane pads;
- Pre-assembly area; and,
- Overhead collector line to transmit power to the electrical grid.

Each feature is discussed in detail below. The batteries and storage area will be at an alternative location. Rotor assembly will occur on a level surface at each turbine site and the additional area may be required for rotor assembly.

4.2.2 *Wind Turbines*

The Proponent is still considering several turbine types and is undergoing site suitability on two different turbine models after eliminating several models due to site constraints. The Project may consist of either a single Enercon GmbH E-82 turbine or two E-44 turbines. Both configurations will yield an approximate capacity of 1.8 – 2.3 MW. Should the E-82 turbine be selected, the turbine will be placed approximately at the T2 location indicated on Figure 4-1.

Each turbine will be comprised of a tubular-shaped support tower, a nacelle, which contains the generator, and three (3) rotor blades. Each turbine's blades will attach to the central hub which will be mounted in the nacelle. The general size specifications for each turbine are demonstrated below in Table 4-1.

Table 4-1 E-82 and E-44 General Specifications

Turbine Model	**E-82 E4**	**E-44**
Nominal Power Output (kW)	2350	900
Hub Height (m)	59	45-55
Rotor Diameter (m)	82	44
Sweep Area (m^2)	5281	1521

Electrical energy is generated by the rotation of the blades and the generator within the nacelle. The orientation of the three blades will be controlled by software to optimize energy production. The nacelle is comprised of several key components that automate the rotors and convert wind energy from the rotor blades to electricity. Wind energy converted in the nacelle to the transformer at the base of the turbine. Electricity is transferred from the transformer at the base to the existing electrical grid via an overhead electrical distribution line.

Enercon is the manufacturer being considered for this Project as their turbines have been used in several northern projects within Canada and internationally. Their turbines are known in the industry as being very favorable in artic and cold weather climates.

4.2.3 *Wind Turbine Foundations*

Each wind turbine will be secured by a foundation designed to suit the specific geotechnical features of the project location. The final foundation type, design and dimensions will be dependent on specific site characteristics determined during geotechnical investigation and industry standards. During a preliminary desktop study completed by WSP the bedrock parameters were estimated based on knowledge and conditions known to WSP from previous work in the area. These values will be confirmed/adjusted following the impending geotechnical investigation.

For the time being, the WSP study completed in 2020 will be utilized to conduct a preliminary foundation design. This design will be conservative in its approach to mitigate risk that site conditions do not meet the assumptions.

Two foundation designs are being considered at this time: rock anchor system or a hybrid concrete and rock foundation system.

A rock anchor system uses the bed rock to support the forces of the structure and is a possible foundation for this site. Rock anchors are drilled and bolted to bedrock to provide support and stability.

There are important design considerations when using rock anchors: Grout-to-rock bond strength and Inverted Cone Angle of Rock Mass. The Grout-to-rock Bond Strength indicates how much resistance the anchor will have to a “pull-out” failure in the event of the foundation undergoing an uplifting force. The Inverted Cone Angle of Rock Mass indicates how much of the rock surrounding the drilled anchor is contributing to the strength of the foundation during the same pull-out action. In order for the rock anchor to be valid, both the Grout-to-rock bond strength and the resistance provided by the rock surrounding the embedded anchor, calculated using the Inverted Cone Angle of Rock Mass, must exceed the possible uplift force applied to the structure. Since the anchors would be embedded in bedrock, it is unlikely that the steel anchor or the bedrock beneath it will fail, however this will be designed and verified by WSP. Should the steel in the anchor or the underlying bedrock fail, the diameter of the anchor or the number of anchors used may be increased. This will increase the area of which the downward forces are exerted.

To place the rock anchors, holes will need to be drilled into the bedrock. Once the hole is drilled the anchor will be inserted and grouted into place. Many types of rock anchors are available, some requiring grouting, and some being fixed in place using mechanisms that can be activated, following the anchor being placed in the drilled hole.

The second type of anchor that is being considered for the Project is a hybrid concrete and rock anchor type, which includes a combination of rock anchors, as described above and concrete masses that add weight to the base of the turbine to provide added stability. The concrete component may be pre-cast or cast in place.

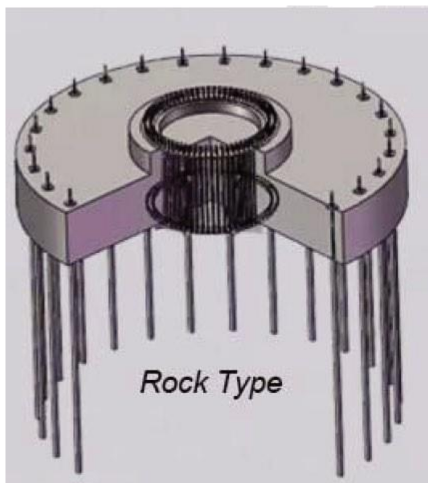

Figure 4-2 Rock anchor example

In Figure 4-3 below, foundations used to support wind turbines in Antarctica can be seen. Options like this are being considered. This configuration includes rock anchors connected to concrete components supporting a steel fabricated base for the wind turbines.

The Proponent is currently open to all options suitable for site conditions, following further investigation.

Figure 4-3 Antarctica Wind Turbine Foundations

Due to the geology of the site (exposed bedrock) a plain cast in place concrete foundation is not expected as it requires overburden soil to support against overturning forces. Concrete constituents used in cast-in-place foundation components, if selected, may be sourced in Nain, contributing to the local economy.

4.2.4 *Access Roads*

The total access road length is expected to measure approximately 2.5 km. Based on preliminary design provided by DMG Consulting Ltd the Project will add approximately 1.1 km to the existing 1.4 km road. The road will be constructed of local materials. The preliminary desktop design indicates that the footprint of each turbine is not expected to exceed one hectare.

The access road will be constructed with a gravel surface and according to the site roads and crane pad specification designated for the specific turbine selected. The road, constructed to ensure specific project components and equipment can be transported on-site, may have a drivable width of 8 meters, should the E-82 be selected. Necessary side sloping and ditching will increase the width by approximately 4 m, resulting in a maximum total disturbed width of approximately 12 m. Some discretion is available in the width of the road, but an 8-meter width is the maximum. This width will be re-evaluated following the selection of a final turbine model.

This road will have an approximate slope of 10-12% to ensure the safe transport of turbine components. This slope may be increased if the proper conditions and equipment are supplemented. The proposed access road will begin at the existing water tower and will extend for approximately one kilometer to the Project area, at the top of the hill. At the site of each turbine, a crane pad area and turbine laydown area will be essential to facilitate access for heavy equipment, to allow vehicles to turn around, to enable the construction of the foundations, and to provide laydowns for tower components (e.g., tower sections, rotor parts, nacelles, etc.).

Access roads will be maintained and graded for the duration of Project to provide access for maintenance, monitoring, and for safety purposes. Once operational, project specific vehicle activity on the access road will be minimal.

4.2.5 *Crane Pads*

A crane will be necessary for the assembly of the selected wind turbine(s). At each turbine site a crane pad will need to be constructed to support the required crane. The two turbine models being considered, E-44 and E-82, will require varying crane pad sizes.

Dimensions of these crane pads will be sufficient to allow for assembly and storage of the turbine components.

All crane pads will undergo the following verifications to ensure safety and performance:

- Verification of bearing capacity (e.g., plate load test, dynamic probing);
- Verification of distances from ditches, hollows and watercourses; and,
- Verification of distances from high voltage/electric/telephone cables.

4.2.6 *Overhead Electrical Distribution Lines*

The electrical energy generated by each turbine will be transmitted from the nacelle into conductors in the support tower to a unit transformer at the base of each turbine. The transformers at each turbine will adjust the voltage of the power produced by the turbine equal to that of the electrical distribution grid existing within Nain. The site will utilize overhead power distribution lines to interconnect the turbines as well as deliver the electrical energy to the existing NL Hydro electrical grid in Nain. It is likely that the lines will be supported by wooden power line poles as currently used by both Newfoundland Power and NL Hydro. This will be confirmed through consultation with NL Hydro and recommendations from the Project engineers.

The interconnection to the existing NL Hydro electrical system is being discussed between NL Hydro and the Proponent. The new overhead line will likely follow the access road to the road to the water tower. At this point, it will either interconnect to the existing electrical grid, or the line will continue as a designated line through the community of Nain using existing infrastructure and line corridors as much as possible. This designated line will connect to the existing substation located by the diesel plant.

If the overhead line connects to the grid at the water tower, 500 meters of line will be required. To reach the community, another 1200 meters of line is required. Depending on existing corridors, the length of the remaining line to the battery storage area is variable.

4.3 Construction

4.3.1 *Process and Schedule*

The proposed wind project consists of one or two wind turbines for a total installed capacity of up to 2.3 MW. The proposed site for the Nain wind turbines is on the ridge north-west of the Nain water tower. The approximate centroid for the project is (56.542, -61.738). There currently exists road access up to as far as the Nain water tower; the additional road will need to be constructed between the water tower and the turbine site location.

Project construction is anticipated to commence in June 2021, based on estimates by the Proponent. Main activities of the construction period include:

- Pre-construction/design activities;
- Construction of access road, lay down area and crane pads;
- Construction of turbine foundation;
- Construction of power pole, power lines;
- Turbine installation;
- Battery installation;
- Commissioning of the wind turbine generator; and,
- Removal of all temporary works and restoration of the site

The proposed schedule for construction activities is presented in Table 4-2.

Table 4-2 Schedule of Construction Activities

Detailed Design & Execution Stage	Start Date	Completion Date
Turbine foundation design	January 2021	March 2021
Preliminary road design	January 2021	March 2021
Execution-level logistics planning	January 2021	April 2021
Detailed electrical design	January 2021	December 2021
Detailed controller design	January 2021	December 2021
Civil works	July 2021	September 2021
Turbine foundation works	August 2021	October 2021
Detailed communications design	September 2021	January 2022
Ship and receive turbine components	May 2022	July 2022
Ship and receive battery system	June 2022	July 2022
Ship and receive electrical BOP equipment and materials	June 2022	July 2022
Erect and mechanically complete turbine	July 2022	September 2022
Install and pre-commissioning battery and electrical BOP	July 2022	September 2022
NL Hydro interconnection works	July 2022	August 2022
Commission communication system	August 2022	August 2022
Commission battery system	August 2022	September 2022
Commission turbines	September 2022	September 2022
Integrated system testing	September 2022	October 2022
Commercial operation	October 2022	October 2022

4.3.2 *Potential Sources of Pollutants for the Construction Period*

4.3.2.1 Airborne Emissions

Vehicle exhaust and road dust are expected to be the primary emission sources during access road and turbine foundation construction due to increased traffic on the site access road. It should be noted that these emissions will be major in terms of total emissions for the project but will not be major in terms of local air quality impacts (i.e., the air quality in Nain should not be negatively impacted). Emissions are also expected during the construction period via the transportation of materials and construction machinery.

Mitigative measures will be implemented via an Environmental Management and Protection Plan to ensure this emission source remains negligible. These measures include:

- Vehicular traffic emissions will be mitigated by turning off engines (when feasible) to minimize idling;
- Imposing appropriate speed limits, enforcing legal load limits for trucks;
- Sourcing local materials where possible; and,
- Road dust emissions will be controlled by coating the roads with water or other environmentally safe dust suppressants during dry weather conditions.

4.3.2.2 Effluent

Runoff from post-precipitation events will be the main source of effluent during the construction period. To manage this pollution source, site access roads will be designed to accommodate typical levels of precipitation in the region, thus mitigating silt generation. The site roads and general construction area will be monitored following severe weather events to ensure silt and effluents are properly managed. Emissions from accidental spillage of hazardous materials (e.g., fuel, oil, hydraulic fluids) are expected to be minimal. Spring melt during the construction phase will be monitored and appropriate erosion and sediment control measures will be used, in accordance with the mitigation measures discussed below.

Mitigative measures will be implemented via an Environmental Management and Protection Plan to ensure this emission source remains negligible. These measures include:

- Adhering to a setback distance between site works and any body of water;
- Efforts will be made to design access roads such that they do not interfere with a watercourse, water body or drainage channel;
- Erosion control strategies (i.e., Straw bales and geo-textiles) will be used in order to maintain baseline water quality conditions in the watercourses and wetlands onsite;
- Where water must be pumped out of excavation pits, it will not be discharged into a wetland, watercourse or defined channel. If pumped water contains suspended solids the water will be pumped to vegetated land with gentle slope to allow sediment to filter, or the water will be filtered before release with a filter bag;
- Thoroughly checking and securing vehicle loads;
- Equipment shall be in good working order and maintained so as to reduce risk of spill/leaks and avoid water contamination;

- Spill response kits will be provided on site for each piece of equipment to ensure immediate response to a potential waste release and will be stocked with supplies to handle a worst-case scenario on ground or in surface or groundwater;
- Routine maintenance, refueling and inspection of machinery will be performed off-site or on level ground onsite;
- Used oil filters, grease cartridge containers and other products associated with equipment maintenance shall be collected and disposed of in accordance with regulatory guidelines; and,
- If a spill occurs, corrective measures will be implemented immediately and reported.

4.3.2.3 Solid Waste

Items such as metals, stone, concrete, wood, plastics, paper, and packing materials will be generated during Project construction. All materials will be assessed for re-use before being sent to a dedicated solid waste sorting and holding zone within the Project footprint. Materials not designated for re-use will be recycled or disposed of at approved waste disposal sites as determined best suitable by the civil contractor selected for the construction.

Mitigative measures will be implemented via an Environmental Management and Protection Plan to ensure this proper disposal of any wastes. These measures include:

- The Contractor shall ensure that the Project area remains clear of waste, and that adequate waste and disposal facilities are provided. The collection and disposal of waste shall be carried out on an appropriate frequency to keep pace with waste generation;
- All waste bins should be kept securely closed, to not attract animals; and,
- Waste disposal areas, in accordance with regulatory guidelines, will be located away from rivers, watercourses or wetlands.

4.3.2.4 Noise

Noise levels are expected to increase above background levels during the construction period due to increased vehicular traffic and the presence of heavy machinery. However, noise levels in the nearby community of Nain are not expected to be significantly impacted due to sufficient setback from dwellings.

Mitigative measures will be implemented via an Environmental Management and Protection Plan to ensure noise from the Project has a minimal impact on the community. These measures include:

- Noise impacts will be limited by restricting construction activities to daytime hours when feasible;
- Complaints will be discussed with workers or contractors involved;
- Solutions to the complaints will be established on a case-by-case basis with workers and contractors;
- Complainants will be informed of how the issues was or will be addressed; and,
- If the complaints persist, the worker(s) and contractor(s) may be dismissed.

4.3.2.5 Potential Resource Interactions During the Construction Period

Potential resource conflicts during the construction period could include:

- Wildlife encounters;
- Harvesting and cultural activities;
- Recreational land-use conflicts; and
- Land claims.

These conflicts are discussed in depth below.

4.3.2.5.1 Wildlife Encounters

Wildlife encounters may occur during the construction period. However, due to the noise generated by construction activities and the minimal observation of wildlife in the footprint, encounters are expected to be minimal.

Mitigative measures will be implemented via an Environmental Management and Protection Plan to ensure noise from the Project has a minimal impact on the community. These measures include:

- Safety talks and training sessions will be conducted to ensure construction personnel is familiar with wildlife encounter protocols;
- Ensuring that food waste and other garbage is stored so that it is not accessible by wildlife; and,
- Garbage will be disposed properly to avoid attracting wildlife to the site.

4.3.2.5.2 Harvesting and Cultural Activities

The Project construction may restrict access to those who use the area for berry-picking, hunting, and any other traditional uses for safety reasons. Mitigation for this impact will be based on consultation with the community to ensure transparency.

As a start, the Proponent is committed to providing ample notice to the community of construction activity schedule so residents can harvest any resources available on site prior the start of the works on site. As well, the schedule will ensure residents are aware when the site is accessible, allowing for cooperative use of the land during construction as well as schedule maintenance.

4.3.2.5.3 Recreational Land Use

During the construction period, access to the Project footprint will be restricted to authorized Project personnel for safety reasons. This may affect those using the land for recreational activities. Mitigation for this impact will be based on consultation with the community to ensure transparency, similarly to previous conflicts. The proponent shall provide ample notice to the community, so residents are aware when the site is accessible.

4.3.2.5.4 Land Claims

A review of the Newfoundland and Labrador Land Use Atlas indicates that the Project footprint is situated in Labrador Inuit Settlement Area, and not within Labrador Inuit Lands. Required land use permits and/or authorizations will be obtained with the Nain Inuit Community Government before commencing construction.

4.4 Operation

4.4.1 *Wind Turbine Generators*

It is anticipated that the proposed turbines will be designed using high-end technology manufactured by Enercon GmbH (Enercon). All Enercon wind turbines are designed and certified according to the latest international standards. Currently, the basis for design is the International Electrotechnical Commission (IEC) standards of the IEC-61400 series. This selection is subject to change, and any changes will be communicated.

This IEC standard uses assumptions and conditions to define the loads that a wind turbine generator can withstand. The safety system of Enercon wind turbines includes control sensors that protect the turbine and its components from damage. In the case that one or more of these sensors detect conditions outside its design limits, the main control of the wind turbines will take the appropriate measures, which range from small power limitations to complete stop of the turbine. These reactive measures can protect the turbine from high and low temperatures, vibrations, oscillations, and strain.

All Enercon turbines operating throughout North America are monitored 24-7 in real-time by a team of technicians at their North American Operations. Natural Forces' operations team will also monitor the turbines remotely. Enercon and Natural Forces operation technicians can shut off a turbine should they observe conditions that could pose a risk to the turbine's proper functioning or risk to people near the turbine.

Ice may form on the rotor blades of the wind turbines in specific weather conditions. The ice build-up poses the risk of ice fragments detaching and creating safety hazards to the surrounding area. The turbines selected will be equipped with a reliable ice detection system. Once ice has been detected, the turbine rotor stops spinning. There are turbine models that provide de-icing systems that are either passive or active that will effectively melt the ice on the blade to reduce the risk of ice throw.

A Marking and Lighting Plan for the Project will be developed and approved by Transport Canada and Canadian Wildlife Services (CWS) to minimize impacts on migrating birds and to ensure aviation safety. The Marking and Lighting Plan will comply with Transport Canada recommendations and Standard 621 – Obstruction Marking and Lighting (Transport Canada, 2019). Chapter 12 of the standard outline's regulations for wind turbines equal to or less than 150 m. The current standard requires a CL-864 (medium intensity, flashing red – 20-40 flashes per minute) light installed on the nacelle. The minister may require lighting on both turbines. These types of lights are likely to be used for the Project but will be adjusted as per Transport Canada recommendations.

4.4.2 *Site Access and Traffic*

Once the wind farm is operational, minimal vehicle activity will be required. The internal site roads will be used for periodic maintenance and safety checks. A comprehensive Supervisory Control and Data Acquisition (SCADA) system will be installed within the turbines and energy storage system for remote monitoring and control of the wind turbine, which will minimize the need for on-site personnel. The SCADA system ensures the safe efficient operation of the turbines and the overall Project site. Any malfunctions are detected in real-time and can be addressed immediately and remotely by first shutting down the turbines.

Consultation with the community will be ongoing to ensure that use of the access roads in cooperative to reduce negative impacts on the community.

4.4.3 *Maintenance Plans*

Scheduled maintenance work will be carried out periodically throughout each year of the operational phase to ensure the project is operating as it is anticipated. Scheduled in-person maintenance and function assessments of the turbines will be conducted by operation managers hired by the Proponent. Unscheduled maintenance is minimal, as the SCADA system provides 24-hour monitoring of the turbines and storage system. Maintenance procedures may require the use of small or large cranes for brief periods for tasks such as replacement of blades or other turbine components.

4.4.4 *Potential Sources of Pollutants for the Operation Period*

Mitigation measures for the operation phase will be similar to those detailed for the construction phase, where appropriate.

4.4.4.1 Airborne Emissions

Emissions from road dust and vehicle exhaust are anticipated to be a source of pollution during the operation period when the site is accessed. However, these events will be minimal and infrequent so anticipated airborne emissions from this Project will be negligible, and given the environmental benefits of wind power, the Project will have a net positive impact on emissions in the Nain area.

Community use of the road may cause dust emissions, but this impact is considered negligible. Mitigation for this impact will include having a posted speed limit on Project roads.

4.4.4.2 Effluent

Effluent is not expected to be a source of pollution during the operation period. Mitigative measures implemented during the design and construction period (e.g., proper drains, regular vehicle maintenance and inspection, providing spill response kits) will continue into the operation period to ensure the risk of accidental spills or leaks is low.

4.4.4.3 Solid Waste

The Enercon turbines are gearless and do not require significant amounts of oil or gear lubricant as would be required by other turbine types with gears. Any other lubricant, or general waste will be disposed of as deemed appropriately in consultation with the Nain Inuit Community Government. As such, solid waste generated during the operation period is expected to be negligible.

4.4.4.4 Noise

Noise levels are not expected to increase significantly once the Project is operational. Industry best practices indicate that the perceived sound at any dwelling should not exceed 40 dB(A) during low wind days (Government of New Brunswick, 2019). Though large mechanical infrastructure is expected to produce noise, technology has advanced such that mechanical noise emitted from wind turbines is minimal. Noise comes from the air-turbine interaction, which decreases with increasing distance from the turbine. Modelling software was used to assess potential for noise and shadow flicker in the community because of the Project. The assessment was conducted using both turbine models under consideration. The detailed results of the noise and shadow flicker studies are included in Appendix G.

Due to the distance from the community, and the relatively quiet nature of the Enercon turbines, noise and shadow are not expected to have a significant effect on the community.

4.4.4.5 Potential Resource Interactions during the Operation Period

Potential resource conflicts during the operation period could include:

- Wildlife encounters
- Harvesting and Cultural Use
- Recreational land use

These conflicts, while not expected to be significant or irresolvable, are discussed in depth below.

4.4.4.5.1 Wildlife Encounters

Wildlife encounters may occur during the operation period. However, due to the lack of personnel presence on-site, and the minimal observation of wildlife in the footprint of the Project, wildlife encounters are expected to be minimal. Nevertheless, operational personnel will be trained to deal with wildlife encounters via safety talks and training sessions.

Mitigation measures for wildlife during the operation phase may include:

- A follow up avian mortality survey will be conducted after the Nain Micro-Grid Wind Project is commissioned and appropriate actions will be taken in consultation with environmental authorities should there be a significant negative impact to migration flyways;
- Only the minimum amount of pilot warning and obstruction avoidance lighting will be used so as to not attract birds or bats;
- Only lights with short flash durations and the ability to emit no light during the 'off phase' of the flash (i.e., as allowed by strobes and modern LED lights) will be installed on tall structures;
- Lights will operate at the minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by Transport Canada; and,
- Instruction will be given to wind farm maintenance staff to ensure all work lights are turned off upon leaving the site particularly during foul weather events.

4.4.4.5.2 Harvesting and Cultural Use

Access to the Project footprint will not be restricted during the operation period unless deemed necessary in consultation with the Nain Inuit Community Government and the Proponent. Since there is a risk of falling ice during specific weather events, signage will be displayed to warn those who use the area for harvesting or cultural uses. If the Project footprint needs to be restricted for safety reasons during the operational period, it will be done so in consultation between the Proponent and the Nain Inuit Community Government and communicated with the community in advance, if possible, to allow for cooperative use of the land.

4.4.4.5.3 Recreational Land Use

Access to the Project footprint will not be restricted during the operation period unless deemed necessary in consultation with the Nain Inuit Community Government and the Proponent. Since there is a risk of falling ice during specific weather events, signage will be displayed to warn those who use the area for recreational activities. If the Project footprint needs to be restricted for safety reasons during the operational period, it will be done so in consultation between the Proponent and the Nain Inuit Community Government and communicated with the community in advance, if possible, to allow for cooperative use of the land.

4.5 Occupations

Contactors and tradespeople will be required during the construction phase of the Project. To stimulate the local economy, the Proponent will make every effort to utilize local companies and workers during Project construction. An early estimate of employment during the construction phase is provided in Table 4-3 below.

Table 4-3 Estimated employment during construction

Task	National Occupational Classification	Number of People Required	Full-Time Positions	Duration of Work (Months)	Equivalent Full Time (*Person-Months*)
Construction environmental studies/monitoring	A,B	2	100%	3	6
Civil engineering/surveying	A,B	4	40%	6	10
Electrical engineering (BoP)	A,B	4	50%	8	16
Geotechnical engineering	A	2	25%	1	0.5
Road and Pad construction	B,C	15	100%	2	30
Blasting and aggregate supply	B,C	4	100%	1	4

Foundation construction	B	5	100%	3	15
Foundation concrete supply – if required	C	20	20%	2	8
Foundation re-bar installation	C	5	100%	2	10
Battery system installation	A,B	4	100%	1	4
PCT Deliveries	C	10	100%	1	10
Crane Support	B	2	75%	2	3
Erection Crew	B,C	6	100%	4	24
Turbine Electrical	B	5	100%	2	10
Site Electrical (BoP)	B	4	50%	2	4
Office / Toilet Rental / Garbage removal	D	2	10%	6	1
	Totals	**94**	**-**	**46**	**155.5**
				FTE Person Years:	**13**

The number of employment opportunities generated during operations of the project as a direct result of the Project is relatively modest. As per Table 4-4, approximately two full-time jobs will be required for the operational phase, with an anticipated lifetime of approximately 30 years.

Table 4-4 Estimated employment during operation

Role	Estimated Employment Opportunities (# full time jobs)
Energy Storage Plant Maintenance	0.25
Turbine Maintenance	0.5
Asset Management	0.5
Ancillary Services (civil maintenance, electrical maintenance, etc.)	0.4

Professional Services (accounting, legal, etc.)	0.1
Total	**~2 full time jobs**

4.6 Project-Related Documents

Several project-related documents have been produced in support of this project (below). Completed documents from this list have been included in the Appendices.

- Nunatsiavut Government. 2019. Nain Wind Turbine Siting. 3 pp.
- Sikumiut Environnemental Management (SEM). 2019. Nunatsiavut Government Wind Power Project Avifauna and Baseline Habitat Surveys. 19 pp.
- Sikumiut Environmental Management (SEM). 2019. Nunatsiavut Government Wind Power Project Fall Migration Avifauna Surveys. 12 pp.
- Sikumiut Environmental Management (SEM). 2020. Nunatsiavut Government Wind Power Project Bat Monitoring Surveys (*in progress*).
- Sikumiut Environmental Management (SEM). 2020. Nunatsiavut Government Wind Power Project Spring Migration Avifauna Surveys (*in progress*).
- Noise studies and Shadow Studies

5 Existing Environment

During the 2019 and 2020 field seasons, the Proponent engaged Sikumiut Environmental Management Ltd. (SEM) to conduct physical and biophysical studies for the Nain Wind Micro Grid Project. The following sections will summarize the results of the studies conducted. The detailed reports written by SEM are included as part of this document as Appendices B, C, D, E, and F.

The Project footprint is located in the Coastal Barrens – Okak/Battle Harbour Ecoregion which extends from Napaktok Bay south to the Strait of Belle Isle. The ecoregion spans three-quarters of the Labrador Coast and has highly variable topography. Forests are uncommon on ridges and primarily exist in valleys. Elevations in this ecoregion range from sea level to ~600 meters. The last glaciation period removed much of the soil in the region, resulting in a landscape dominated by exposed bedrock with very sparse soil and thin deposits. The Project footprint is situated on rocky outcrop; a landscape relatively devoid of large vegetation and shelter. A photograph depicting the typical physical features of the Project Site is shown below in Figure 5-1.

Figure 5-1 Typical view and physical features at the Project Site

5.1 Physical

5.1.1 *Ground Water*

There are three small ponds within the boundaries of the footprint of the wind turbines and site access road (Figure 5-2). They are not connected and are fed by rainwater and upland runoff. There are small outflow streams from the ponds that connect to channels in the bedrock and extend down the slope of the hill to the valley.

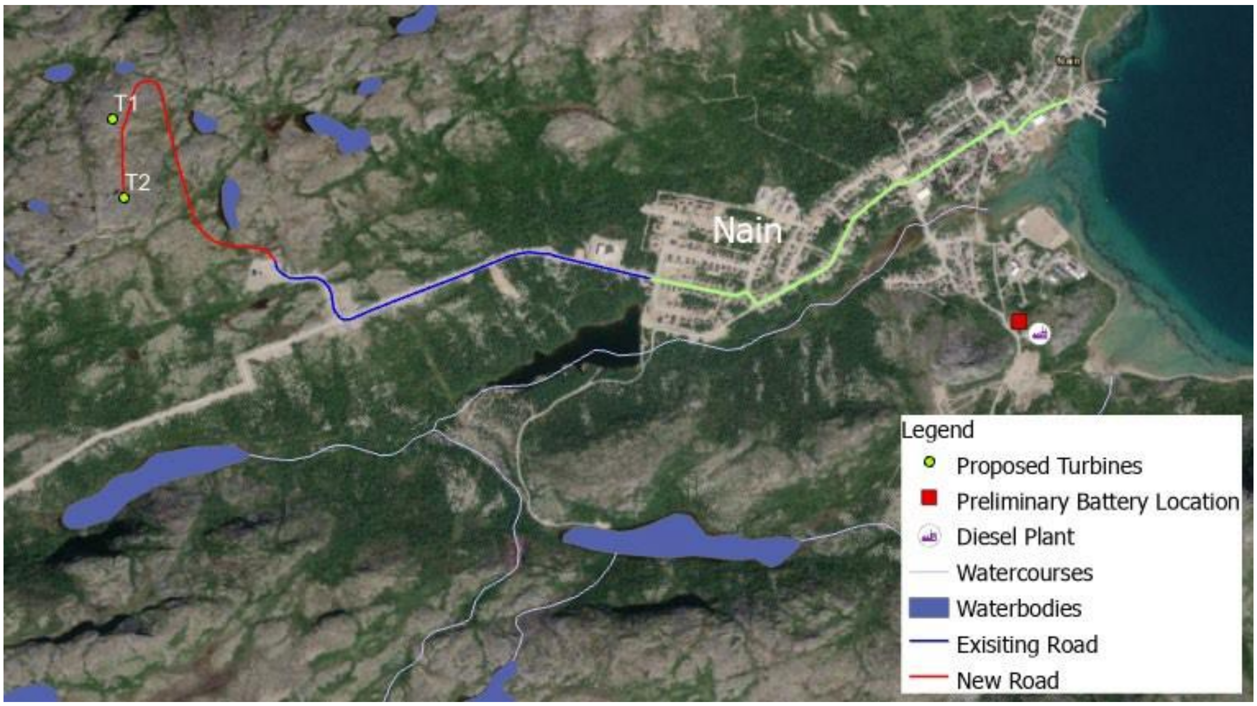

Figure 5-2 Waterbodies within the Project footprint and in the general area of the footprint

5.1.2 *Geophysical*

The Project footprint is located in the Nain Coast Ecodistrict, part of the Nain geological Province of the Canadian Shield. The Nain Province (or Nain Craton) is part of the North American Craton, the ancient portion of the continental lithosphere that is exposed in parts of Labrador, Greenland, and Scotland. Archean granites, granitic metamorphic gneiss, and igneous anorthosites dominate the geology of the area (Ryan 2000). The topography consists primarily of weathered, round-topped mountains with deep valleys and fjords that reach kilometers inland from the sea. Bedrock exposures, like the hilltop proposed for this Project, are prevalent throughout the region, as is the scarcity of surficial deposits.

5.1.3 *Climate*

The Project footprint is located within the Coastal Barrens Ecoregion; the ecoregion is characterized as having an Atlantic low subarctic ecoclimate and is heavily impacted by the influence of the Atlantic Ocean and the cold Labrador Current. The Nain area experiences short, cool summers and long, cold winters, with a mean annual temperature of 3.5°C. The growing season is short (~110 days), and the annual precipitation is approximately 600 mm annually. Snow cover persists throughout winter and generally into June.

5.2 Biophysical

5.2.1 *Wildlife*

5.2.1.1 Mammals

In general, the Project Footprint provides limited habitat for most mammal species, given its exposure to wind and scarcity of vegetation and shelter. From observations, the species in the area use the Project footprint as a travel corridor or for foraging for low lying berries such as red berries or crow berries which are common to the general vicinity.

Mammal species observed by SEM staff in the Project Area during 2019-2020 include Red fox, Arctic hare, Black bear, and Deer mouse.

A list of common species that may be using the Nain area, not specifically observed, is provided below. The list serves as an overview of some of the more common species rather than a comprehensive inventory of all wildlife in the Nain area. Caribou, once abundant in this region and a staple in the diet of Inuit, has undergone a precipitous decline since the early 2000s, and a moratorium was brought in on caribou hunting in Labrador in 2013. The Eastern Migratory Population (of which the George River herd is a part) was listed as Endangered by COSEWIC in 2017.

A Species at Risk (SAR) that is possible in the general area of Nain, but unlikely to be using the Project Footprint itself is the little brown bat (*Myotis lucifugus*), listed as Endangered by the *Species at Risk Act* (*SARA*) in 2014. The emergency listing of this specie followed rapid population declines in Canada due to White-nose Syndrome. Environment and Climate Change Canada stated that "*The population decline that has been documented for this species is considered by some experts to be the most rapid decline of* *mammals ever documented anywhere in the world*" (Environment Canada, 2014). The Proponent implemented a four-month bat monitoring program within the Project footprint and around Nain. Bat detectors scanned for bats from June 1 to September 15, based on recommendations from the NL Wildlife Division of the Department of Fisheries and Land Resources. The details of this study are included in the appendices.

Bats have not been detected in Nain from earlier efforts by the NL Wildlife Division and there are no known anecdotal observations of bats around Nain. However, there was a recent observation of a deceased bat at Kogaluk (near Voisey's Bay), and other anecdotal observations at the Vale Nickel Mine at Voisey's Bay, and Paul Island, just east of Nain. This data is being reviewed and analyzed as an addendum to this document.

5.2.1.1 Avifauna

Resident and migratory species of birds in the Nain area include representatives from the bird Orders Anseriformes (Waterfowl), Galliformes (Gamebirds), Gaviiformes (Loons), Accipitriformes (Raptors), Charadriiformes (Shorebirds), Columbiformes (Doves), Gruiformes (Rails), Strigiformes (Owls), Coraciiformes (Kingfishers), Piciformes (Woodpeckers) and Passeriformes (Perching birds).

Nain is located in the Taiga Shield and Hudson Plains Bird Conservation Region (Notzl *et al*. 2013) and is situated along the Atlantic Migratory Bird Flyway (Figure 5-3, adopted from Lake Region Audubon 2010).

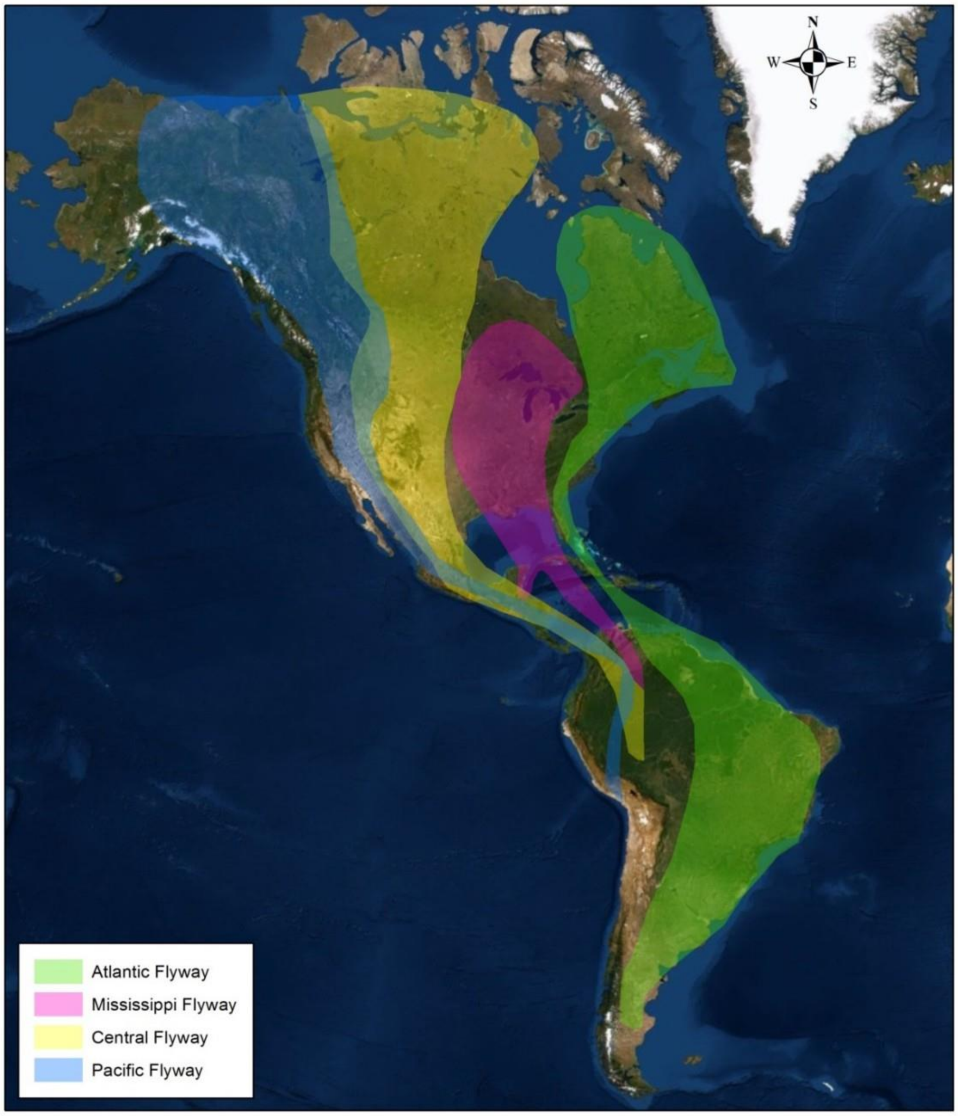

Figure 5-3 North American Migratory Bird Flyways (Lake Region Audubon 2010)

Avifauna surveys were completed during the breeding season/late spring migration season and during fall migration in 2019, and throughout the migration temporal window in spring 2020.

Relatively common generalist species like the American Robin (*Turdus migratorius*), Common Raven (*Corvus corax*), White-throated Sparrow (*Zonotrichia albicollis*) comprised a large number of observations, along with observations of species more typical of northern climes such as the American Pipit (*Anthus rubescens*), Common Redpoll (*Acanthis flammea*), and Horned Lark (*Eremophila alpestrisand*). The species most frequently observed in the vertical strata of greatest concern (i.e., the 34-66 m and the 67-100 m) was Common Raven. The detailed results of the avifauna surveys are available in Appendix D.

Relative to other areas in the Province, there is a general deficiency of empirical information on birds in and around Nain and northern Labrador. However, SEM conducted a literature search for historical records and range maps and produced a list of species known from the area, grouped below by terrestrial birds, seabirds and shorebirds, waterfowl, and raptors and owls (Appendix A). Information was assembled from The Birds of North America Online, eBird, and the Labrador Nature Atlas (Notzl *et al*. 2013). Some of the most known species from the Nain area coincided with observations from SEM's surveys of the area including:

- American Robin
- Gray Jay
- Dark-eyed Junco
- Yellow-rumped Warbler
- Boreal Chickadee
- Fox Sparrow
- Common Redpoll

Aside from breeding species, several species may use the Nain area as stopover habitat during migration to the Arctic, such as Lapland Longspur (*Calcarius lapponicus*) and several shorebird species like Dunlin (*Caladris alpina*).

Several seabirds and shorebirds are known from the Nain area, all of which are protected by federal legislation under the *Migratory Bird Convention Act* (*MBCA*). Seabird species include but are not limited to:

- Herring Gull (*Larus argentatus*)
- Thick-billed Murre (*Uria lomvia*)
- Great Black-backed Gull (*Larus marinus*)

Typical shorebird species include:

- Greater Yellowlegs (*Tringa melanoleuca*)
- Solitary Sandpiper (*Tringa solitaria*)
- Spotted Sandpiper (*Actitus macularia*)

Waterfowl species are also protected federally by the *MBCA*. Some of the species known to occur in the Nain area, either on inland water bodies or marine environments (or both) include:

- Common Eider (*Somateria mollissima*)
- American Black Duck (*Anas rubripes*)
- Canada Goose (*Branta canadensis*)
- Common Merganser (*Mergus merganser*)

Raptors and owls, unlike the species above, are protected by Provincial legislation, the Newfoundland and Labrador *Wildlife Act* (1996). The Province requires nests of raptor species to be buffered from disturbance and no vegetation is to be cleared within 800 meters of an eagle or Osprey (*Pandion haliaetus*) nest during nesting season. Eagle and Osprey nests also warrant a 200-meter buffer outside the nesting season. This buffer also applies to all other raptor nests (e.g., Northern Goshawk (*Accipiter gentilis*), Merlin (*Falco columbarius*), Great-horned Owl (*Bubo virginianus*)). There are several raptor and owl species known from the Nain area, including, but not limited to:

- Golden Eagle (*Aquila chrysaetos*)
- Great-horned Owl
- Peregrine Falcon (*Falco peregrinus anatum/tundrius*)

Several avian SAR are known from the general area around Nain. These include:

- Ivory Gull
- Harlequin Duck
- Rusty Blackbird
- Short-eared Owl
- Peregrine Falcon

Ivory Gulls breed in the high Arctic, Harlequin Ducks breed in fast-moving mountain rivers, and Rusty Blackbirds breed in treed wetlands, so these three species are unlikely to be breeding near the footprint of the Project. However, the ice pack in winter off Nain would possibly provide winter habitat for Ivory Gull and the waters off Nain would provide non-breeding habitat for Harlequin Duck. Peregrine Falcon of the *tundrius* subspecies nest on islands within the Nain Coastline Important Bird Area. This species is also listed as Special Concern on *SARA*.

Birds considered SAR listed above were not detected in the vicinity of the Project and habitat mapping revealed that the likelihood of most SAR breeding near the Project was minimal. The only SAR for which habitat may exist in the Project footprint is Short-eared Owl (*Asio flammeus*). Short-eared Owl is protected by the federal *SARA* and the Provincial *Endangered Species Act* (*ESA*). There were no Short- eared Owls detected during surveys in 2019-2020. This species prefers vast, open habitats, including meadows, marshes, bogs, tundra, heathlands, and agricultural areas and rehabilitated mine sites. Short- eared Owl populations tend to cycle with their mammalian prey, notably voles and mice. There are no population estimates for this species in Labrador and accurate estimates of North American populations have eluded biologists. Data from the *North American Breeding Bird Survey* suggests that although this species has undergone a long-term population decline across Canada, its numbers have remained relatively stable in the Atlantic Provinces.

In addition to bird monitoring, bat monitoring analyses were completed. While the monitoring activities have been completed, reports summarizing the results are underway and will be available upon request.

5.2.1.2 Amphibians

Amphibian habitat was surveyed opportunistically during the habitat survey in 2019. This involved inspection and observation around the areas of the waterbodies of the proposed Project footprint. Possible amphibian species for the Project footprint include:

- American toad (Anaxyrus americanus)
- Blue-spotted salamander (Ambystoma laterale)
- Northern two-lined salamander (Eurycea bislineata)

No amphibians were observed during surveys of the Project footprint in July 2019, an appropriate time for detecting American toad. Salamanders are more difficult to detect without dedicated cover board surveys, but given the relatively small footprint of the Project, and that the Project will primarily occur on exposed bedrock, there will likely be a negligible impact on any amphibians using this area.

5.2.1.2 Fish

Upon consultation with residents of Nain, there are no fish species known to inhabit the small ponds present in the Project area, and no fish were observed while conducting on site surveys in 2019 or 2020.

5.2.2 *Vegetation*

Vegetation in the Project footprint is limited due to the cold climate, windy conditions, exposure to sea salt, short growing season, and the scarcity of soil. The bedrock headlands of the Project footprint primarily include vegetation species of alpine tundra: low shrubs, forbs, sedges, mosses, lichens, and grasses (Meades 1990). Several vegetation species were observed by SEM during habitat assessments in the Project footprint in 2019, including:

- Alpine azalea (*Kalmia procumbens*)
- Alpine bearberry (*Arctous alphina*)
- Black crowberry (*Empetrum nigrum*)
- Cottongrass (*Eriophorum spp.*)
- Dwarf blueberry (*Vaccinium cespitosum*)
- Eastern larch (*Larix laricina*)
- Glandular birch (*Betula glandulosa*)
- Grass species (*Graminoid* spp.)
- Green alder (*Alnus viridis*)
- Labrador tea (*Ledum groenlandicum*)
- Lapland diapensia (*Diapensia lapponica*)
- Lingonberry/Red berry (Vaccinium vitis-idaea)
- Reindeer lichen (*Cladonia* spp.)
- Rhodora (*Rhododendron canadense*)
- Sphagnum moss (*Sphagnum* spp.)
- Stiff clubmoss (*Lycopodium annotinum*)

- Sweet gale (*Myrica gale*)
- White spruce (*Picea glauca*)

Willow (*Salix* spp.), one of the above species are considered SAR federally or provincially, and all are considered secure by the Atlantic Canada Conservation Data Centre and International Union For Conservation of Nature.

5.3 Socio-economic

5.3.1 *Resource and Traditional Land Use*

The provincial Land Use Atlas indicates that the Project footprint is located in the Nain rural zone as defined by the Nain Inuit Community Government. Though close by, the project footprint does not encroach on the protected watershed restriction zone for the domestic water supply. The existing road to the water tower will be used to access the Project Footprint, but an extension must be constructed to connect the existing access road to the Project Area.

The residents of Nain have a long and rich history of hunting, trapping, and harvesting from the land. The general area surrounding the Project has been historically used for ptarmigan hunting, fox trapping, and berry picking. Historically the area was also used for caribou hunting, but caribou have not been observed in the area for several years (G. Dicker pers. comm.). Caribou in the past were primarily harvested from the George River Herd.

Bra Pond, just east of the Project footprint, is used frequently by locals for recreational swimming in summer.

The area is also used as a transportation route to gain access farther inland in the early fall after the first heavy snowfall (G. Dicker, pers. comm) and the area has some trails and evidence of impacts from ATVs and snowmobiles.

5.3.2 *Communication*

There are several communication towers within Nain. An Electromagnetic Interference (EMI) study was conducted by the proponent to ensure that communication within Nain would not be disrupted. This study has been included in Appendix H. In addition to project components, Figure 5-4 below shows the telecommunication towers and the buffers surrounding the towers.

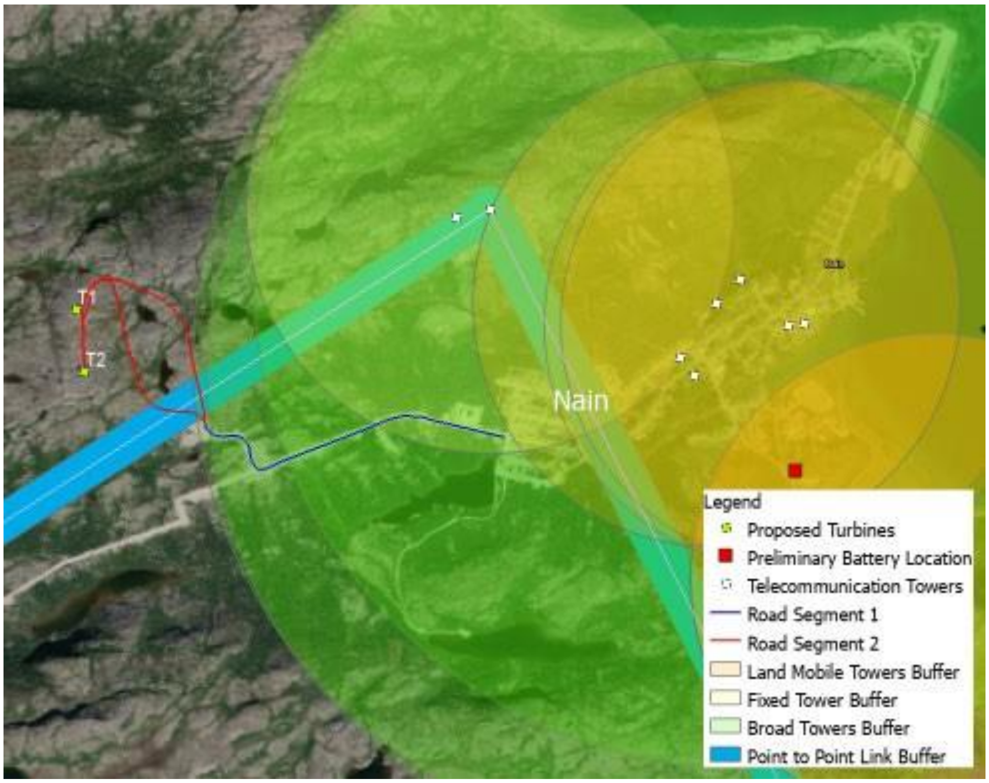

Figure 5-4 All telecommunication towers (points) and associated consultation zones (blue, green, yellow, orange) within the Nain boundary (white line).

The four types of towers relevant to this study: Point-to-Point Microwave Radio Systems, Broadcast Radio Systems, Land Mobile Radio Towers, and Navigation Canada and Canadian Coast Guard Towers. The buffers applied to each tower represent the consultation zone for each tower, as the extent of this zone varies for different towers. Currently, the turbines are sited outside of any of the consultation zones for these telecommunication towers.

6 Consultation

6.1 Activities to Date

The consultation activities that have occurred to date are summarized in Table 6-1 below.

Table 6-1 Consultation Activities to Date

Activity	Date	Description
Nain Open House	September 23rd, 2020	The Open House was advertised with local flyer distribution via Canada Post, a digital flyer which was posted on NG social media platforms, and on radio with the OKâlaKatiget Society in Nain. A presentation was delivered by the development partners, Natural Forces, which gave a broad overview of the project, proposed location, justification for the work, preliminary timeline, and potential impacts (e.g. sound models). In addition, this open house was broadcast over Facebook Live. This presentation has been viewed in excess of 350 times as of December, 2020. Questions were accepted from both in-person and virtual audiences.
Community Meal	September 24th, 2020	Recognizing that a formal open house may not be accessible or of interest to all community members, we held an additional community event at the J.S. This event was advertised on the Nunatsiavut Energy Strategy Facebook page as well as on the Nain Bulletin Board. Prior to receiving a meal free of charge, community members were asked to visit NG staff at a NWMG Project Booth. At the Project Booth community members listed potential concerns or questions about the project, identified possible benefits, and were able to discuss the project with NG staff.
Meeting with Nain Inuit Community Government	September 24th, 2020	NG staff within the policy and planning division, as well as the development partner (Natural Forces) met with representatives of the Nain Inuit Community Government. AngajukKak, Joe Dicker, as well as Town Manager, Benigna Ittulak, were in attendance. The development partners gave a shortened version of the September 23rd Open House presentation and

		responded to questions of the Nain Unit Community Government.
Meeting with Constituency of Nain	September 23rd, 2020	NG staff as well as Natural Forces hosted a presentation for the Constituency of Nain – both representatives for the community attended including Minister Tony Andersen (Finance, Human Resources and Information Technology) as well as Minister Jim Lyall (Language, Culture and Tourism). Again, the development partners gave a shortened version of the September 23rd Open House presentation and responded to the questions of elected officials.
Presentation to N.G. Staff	September 23rd, 2020	Natural Forces hosted a presentation for Nunatsiavut Government Staff in the board room of the NG Administrative Building. The presentation was advertised via internal email as well as over the building intercom system. The presentation was identical to that which was given at the Open House but allowed NG staff a direct opportunity to ask questions of the project developer.
School Visit	September 23rd, 2020	Nunatsiavut Secretariat Staff as well as the development partner undertook an interactive workshop with science students at Jess Haven Memorial School. NG Staff and development partner delivered a short presentation on renewable energies vs. Fossil fuels and played a trivia game with students about where their energy comes from. Staff then supported students in building and testing model wind turbine kits and disseminated informational materials for the Nain Microgrid Project.

7 Approval of the Undertaking

In Table 7-1 below are listed the primary permits, licenses, approvals, and other forms of authorization that may be required for the undertaking, together with the names of the authorities responsible for their issue/authorization. This list is not exhaustive.

Table 7-1 Primary permits, licenses, approvals and other forms of authorization

Approval/License/Permit	Issuing Agency/Authority
Environmental Assessment Registration	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities
Certificate of Approval (following EA Release)	Newfoundland and Labrador Department of Municipal Affairs and Environment Newfoundland and Labrador Department of Environment, Climate Change and Municipalities
Environmental Assessment Registration and Certificate of Approval	Nunatsiavut Government Department of Lands and Natural Resource
Land Use	Newfoundland and Labrador Department of Municipal Affairs and Environment Newfoundland and Labrador Department of Environment, Climate Change and Municipalities
Access Road Construction	Department of Works, Services and Transportation
Distribution Lines	Newfoundland and Labrador Department of Municipal Affairs and Environment Newfoundland and Labrador Department of Environment, Climate Change and Municipalities
Building and Accessibility Exemption Registration	Nain Inuit Community Government
General Environmental Permits	Newfoundland and Labrador Department of Environment, Climate Change and Municipalities
Development Permit	Nain Inuit Community Government
Building Permits	Nain Inuit Community Government
Highway Access Permit	Department of Works, Services and Transportation
Tall Structures Obstruction Clearance	Transport Canada, NAV Canada

Municipal plan amendment to accommodate wind turbines	Nain Inuit Community Government and Minister of Municipal Affairs Newfoundland and Labrador Department of Environment, Climate Change and Municipalities

8 Schedule

The proposed schedule for this project is listed in Table 8-1 below:

Table 8-1 Schedule

Submission of Registration Document	**November 2020**
Review of Submission Document by Government	Dec 2020/January 2021
Commencement of Project Construction	July 2021
Commencement of Commercial Operation	October 2022

9 Funding

Funding for the undertaking will be provided through a combination of grants, partner equity, and long-term debt.

Date and Signature of Chief Executive Officer

Date January 8 2021

Signature of President 

10 References

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Appendix A - Nunatsiavut Government Nain Wind Turbine Siting Document

NUNATSIAVUT
kavamanga Government
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Nunatsiavut Secretariat

Nain Wind Turbine Siting:

20 Jane 2019

In 2015 Hatch Engineering conducted feasibility studies, recording wind data with met towers in five Labrador coastal communities. This report recommended Nain Labrador as the best candidate for a first wind project. The Hatch report proposes a few different turbine configurations and locations in Nain based on modelling, these potential wind turbine locations are shown in Figure 2. The options on Nain Hill were ruled out as they potentially conflict with existing radio tower infrastructure.

The proposed wind project consists of two 900 kW wind turbines for a total installed capacity of 1.8 MW. The proposed site for the Nain wind turbines is on the ridge north-west of the Nain water tower, as indicated by the orange shaded area in Figure 1. The approximate centre of the shaded area is (56.542, -61.738). There currently exists road access up to as far as the Nain water tower, additional road will likely need to be constructed between the water tower and the turbine site location. As the surveying and engineering for this road has not yet been completed the approximate location is indicated by the red shaded area in Figure 1.

25 Ikajuktauvik Road, PO Box 70, Nain, NL, Canada A0P 1L0 Toll Free: 1.866.922.2942 Fax: 709.922.2931

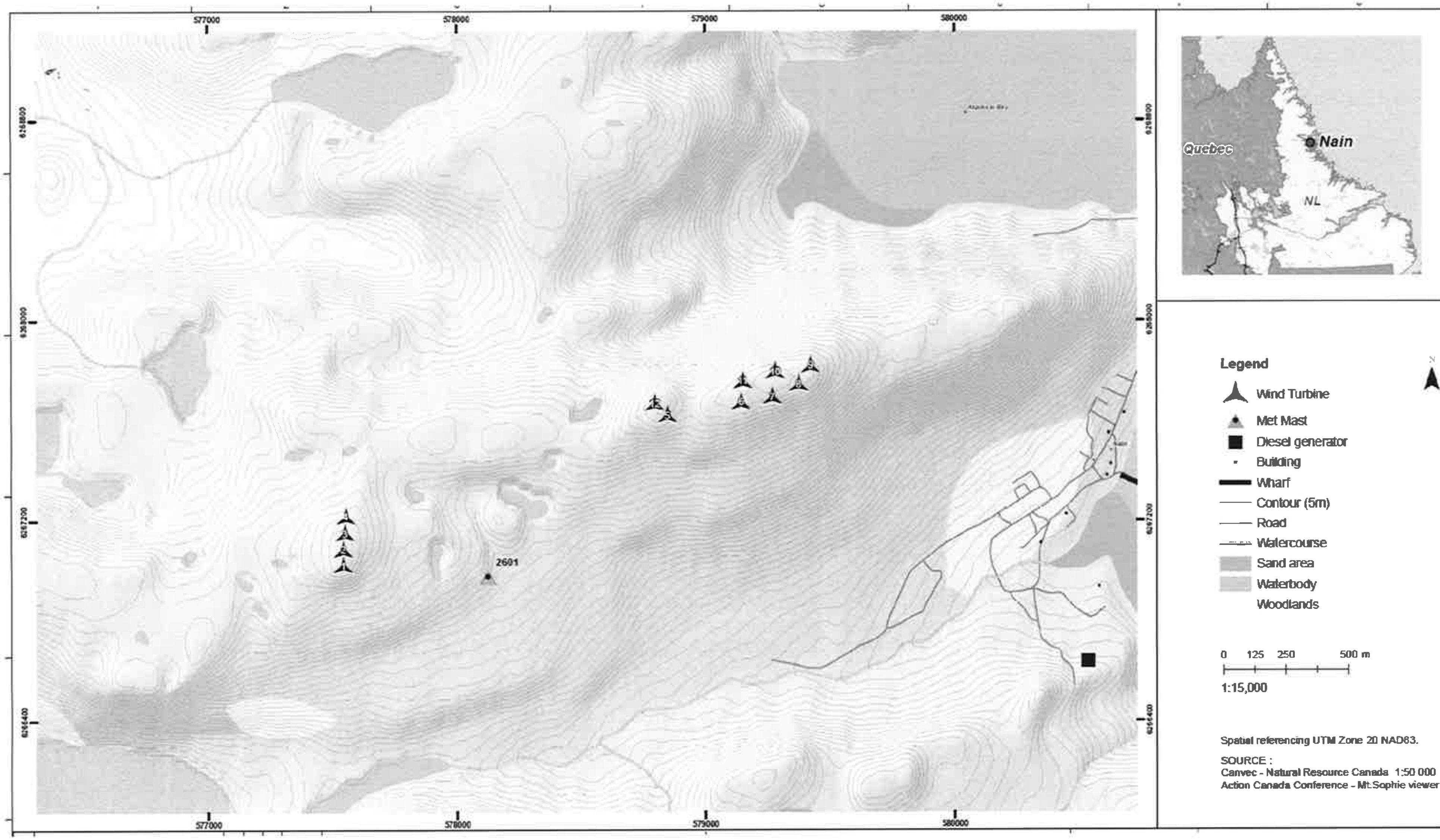

Figure 2 Potential Nain wind turbine locations from Hatch wind study, 2015

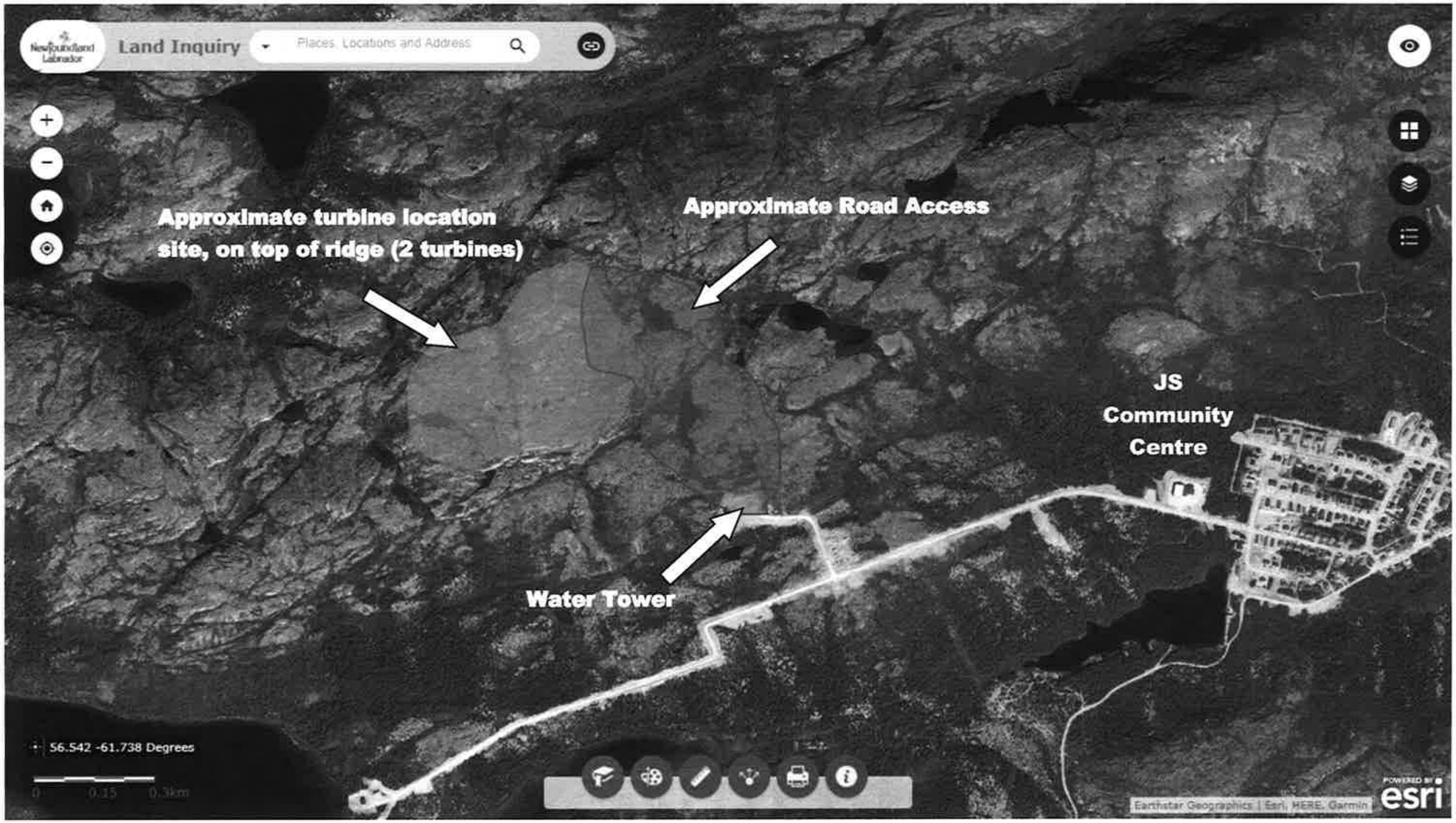

Figure 1 Approximate turbine and road access locations for Nain wind turbines.

Base map from Land Inquiry: https://www.gov.nl.ca/landuseatlas/inquiry/?extent=-6875170.8475%2C7665518.1066%2C-6868645.0362%2C7668503.9281%2C102100

Appendix B - 2019 Avifauna and Baseline Habitat Surveys

Nunatsiavut Wind Power Project: Avifauna and Baseline Habitat Surveys

2019

Prepared for:

Neil Hawkes and Patricia Johnson-Castle
Sustainable Energy Coordinators
Nunatsiavut Government

SEM Project 002-035

Prepared by:

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September 6, 2019

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1.0 INTRODUCTION

The Nunatsiavut Government (NG) is proposing a wind power project (the Project) for Nain, NL, to be comprised of two turbines of 900 kW each for a total of 1.8 mW. Nain is the northernmost incorporated settlement in Labrador, isolated by vast distances from any electricity grids, with only a diesel generator for energy production. The cost of electricity produced by those diesel systems is relatively high compared to other parts of the Province that avail of hydroelectric power. Wind energy is a potential green solution to this issue. Wind energy is much more environmentally friendly to the Earth than most other production systems like hydroelectric, as wind energy requires minimal disturbance to the land and no disturbance to the waters.

Wind turbine projects and their associated infrastructure have been established as a potential source of mortality for birds and bats. Direct mortality or lethal injury of birds and bats can result from collisions with the spinning blades and associated towers, lights, guy cables, power lines and meteorological stations (Erickson *et al*. 2001; Drewitt and Langston 2006). However, the majority of studies of collisions caused by wind turbines have recorded relatively low levels of mortality (Erickson *et al*. 2001). This trend may be due to the placement of wind turbines or an underestimation of mortality with carcass surveys. In any case, it is important to establish *a priori* the significance of a particular area to birds and bats before wind turbines are erected. Many Families of birds are federally protected by the *Migratory Birds Convention Act* (*MBCA* 1994), including all the waterfowl species and insectivorous perching birds. Raptors and Owls are protected under Provincial legislation. Species at Risk are protected under the federal *Species at Risk Act* (*SARA* 1994) and provincially under the Newfoundland and Labrador Endangered Species Act (*NL ESA*, 2001).

Sikumiut Environmental Management Ltd. (SEM) conducted an avifauna survey and a baseline bird and bat habitat assessment for the NG in the area of the proposed turbines in Nain. SEM has direct, relevant experience with several ornithological projects, habitat surveys and Environmental Registrations around the Province of NL, including many projects around Labrador.

2.0 STUDY AREA

Nain is located in the Coastal Barrens – Okak/Battle Harbour Ecoregion which stretches from Napaktok Bay south to the Strait of Belle Isle. This rugged coast has many deep inlets with forests occurring primarily in the valleys and barrens on the uplands.

The proposed area for the wind turbine project is located just west of Nain itself, on an upland rocky upland area north of Trouser Lake. Specifically, the potential turbine locations were modelled by Hatch (2015) and were located northwest of the Nain water tower, as per Figure 2.1.

Road access ends at the water tower and the exact route of the new extension road has yet to be determined at the time of writing this report. The proposed locations of the two wind turbines are depicted in Figure 2.2.

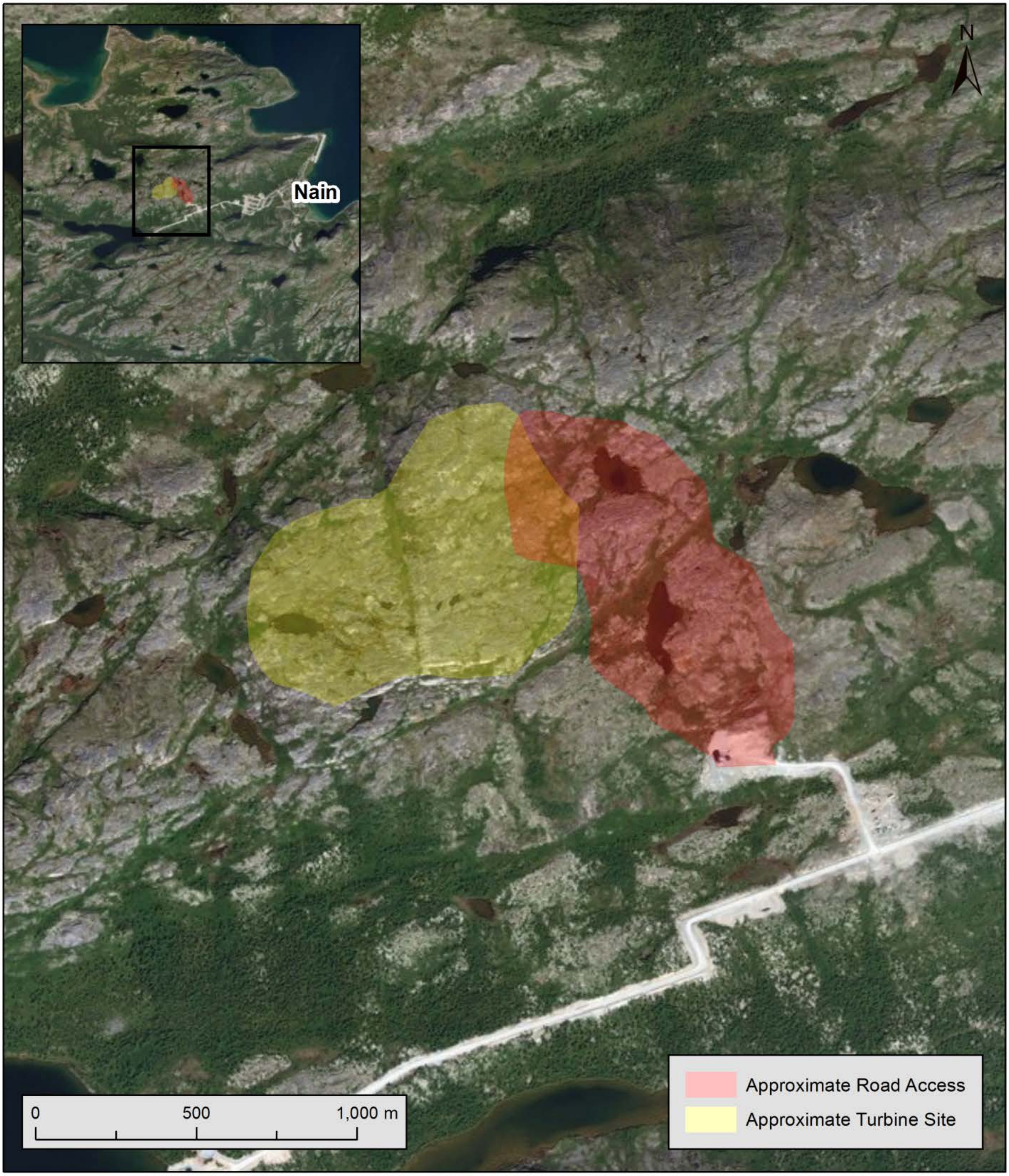
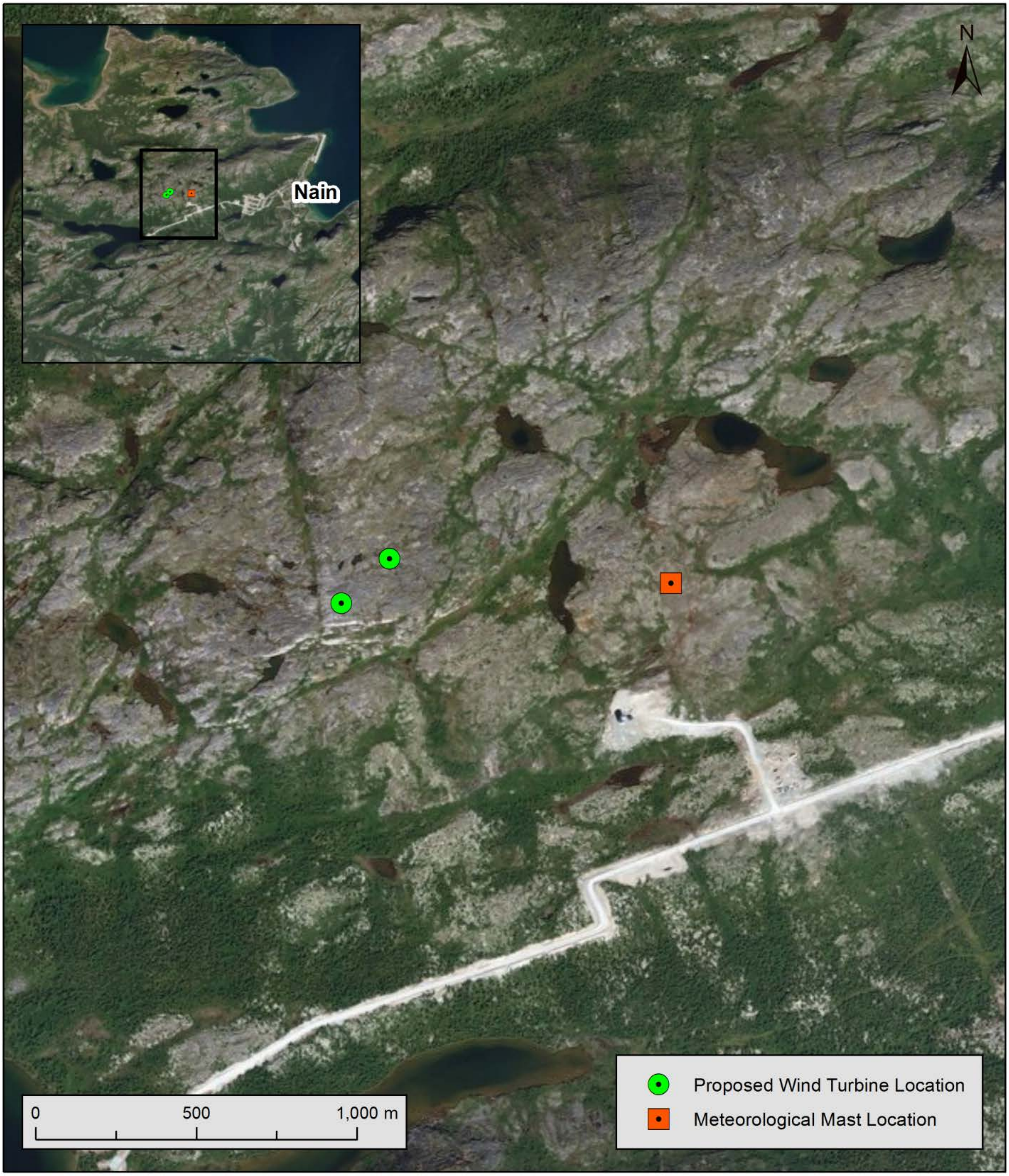


		FIGURE NO:	PREPARED BY:
NUNATSIAVUT kavamanga Government	Nunatsiavut Avifauna and Habitat Surveys	2.1	SEM
	Proposed Wind Turbine and Road Access	COORDINATE SYSTEM: NAD83 UTM Zone 20	DATE: 27/08/2019



NUNATSIAVUT
kavamanga Government

Nunatsiavut Avifauna and Habitat Surveys	FIGURE NO: 2.2	PREPARED BY: SEM
Proposed Wind Turbine Locations	COORDINATE SYSTEM: NAD83 UTM Zone 20	DATE: 27/08/2019

3.0 EXISTING INFORMATION

Resident and migratory species of birds in northern Labrador include representatives from the bird Orders Anseriformes (Waterfowl), Galliformes (Gamebirds), Gaviiformes (Loons), Accipitriformes (Raptors), Charadriiformes (Shorebirds), Columbiformes (Doves), Gruiformes (Rails), Strigiformes (Owls), Coraciiformes (Kingfishers), Piciformes (Woodpeckers) and Passeriformes (Perching birds).

Nain is located in the Taiga Shield and Hudson Plains Bird Conservation Region (Notzl *et al*. 2013) and is situated along the Atlantic Migratory Bird Flyway (Figure 3.1, adopted from Lake Region Audubon 2010).

Relative to other areas in the Province, there is a general deficiency of empirical information on birds in and around Nain and northern Labrador. However, a literature search for historical records and range maps produced a list of species known from the area, grouped below by terrestrial birds, seabirds and shorebirds, waterfowl, and raptors and owls. Information was gleaned from The Birds of North America Online, the Labrador Nature Atlas (Notzl *et al*. 2013).

Terrestrial Species Known from the Nain Area

Terrestrial species for which records were found for Nain included: American Robin (*Turdus migratorius*), Gray Jay (*Perisoreus canadensis*), Common Raven (*Corvus corax*), Dark-eyed Junco (*Junco hyemalis*), Yellow-rumped Warbler (*Setophaga coronata*), Boreal Chickadee (*Poecile hudsonicus*), Common Redpoll (*Acanthis flammea*), Fox Sparrow (*Passerella iliaca*), Northern Waterthrush (*Parkesia noveboracensis*), Pine Grosbeak (*Pinicola enucleator*), Spruce Grouse (*Falcipennis canadensis*), Willow Ptarmigan (*Lagopus lagopus*), Rock Ptarmigan (*Lagopus muta*), Pine Siskin (*Spinus pinus*), Tennessee Warbler (*Leiothlypis peregrina*), White-throated Sparrow (*Zonotrichia albicollis*), Blackpoll Warbler (*Setophaga striata*), Ruby-crowned Kinglet (*Regulus calendula*), White-winged Crossbill (*Loxia leucoptera*), Wilson's Warbler (*Cardellina pusilla*), Alder Flycatcher (*Empidonax alnorum*), Bohemian Waxwing (*Bombycilla garrulus*), Three-toed Woodpecker (*Picoides dorsalis*), Horned Lark (*Eremophila alpestrisand*) and American Pipit (*Anthus rubescens*). In addition, several species may use the Nain area as stopover habitat on migration to the Arctic, such as Lapland Longspur (*Calcarius lapponicus*). The list above is not considered to be inclusive of all terrestrial species that may be using the Nain area, but provides an overview of some of the more common species from the area.

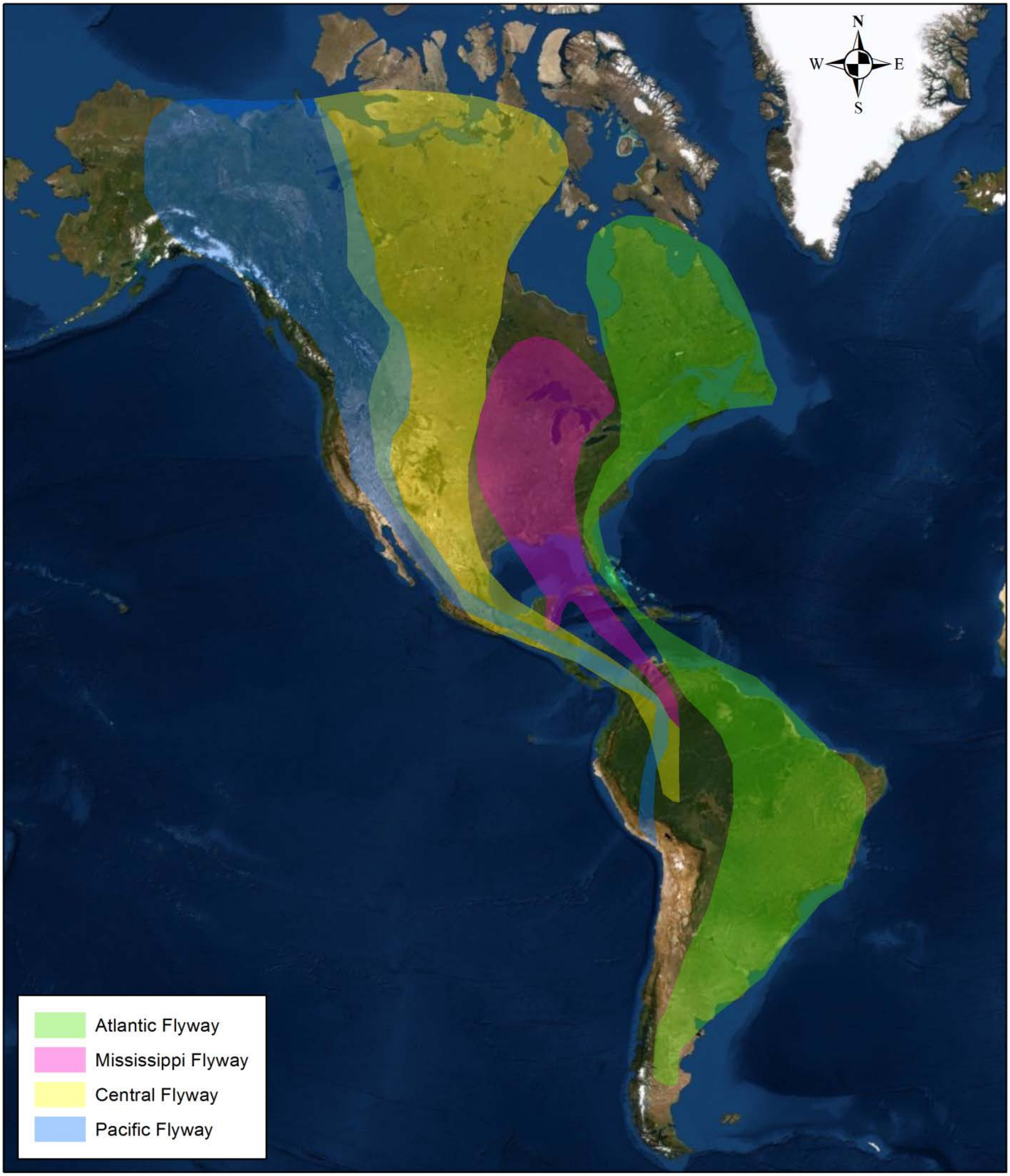


		FIGURE NO:	PREPARED BY:
NUNATSIAVUT kavamanga Government	Nunatsiavut Avifauna and Habitat Surveys	3.1	SEM
	North American Migratory Bird Flyways	COORDINATE SYSTEM: WGS84 Web Mercator	DATE: 27/08/2019

Seabird and Shorebird Species Known from the Nain Area

Several seabirds and shorebirds are known from the Nain area, all of which are protected by federal legislation under the *MBCA*. Seabird species include, but are not limited to: Herring Gull (*Larus argentatus*), Glaucous Gull (*Larus hyperboreus*), Razorbill (*Alca torda*), Atlantic Puffin (*Fratercula arctica*), Thick-billed Murre (*Uria lomvia*) and Great Black-backed Gull (*Larus marinus*). Shorebird species using the area may include: Greater Yellowlegs (*Tringa melanoleuca*), Solitary Sandpiper (*Tringa solitaria*), Spotted Sandpiper (*Actitus macularia*), Least Sandpiper (*Caladris minutilla*), Red-necked Phalarope (*Phalaropus lobatus*) Wilson's Snipe (*Gallinago gallinago*), American Golden Plover (*Pluvialis dominica*) (non-breeding in Labrador, migration only), Dunlin (*Caladris alpina*) (non-breeding in Labrador, migration only), Semipalmated Plover (*Charadrius semipalmatus*) (non-breeding in Labrador, migration only), Semipalmated Sandpiper (*Caladris pusilla*) (non-breeding in Labrador, migration only) and White-rumped Sandpiper (*Caladris fuscicollis*) (non-breeding in Labrador, migration only).

Waterfowl Known from the Nain Area

Waterfowl species are also protected federally by the *MBCA*. Some of the species known to occur in the Nain area, either on inland waterbodies or marine environments (or both) include: Common Eider (*Somateria mollissima*), King Eider (*Somateria spectabilis*), American Black Duck (*Anas rubripes*), Canada Goose (*Branta canadensis*), Common Goldeneye (*Bucephala clangula*), Common Loon (*Gavia immer*), Common Merganser (*Mergus merganser*), Green-winged Teal (*Anas crecca*), Northern Pintail (*Anas acuta*), Red-breasted Merganser (*Mergus serrator*), Ring-necked Duck (*Aythya collaris*), Surf Scoter (*Melanitta perspicillata*), Lesser Scaup (*Aythya affinis*), Greater Scaup (*Aythya marila*) and Long-tailed Duck (*Clangula hyemalis*).

Raptors and Owls Known from the Nain Area

Raptors and owls are protected by the Newfoundland and Labrador *Wild Life Act* (1996). The Province requires nests of raptor species to be buffered from disturbance and no vegetation is to be cleared within 800 meters of an eagle or Osprey (*Pandion haliaetus*) nest during nesting season. In addition, eagle and Osprey nests are to warrant a 200 m buffer outside the nesting season. A 200-m buffer also applies to all other raptor nests (e.g., Northern Goshawk (*Accipiter gentilis*), Merlin (*Falco columbarius*), Great-horned Owl (*Bubo virginianus*)).

There are a number of raptor and owl species known from the Nain area, including, but not limited to, the following: Golden Eagle (*Aquila chrysaetos*), Great-horned Owl, Gyrfalcon (*Falco *rusticolus*) (non-breeding), Merlin, Northern Goshawk, Northern Hawk Owl (*Surnia ulula*), Osprey and Rough-legged Hawk (*Buteo lagopus*).

Possible Species at Risk in Nain

Several Species at Risk are known from the general area around Nain. Ivory Gull, Harlequin Duck, Rusty Blackbird, Short-eared Owl and Peregrine Falcon are known from the general region. However, Ivory Gull breeds in the high Arctic, Harlequin Duck breeds in fast-moving mountain rivers and Rusty Blackbird breeds in treed wetlands, so these three species are unlikely to be breeding in close proximity to the footprint of the proposed wind power project in Nain. However, the ice pack in winter off Nain would possibly provide wintering habitat for Ivory Gull and the waters off Nain would provide non-breeding habitat for Harlequin Duck. Peregrine Falcon of the *tundrius* subspecies nest on islands within the Nain Coastline Important Bird Area. This species is listed as Special Concern on *SARA*.

Short-eared Owl is known from the Nain region and is protected by the federal *SARA* and the Provincial *ESA.* This species prefers vast, open habitats, including meadows, marshes, bogs, tundra, heathlands, and agricultural areas and rehabilitated mine sites. Short-eared owl populations tend to cycle with their mammalian prey, notably voles and mice. There are no population estimates for this species in Labrador and accurate estimates of North American populations have eluded biologists. Data from the North American Breeding Bird Survey suggests that although this species has undergone a long-term population decline across Canada, its numbers have remained relatively stable in the Atlantic Provinces.

4.0 METHODOLOGY

4.1 Breeding Bird Survey

Prior to ground surveys, field survey maps were generated by SEM using geographical information systems (GIS). A preliminary habitat assessment was completed to determine the probable avian species and any SAR that were possible for the area, based on the habitat types available and the spatial extent of each. From the habitat assessment it was determined that the majority of the footprint of the turbines and access road will be in Rocky Outcrop habitat. This indicated that the biodiversity of birds expected for the area would be relatively low.

The survey method SEM chose for this project is an amalgamation of several survey techniques chosen to maximize the likelihood of detection of birds. Systematic “atlassing” transects were employed throughout the proposed footprint of the turbines, access road, and around the Nain area, combined with behavioral observations of breeding evidence, the practice of “pishing” to attract birds to closer proximity, and point counts (i.e., listening and observing for ten minutes at pre-determined locations). Eight point counts were conducted within the footprint of the project, spaced out by >250 m. This combination of methods allowed SEM to document the species generally using the Nain area and also document the species in proximity to the proposed turbine locations and access road at the time of the survey.

The SEM ornithologist led the surveys and was accompanied by an additional SEM technician as a second observer. The walking pace depended upon terrain, habitat type and the number of birds present. Surveys were conducted in appropriate weather and began in the evening on the first day and just after sunrise on the second day. Surveys were not conducted in uncertain weather conditions as inclement weather can reduce the detectability of birds.

The following general protocols are employed by SEM during breeding bird surveys (adopted from Bird Studies Canada’s *Nest Monitoring Code of Conduct*):

1. Surveyors minimize disturbance to the nests and birds during breeding bird surveys. Confirmation of breeding using Atlas codes will be preferred over locating exact nest locations.

2. Surveyors avoid trampling nest areas and the surrounding vegetation and do not survey immediately following rain, so as to avoid risk to nestling disturbance at vulnerable times.

3. Atlas codes will be used to confirm nesting, if possible, to reduce nest-searching time.

4. Surveyors do not walk the same path to nests as the first visit to avoid predators following the scent path to the nest.

5. Surveyors leave nest sites quickly after finding a nesting area and record information at least 20 m from the nest site. Breeding information is recorded as per codes established by Bird Studies Canada (see Appendix A for list of codes used in the survey).

SEM conducted ground surveys for all bird species, and during those surveys also searched for raptor nests (e.g., Northern Goshawk, Merlin, Great-horned Owl) and any waterfowl that might be using the area. Ground surveys were conducted with high quality optical equipment, and all high points and cliff faces were scanned, in addition to scans of the sky, for 15 minute periods at a time. Waterbodies were also scanned in various locations to detect the presence of waterfowl using the area. Data were recorded on field data sheets and then entered into spreadsheets at the end of each field day.

4.2 Habitat Assessment

Field survey maps were generated by SEM using geographical information systems (GIS). The majority of the footprint of the turbines and access road are in Rocky Outcrop habitat. This type of habitat tends to be a landscape relatively devoid of much vegetation or shelter, and usually exists in upland areas like this one, with high winds for much of the time.

Additional habitat information was recorded during dedicated transect surveys throughout the area on July 2, 2019, and during breeding bird surveys on July 3, 2019. Dominant species and habitat types were recorded throughout the footprint of the project. An assessment of the potential for avian Species at Risk and Little Brown Bat (*Myotis lucifugus*) was also conducted.

5.0 RESULTS

Eleven species of birds from several Orders were detected during field surveys in the footprint of the turbines and the access road: Alder Flycatcher, American Robin, Common Raven, Fox Sparrow, Gray Jay, Horned Lark, Pine Grosbeak, Pine Siskin, White-crowned Sparrow, White-throated Sparrow and White-winged Crossbill (Table 5.1).

Table 5.1 Survey Observations.

Species	No. Observations
Alder Flycatcher	1
American Robin	9
Common Raven	6
Fox Sparrow	2
Gray Jay	1
Horned Lark	1
Pine Grosbeak	1
Pine Siskin	1
White-crowned Sparrow	5
White-throated Sparrow	1
White-winged Crossbill	8

Other species observed around Nain, but not within the project footprint, include Dark-eyed Junco, Herring Gull, American Pipit (*Anthus rubescens*) and Ruby-crowned Kinglet. Willow Ptarmigan and Rock Ptarmigan are both known from the footprint as verified by scat observed during surveys. No raptors or owls were observed during surveys, and habitat is quite limited for most species.

From the habitat mapping exercise it was determined that the likelihood was minimal that any SAR were breeding in close proximity to the proposed turbine locations or access road, due to the lack of appropriate breeding habitat for each species. Those results were confirmed during the field surveys – there were no areas within the footprint of the project that were deemed to be high potential for SAR, and indeed no SAR were detected during surveys. Short-eared Owl would be possible for the footprint, however, given the open nature of the area.

5.1 Habitat Assessment

Field survey maps were generated by SEM using geographical information systems (GIS). The majority of the footprint of the turbines and access road are in Rocky Outcrop habitat (Figure 5.1). This type of habitat tends to be a landscape relatively devoid of much vegetation or shelter, and usually exists in upland areas like this one, with high winds for much of the time. Rocky Outcrop provides habitat for only relatively few bird species, given the harsh conditions, constant wind and paucity of vegetation for foraging or cover.

Figure 5.1 Typical Rocky Outcrop Habitat of the Proposed Turbine Area and Access Road.

Little Brown Bat, an endangered bat species, is known from Labrador but not from this area in Nain (G. Dicker, pers. comm. 2019). This upland habitat is very harsh and windy, without any habitat that would be considered good foraging habitat for this species. A previous effort by the Newfoundland and Labrador Wildlife Division did not produce any echolocation detections of bats around Nain. Anecdotal reports of bats in northern Labrador include a sighting at the Vale NL site (Voisey's Bay) and a sighting near the coast of Paul's Island (G. Dicker, pers. comm. 2019).

Some of the more common vegetation species observed in the footprint of the turbines and access road included:

- Glandular birch (*Betula glandulosa*)
- Grass species (Graminoid spp.)
- Reindeer lichen (*Cladina* spp.)
- Labrador Tea (*Ledum groenlandicum*)
- Dwarf Blueberry (*Vaccinium cespitosum*)
- Stiff clubmoss (*Lycopodium annotinum)*
- Green alder (*Alnus viridis)*
- Black crowberry (*Empetrum nigrum*)
- Black spruce (*Picea mariana)*
- Eastern larch *(Larix laricinal)*
- Common cottongrass (*Eriophorum angustifolium*)
- Sphagnum moss (*Sphagnum* spp.)
- Bearberry (*Arctous alpina*)
- Rhododendron (*Rhododendron canadense*)

In addition to the birds observed during breeding bird surveys and the vegetation species mentioned above, the footprint of the wind turbines may provide habitat for Arctic hare (*Lepus arcticus*), red fox (*Vulpes vulpes*), black bear (*Ursus americanus*), gray wolf (*Canis lupus*), weasel (*Mustela erminea*), lynx (*Lynx canadensis*), Southern red-backed vole (*Myodes gapperi*) and woodland caribou (*Rangifer tarandus*).

Given the proximity of the area to the town of Nain, these species would not be expected to rely on the study area for any critical life cycle stages or for any extended basis.

6.0 CONCLUSIONS

The bird species observed in the footprint of the project were typical of those from Rocky Outcrop habitat (with some small patches of intermixed boreal forest). There were no raptors or owls detected during surveys, and no SAR or rare species were observed in the areas around the proposed turbine or access road areas, all of which were rigorously surveyed.

Given the small footprint involved there would be minimal impact upon breeding birds and breeding bird habitat in the areas. However, dedicated surveys during fall and spring migration would be required to determine the significance of the area to migrating birds.

7.0 REFERENCES

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Appendix A

Survey Codes

Nesting Codes for Breeding Bird Surveys (adopted from Bird Studies Canada's Nestwatch Program)

POSSIBLE BREEDING

H	Species observed in suitable nesting habitat during its breeding season.
S	Individual singing or producing other sounds associated with breeding (e.g., calls or drumming) in suitable nesting habitat

PROBABLE BREEDING

M	At least 7 individuals singing or producing other sounds associated with breeding (e.g., calls or drumming), heard during the same visit
P	Pair observed in suitable nesting habitat during the species' breeding season.
T	Presumed territory based on the presence of an adult bird in the same place in suitable nesting habitat on two visits a week or more apart
C	Breeding behaviour involving a male and female (e.g., display, courtship feeding and copulation) or antagonistic behaviour between males
V	Bird visiting a probable nest site in suitable nesting habitat during the species' breeding season.
A	Agitated behaviour or alarm call of an adult in suitable nesting habitat during the species' breeding season.
N	Nest-building by wrens or nest hole excavation by woodpeckers.

CONFIRMED BREEDING

CN	Nest building and/or carrying of nesting material
NU	Empty nest recently used, or the shells of eggs.
NO	Adult occupying, leaving or entering a probable nest site (visible or not)
FE	Adult carrying a fecal sac.
AT	Adult carrying food for young.
NF	Nest containing one or more eggs.

Appendix C - 2019 Fall Migration Bird Survey Report

Nunatsiavut Government Wind Power Project

Fall Migration Avifauna Surveys

2019

Prepared for:

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SEM Project 002-037

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November 1, 2019

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1.0 INTRODUCTION

The Nunatsiavut Government (NG) is proposing a wind power generating project (the Project) for Nain, NL, to be comprised of two turbines of 900 kW each. Nain is the northernmost incorporated settlement in Labrador, is isolated from any electricity grids and currently operates a diesel generator for energy production. The cost of electricity produced by those diesel systems is relatively high compared to other parts of the Province. In addition, diesel generators emit several harmful exhaust gases. Wind energy is a potential green solution to this issue and requires minimal disturbance to the land and no disturbance to the waters.

Wind turbine projects and their associated infrastructure have been established as a potential source of mortality for birds. Many Families of birds are federally protected by the *Migratory Birds Convention Act* (*MBCA* 1994), including all the waterfowl species and insectivorous perching birds. Raptors and Owls are protected under Provincial legislation. Species at Risk are protected under the federal *Species at Risk Act* (*SARA* 2002) and provincially under the *Newfoundland and Labrador Endangered Species Act* (*NL ESA*, 2001). Direct mortality or lethal injury of birds (from wind turbines) can result from collisions with the spinning blades and associated towers, lights, guy cables, power lines and meteorological stations (Erickson *et al*. 2001; Drewitt and Langston 2006). Soaring birds like several species of raptors are among the most affected groups due to fatalities by collision with wind turbines and a growing incursion into their migratory corridors (Marques et al. 2019). Raptors are especially vulnerable due to this tendency as they use the same airspace as turbines and because they are long-lived species with low reproductive rates. Raptors, as well as other groups of birds (e.g., Passerines) may also experience a loss or fragmentation of habitat from the construction and operation of wind energy facilities.

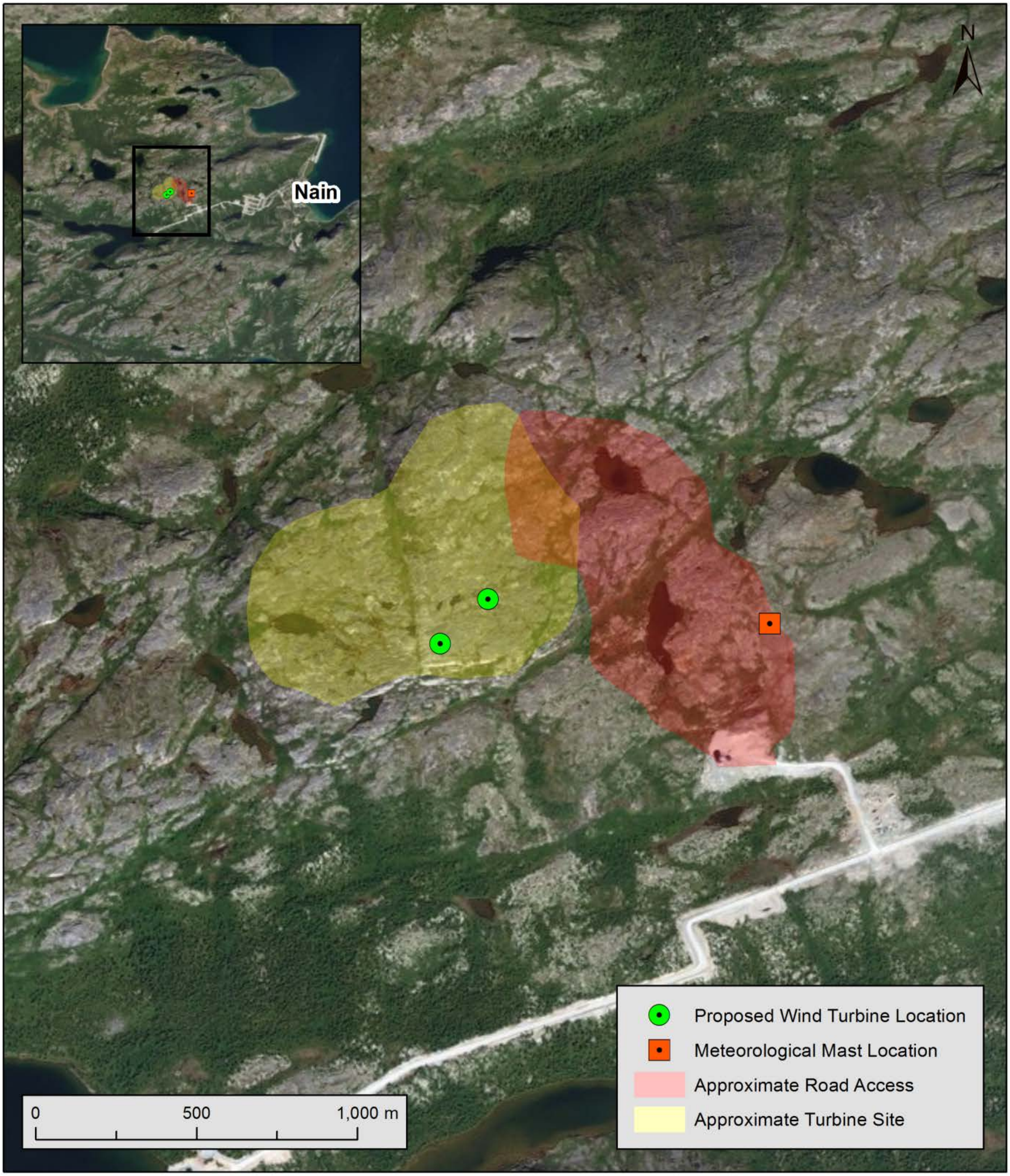
Due to the known risks for birds, it is important to establish *a priori* the significance of a particular area to birds before wind turbines are erected. Knowing which species of birds are using the proposed area, and when they are using it, can aid in assessing that significance. To establish the species using the area at different times of year, the Nunatsiavut Government has committed to the completion of surveys during the bird breeding season (July), fall migration (September) and spring migration (June). In addition, Sikumiut Environmental Management Ltd. (SEM) will deploy SongMeter SM4 acoustic recorders during migration in an attempt to detect the flight calls of birds migrating at night, which includes most Passerines. In September 2019, SEM conducted the fall migration survey within the area of the proposed turbines and access road. This report summarizes the results of that survey.

2.0 STUDY AREA

Nain is located in the Coastal Barrens – Okak/Battle Harbour Ecoregion which stretches from Napaktok Bay south to the Strait of Belle Isle. This rugged coast has many deep inlets with forests occurring primarily in the valleys and barrens on the uplands.

The proposed area for the wind turbine project is located just west of Nain itself, on a rocky upland area north of Trouser Lake. Specifically, the potential turbine locations were modelled by Hatch (2015) and were located northwest of the Nain water tower, as per Figure 2.1.

Road access ends at the water tower and the exact route of the new extension road has yet to be determined at the time of writing this report. The proposed locations of the two wind turbines are depicted in Figure 2.1.



NUNATSIAVUT kavamanga Government

Nunatsiavut Avifauna and Habitat Surveys

Proposed Wind Turbine, Mast and Road Access Locations

FIGURE NO: 2.1

PREPARED BY: SEM

COORDINATE SYSTEM: NAD83 UTM Zone 20

DATE: 01/11/2019

3.0 EXISTING INFORMATION

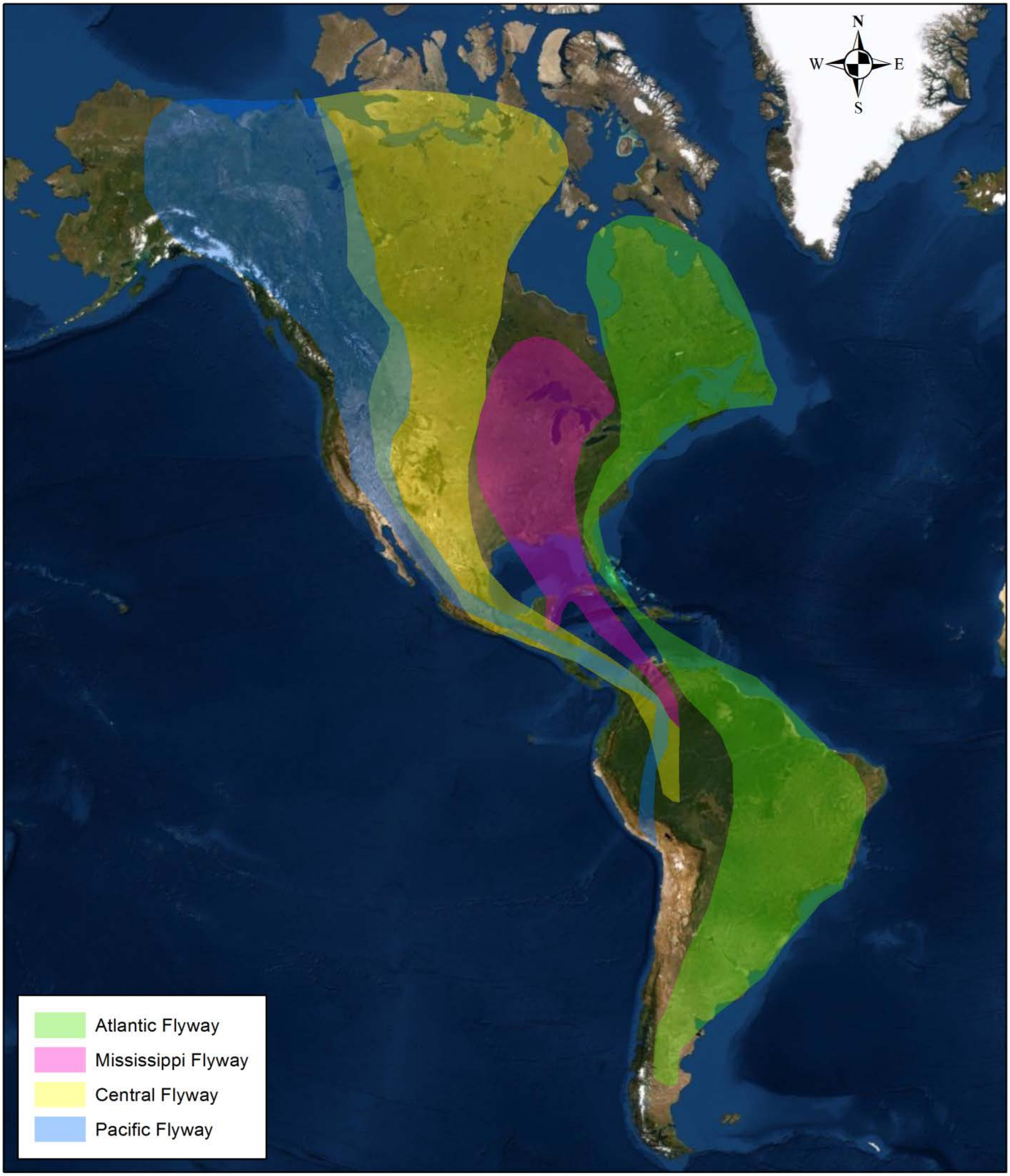
Resident and migratory species of birds in northern Labrador include representatives from the bird Orders Anseriformes (Waterfowl), Galliformes (Gamebirds), Gaviiformes (Loons), Accipitriformes (Raptors), Charadriiformes (Shorebirds), Columbiformes (Doves), Gruiformes (Rails), Strigiformes (Owls), Coraciiformes (Kingfishers), Piciformes (Woodpeckers) and Passeriformes (Perching birds).

Nain is located in the Taiga Shield and Hudson Plains Bird Conservation Region (Notzl *et al*. 2013) and is situated along the Atlantic Migratory Bird Flyway (Figure 3.1, adopted from Lake Region Audubon 2010).

Relative to other areas in the Province, there is a general deficiency of empirical information on birds in and around Nain and northern Labrador. However, a literature search for historical records and range maps produced a list of species known from the area, grouped below by terrestrial birds, seabirds and shorebirds, waterfowl, and raptors and owls. Information was gleaned from The Birds of North America Online and the Labrador Nature Atlas (Notzl *et al*. 2013).

Terrestrial Species Known from the Nain Area

Terrestrial species for which records were found for Nain included: American Robin (*Turdus migratorius*), Gray Jay (*Perisoreus canadensis*), Common Raven (*Corvus corax*), Dark-eyed Junco (*Junco hyemalis*), Yellow-rumped Warbler (*Setophaga coronata*), Boreal Chickadee (*Poecile hudsonicus*), Common Redpoll (*Acanthis flammea*), Fox Sparrow (*Passerella iliaca*), Northern Waterthrush (*Parkesia noveboracensis*), Pine Grosbeak (*Pinicola enucleator*), Spruce Grouse (*Falcipennis canadensis*), Willow Ptarmigan (*Lagopus lagopus*), Rock Ptarmigan (*Lagopus muta*), Pine Siskin (*Spinus pinus*), Tennessee Warbler (*Leiothlypis peregrina*), White-throated Sparrow (*Zonotrichia albicollis*), Blackpoll Warbler (*Setophaga striata*), Ruby-crowned Kinglet (*Regulus calendula*), White-winged Crossbill (*Loxia leucoptera*), Wilson's Warbler (*Cardellina pusilla*), Alder Flycatcher (*Empidonax alnorum*), Bohemian Waxwing (*Bombycilla garrulus*), Three-toed Woodpecker (*Picoides dorsalis*), Horned Lark (*Eremophila alpestrisand*) and American Pipit (*Anthus rubescens*). In addition, several species may use the Nain area as stopover habitat on migration to the Arctic, such as Lapland Longspur (*Calcarius lapponicus*). The list above is not considered to be inclusive of all terrestrial species that may be using the Nain area, but provides an overview of some of the more common species from the area.



NUNATSIAVUT kavamanga Government	Nunatsiavut Avifauna and Habitat Surveys	FIGURE NO: 3.1	PREPARED BY: SEM
	North American Migratory Bird Flyways	COORDINATE SYSTEM: WGS84 Web Mercator	DATE: 27/08/2019

Seabird and Shorebird Species Known from the Nain Area

Several seabirds and shorebirds are known from the Nain area, all of which are protected by federal legislation under the *MBCA*. Seabird species include, but are not limited to: Herring Gull (*Larus argentatus*), Glaucous Gull (*Larus hyperboreus*), Razorbill (*Alca torda*), Atlantic Puffin (*Fratercula arctica*), Thick-billed Murre (*Uria lomvia*), Black Guillemot (*Cepphus grylle*) and Great Black-backed Gull (*Larus marinus*). Shorebird species using the area may include: Greater Yellowlegs (*Tringa melanoleuca*), Solitary Sandpiper (*Tringa solitaria*), Spotted Sandpiper (*Actitus macularia*), Least Sandpiper (*Caladris minutilla*), Red-necked Phalarope (*Phalaropus lobatus*), Wilson's Snipe (*Gallinago gallinago*), American Golden Plover (*Pluvialis dominica*) (non-breeding in Labrador, migration only), Dunlin (*Caladris alpina*) (non-breeding in Labrador, migration only), Semipalmated Plover (*Charadrius semipalmatus*) (non-breeding in Labrador, migration only), Semipalmated Sandpiper (*Caladris pusilla*) (non-breeding in Labrador, migration only) and White-rumped Sandpiper (*Caladris fuscicollis*) (non-breeding in Labrador, migration only).

Waterfowl Known from the Nain Area

Waterfowl species are also protected federally by the *MBCA*. Some of the species known to occur in the Nain area, either on inland waterbodies or marine environments (or both) include: Common Eider (*Somateria mollissima*), King Eider (*Somateria spectabilis*), American Black Duck (*Anas rubripes*), Canada Goose (*Branta canadensis*), Common Goldeneye (*Bucephala clangula*), Common Loon (*Gavia immer*), Common Merganser (*Mergus merganser*), Green-winged Teal (*Anas crecca*), Northern Pintail (*Anas acuta*), Red-breasted Merganser (*Mergus serrator*), Ring-necked Duck (*Aythya collaris*), Surf Scoter (*Melanitta perspicillata*), Lesser Scaup (*Aythya affinis*), Greater Scaup (*Aythya marila*) and Long-tailed Duck (*Clangula hyemalis*).

Raptors and Owls Known from the Nain Area

Raptors and owls are protected by the Newfoundland and Labrador *Wild Life Act* (1996). The Province requires nests of raptor species to be buffered from disturbance and no vegetation is to be cleared within 800 meters of an eagle or Osprey (*Pandion haliaetus*) nest during nesting season. In addition, eagle and Osprey nests are to warrant a 200 m buffer outside the nesting season. A 200-m buffer also applies to all other raptor nests (e.g., Northern Goshawk (*Accipiter gentilis*), Merlin (*Falco columbarius*), Great-horned Owl (*Bubo virginianus*)).

There are a number of raptor and owl species known from the Nain area, including, but not limited to, the following: Golden Eagle (*Aquila chrysaetos*), Great-horned Owl, Gyrfalcon (*Falco rusticolus*) (non-breeding), Merlin, Northern Goshawk, Northern Hawk Owl (*Surnia ulula*), Osprey and Rough-legged Hawk (*Buteo lagopus*).

Possible Species at Risk in Nain

Several Species at Risk are known from the general area around Nain. Ivory Gull, Harlequin Duck, Rusty Blackbird, Short-eared Owl and Peregrine Falcon are known from the general region. However, Ivory Gull breeds in the high Arctic, Harlequin Duck breeds in fast-moving mountain rivers and Rusty Blackbird breeds in treed wetlands, so these three species are unlikely to be breeding in close proximity to the footprint of the proposed wind power project in Nain. However, the ice pack in winter off Nain would possibly provide wintering habitat for Ivory Gull and the waters off Nain would provide non-breeding habitat for Harlequin Duck. Peregrine Falcon of the *tundrius* subspecies nest on islands within the Nain Coastline Important Bird Area. This species is listed as Special Concern on *SARA*.

Short-eared Owl is known from the Nain region and is protected by the federal *SARA* and the Provincial *ESA.* This species prefers vast, open habitats, including meadows, marshes, bogs, tundra, heathlands, and agricultural areas and rehabilitated mine sites. Short-eared Owl populations tend to cycle with their mammalian prey, notably voles and mice. There are no population estimates for this species in Labrador and accurate estimates of North American populations have eluded biologists. Data from the North American Breeding Bird Survey suggests that although this species has undergone a long-term population decline across Canada, its numbers have remained relatively stable in the Atlantic Provinces.

4.0 METHODOLOGY

4.1 Fall Migration Bird Survey

The survey method SEM chose for this project is an amalgamation of several survey techniques chosen to maximize the likelihood of detection of birds. Systematic "atlassing" transects were employed throughout the proposed footprint of the turbines, access road, and around the Nain area, combined with the practice of "pishing" to attract birds to closer proximity, and point counts (i.e., listening and observing for ten minutes at pre-determined locations). Eight point counts were conducted within the footprint of the project, spaced out by >250 m. This combination of methods allowed SEM to document the species generally using the Nain area and also document the species in proximity to the proposed turbine locations and access road at the time of the survey.

The SEM ornithologist led the surveys and was accompanied by an additional SEM technician as a second observer. The walking pace depended upon terrain, habitat type and the number of birds present. Surveys were conducted in clear and sunny weather and began just before sunrise on each day. All species were recorded (i.e., resident and migratory species) to ensure a more comprehensive list of the species using the area.

4.2 Raptors and Waterfowl Surveys

In addition to the standard survey (Section 4.1), SEM also surveyed for raptors and waterfowl within the footprint of the project and in the general area around Nain. For raptors, this consisted of scans of the sky during point count surveys and along transects. Surveys were conducted with high quality optical equipment. In addition, a two-hour afternoon raptor survey was conducted on September 24, 2019, during which the SEM ornithologist scanned the sky for raptors. The appropriate temporal window for surveying these species coincides with the survey dates as it pre-dates their departure from northern breeding areas which often overlaps with the first lasting snowfall, freeze-up, or decreasing prey abundance.

Waterbodies were also scanned in appropriate habitats to detect the presence of waterfowl that may be using the area during migration (i.e., staging).

Data were recorded on field data sheets and then entered into spreadsheets at the end of each field day.

5.0 RESULTS

5.1 Fall Migration Bird Survey

Twelve species of birds from several Orders were detected during fall migration surveys in the footprint of the turbines and the access road (Table 5.1).

Table 5.1 Survey Observations.

Species	No. Observations
American Pipit	2
Canada Goose	25
Common Raven	7
Common Redpoll	5
Fox Sparrow	10
Horned Lark	3
Northern Shrike	1
Northern Wheatear	2
Pine Grosbeak	3
Snow Bunting	4
White-throated Sparrow	3
White-winged Crossbill	4

Several of the species detected were likely resident birds, such as the Common Raven, Common Redpoll, Pine Grosbeak, Snow Bunting and White-winged Crossbill. These species would possibly be using the proposed turbine area at any time of year. However, the Pine Grosbeak and White-winged Crossbill were primarily detected in the forested valley and not atop the hills. The remainder of the species detected within the footprint consisted of migratory species that would either be passing through the area during migration or were breeding in the area and had not yet departed for southerly climes. These species would include American Pipit, Canada Goose, Fox Sparrow, Horned Lark, Northern Shrike, Northern Wheatear (which migrates to sub-Saharan Africa) and White-throated Sparrow.

5.2 Raptors and Waterfowl Surveys

Conditions were clear and sunny during both survey days. No raptors were observed during point count surveys or the afternoon raptor survey. Based on habitat, the most probable raptors for the footprint of the turbines and access road were Golden Eagle, Merlin and Rough-legged Hawk.

Aside from the Canada Geese that were detected during the primary survey, no other waterfowl were observed in the ponds atop the hill, the wetland areas, or passing through on migration.

6.0 CONCLUSIONS

The proposed area for the turbines and access roads is located on a rocky upland, a typical habitat type in this harsh region. Due to the cold climate, low biodiversity, short/windswept/sparse vegetation structure and short growing season in this region, the avian diversity expected for this area during fall migration (and all seasons) was low. Migrants arrive in the north relatively late in spring, breed and raise young quickly, and migrate south before winter comes (usually beginning in October). Only certain migrants are adapted for this type of climate and reproductive strategy. Similarly, only cold-adapted resident species are adapted to endure the frigid winter in Nain.

Raptors (Falconiformes, Accipitriformes and Strigiformes) are the group of birds that would be of highest concern for a project like this one, as they would comprise the species that may utilize the habitat atop the hill for foraging or during migration, and possibly occupy altitudes that would coincide with the height stratum of the turbine blades. However, recent research has shown that Golden Eagles showed detection and avoidance of turbines during migration (Johnson et al. 2014).

There were no raptors or owls detected during the fall migration surveys. In addition, no SAR or rare species were observed in the areas around the proposed turbine or access road areas, all of which were rigorously surveyed. Most passerines and other birds migrate at altitudes that would not coincide with the stratum of the wind turbines.

Given the small footprint involved, the small number of turbines (i.e., two turbines), and the relatively homogeneous rocky outcrop habitat with low avian diversity and abundance in fall, there would likely be minimal impact upon migratory birds in the Nain area. Spring migration surveys will include acoustic monitoring to confirm that this small footprint is not located on a major migratory flyway for passerines, raptors, waterfowl, shorebirds or other birds.

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Appendix D - Avifauna Summaries

The following species were detected during surveys of the Project area in 2019 and 2020 (2019 breeding bird survey, 2019 fall migration surveys, and 2020 spring migration survey)

- Alder Flycatcher (*Empidonax alnorum*);
- American Robin (*Turdus migratorius*);
- American Pipit (*Anthus rubescens*);
- Canada Goose (*Branta canadensis*);
- Common Raven (*Corvus corax*);
- Common Redpoll (*Acanthis flammea*);
- Fox Sparrow (*Passerella iliaca*);
- Gray Jay (*Perisoreus canadensis*);
- Fox Sparrow (*Passerella iliaca*);
- Herring Gull (*Larus argentatus smithsonianus);*
- Horned Lark (*Eremophila alpestrisand*);
- Lapland Longspur (*Calcarius lapponicus*);
- Northern Shrike (*Lanius borealis*);
- Northern Wheatear (*Oenanthe oenanthe*);
- Pine Grosbeak (*Pinicola enucleator*);
- Pine Siskin (*Spinus pinus*);
- Rock Ptarmigan (*Lagopus muta*);
- Rough-legged Hawk (*Buteo lagopus*);
- Snow Bunting (*Plectrophenax nivalis*);
- White-crowned Sparrow (*Zonotrichia leucophrys*);
- White-throated Sparrow (*Zonotrichia albicollis*);
- White-winged Crossbill (*Loxia leucoptera*);
- Willow Ptarmigan (*Lagopus lagopus*);

Appendix E - Table depicting the heights at which birds were detected during surveys of the Project footprint.

Height Above Ground (m)	Percent of Observations (%)		
	Summer 2019	Fall 2019	Spring 2020
1-33	62	49	61
34-66	38	13	35
67-100	0	0	3
>100	0	36	0

Appendix F - List of bird species known from the Nain Area

List of Bird Species Known from the Nain Area (from the Cornell Lab of Ornithology, eBird, and the Labrador Nature Atlas)	
Alder Flycatcher	*Empidonax alnorum*
American Black Duck	*Anas rubripes*
American Golden Plover	*Pluvialis dominica*
American Pipit	*Anthus rubescens*
American Robin	*Turdus migratorius*
Atlantic Puffin	*Fratercula arctica*
Blackpoll Warbler	*Setophaga striata*
Boreal Chickadee	*Poecile hudsonicus*
Canada Goose	*Branta canadensis*
Common Eider	*Somateria mollissima*
Common Goldeneye	*Bucephala clangula*
Common Loon	*Gavia immer*
Common Merganser	*Mergus merganser*
Common Raven	*Corvus corax*
Common Redpoll	*Acanthis flammea*
Dark-eyed Junco	*Junco hyemalis*
Dunlin	*Caladris alpina*
Fox Sparrow	*Passerella iliaca*
Glaucous Gull	*Larus hyperboreus*
Golden Eagle	*Aquila chrysaetos*
Gray Jay	*Perisoreus canadensis*
Great Black-backed Gull	*Larus marinus*
Greater Scaup	*Aythya marila*
Greater Yellowlegs	*Tringa melanoleuca*
Great-horned Owl	*Bubo virginianus*
Green-winged Teal	*Anas crecca*
Gyrfalcon	*Falco rusticolus*
Herring Gull	*Larus argentatus*
Horned Lark	*Eremophila alpestrisand*
King Eider	*Somateria spectabilis*
Least Sandpiper	*Caladris minutilla*
Lesser Scaup	*Aythya affinis*
Long-tailed Duck	*Clangula hyemalis*
Merlin	*Falco columbarius*
Northern Goshawk	*Accipiter gentilis*
Northern Hawk Owl	*Surnia ulula*
Northern Pintail	*Anas acuta*
Northern Waterthrush	*Parkesia noveboracensis*
Osprey	*Pandion haliaetus*
Peregrine Falcon	*Falco peregrinus anatum/tundrius*
Pine Grosbeak	*Pinicola enucleator*
Pine Siskin	*Spinus pinus*
Razorbill	*Alca torda*
Red-breasted Merganser	*Mergus serrator*

Red-necked Phalarope	*Phalaropus lobatus*
Ring-necked Duck	*Aythya collaris*
Rock Ptarmigan	*Lagopus muta*
Rough-legged Hawk	*Buteo lagopus*
Ruby-crowned Kinglet	*Regulus calendula*
Semipalmated Plover	*Charadrius semipalmatus*
Semipalmated Sandpiper	*Caladris pusilla*
Solitary Sandpiper	*Tringa solitaria*
Spotted Sandpiper	*Actitus macularia*
Spruce Grouse	*Falcipennis canadensis*
Surf Scoter	*Melanitta perspicillata*
Tennessee Warbler	*Leiothlypis peregrina*
Thick-billed Murre	*Uria lomvia*
Three-toed Woodpecker	*Picoides dorsalis*
White-rumped Sandpiper	*Caladris fuscicollis*
White-throated Sparrow	*Zonotrichia albicollis*
White-winged Crossbill	*Loxia leucoptera*
Willow Ptarmigan	*Lagopus lagopus*
Wilson's Snipe	*Gallinago gallinago*
Wilson's Warbler	*Cardellina pusilla*
Yellow-rumped Warbler	*Setophaga coronata*

Appendix G – Preliminary Noise and Shadow Studies

Nain Wind Micro-Grid Project

Preliminary Noise Assessment v.2

January 2021

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Appendix C: WindPRO v3.1, Decibel Module Calculation Results E-44: Worst Case
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1. Introduction

In an effort to reduce reliance on diesel fuel as well as the opportunity to promote economic development, the Nunatsiavut Government has been pursuing a wind project in Nain called the Nain Wind Micro Grid Project. The Nain Wind Micro Grid Project consists of two turbines, a battery storage system, and a micro-grid controller. The turbines are located on the outskirts and to the west of the community of Nain.

Due to the location of the turbines relative to the community and local homes, Natural Forces has undertaken a preliminary noise assessment for the proposed Nain Wind Micro-Grid Project on behalf of the Nunatsiavut Government. This assessment will study the potential impact of generated noise on the homes located in proximity to the project.

This report will outline background information on the noise assessment, discuss policy and guideline documents, provide the prediction methodology, outline the results, and propose mitigation methods. The detailed WindPRO software results are included in Appendices C and D, for the two turbine models being considered.

The noise assessment was conducted using the ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation model within the Decibel module of the software package, WindPRO version 3.1.

1.1. Policy and Guidelines

As neither the Nunatsiavut Government nor the Government of Newfoundland and Labrador have regulations surrounding requirements for generated noise from wind turbine generators (WTGs), industry best practices will be adopted. Typically, the threshold seen in other jurisdictions in Canada is 40 dB(A) for a "worst case" calculation where mitigation is not feasible. The worst-case calculation is defined in many guidelines and regulations as the maximum perceived at a receptor. These conditions have been adopted for this study.

As supportive documentation to this threshold, the guidelines from the *Additional Information Requirements for Wind Turbines* document created to outline additional requirements to the *Environmental Impact Assessment Regulation* in New Brunswick will be used. The recommendations are outlined in Table 1. The sound thresholds used for this assessment are more conservative than these regulations, as 40 dB(A) is considered the maximum allowable noise perceived at a receptor for all wind speeds between 4 and 12 m/s in this assessment.

Table 1: Recommended Sound Criteria for Wind Turbines (*Additional Information Requirements for Wind Turbines*).

Wind Speed (m/s)	4	5	6	7	8	9	10	11
Wind Turbine Noise Criteria [dB(A)]	40	40	40	43	45	49	51	53

Prior to determining the predicted amount of sound perceived from a project, careful site design is recommended, followed by industry accepted mitigation strategies. This assessment demonstrates that the perceived noise at all receptors will comply with industry standards due to careful siting.

1.2. Receptors

There are 443 known receptors located within 4 km of the turbine locations that consist of year-long dwellings, seasonal dwellings, and local businesses. They have been identified based on online geographical data and cross referenced with aerial photography. The geographical coordinates of these receptors are included in Appendices C and D. A map of the project area with the receptors is included in Appendices A and B, for the E-44 and E-82 layouts, respectively.

1.3. Turbine Model

The turbine models used for the assessment are the Enercon E-44 and E-82, a 900-kW and 2.35 MW machine, respectively. The geographical coordinates of the 1 or 2 proposed turbine locations are included in Appendices C and D. The specifications of the two considered models are outlined below.

Table 2 E-82 and E-44 Specifications

Turbine Model	**E-82**	**E-44**
Nominal Power Output (kW)	2350	900
Hub Height (m)	59	45-55
Rotor Diameter (m)	82	44
Sweep Area (m^2)	5281	1521

Should the turbine model change, a new noise assessment will be conducted and submitted for review.

2. Noise Impact Assessment Methodology

The sound pressure level was calculated at each point of reception using the Decibel module of WindPRO v.3.1, which uses the ISO 9613-2 model "Attenuation of sound during propagation outdoors, Part 2: A general method of calculation".

2.1. Worst Case Noise Assessment

The worst-case noise assessment followed a conservative methodology in calculating noise levels by assuming downwind propagation is occurring simultaneously in all directions of the wind turbine. In reality, noise propagation in an upwind direction would result in a significant reduction of noise levels at any receptor located upwind from the turbine. This means that the resulting sound levels from the assessment are likely calculated as higher than they would be experienced.

As another conservative measure, no attenuation was considered from topographical shielding for objects (such as barns, trees, buildings, etc.) located between the turbines and receptors. A global ground attenuation of 0 was input, which represents a ground area that is covered in glass, to produce the worst-case scenario for noise impacts.

No correction for special audible characteristics, such as clearly audible tones, impulses, or modulation of sound levels, were made as part of this assessment. These are not common characteristics of modern WTGs in a well-designed wind farm. Furthermore, impulses and modulation of sound levels from the wind farm under normal conditions would not be of a level to necessitate the application of any penalty.

All assumptions made for the noise impact assessment can be found in the Appendices C and D for the E-44 and E-82 models, respectively.

3. Results of Noise Impact Assessment

3.1. E-44 Results

The results for all receptors from the WindPRO analysis using the E-44 model are included in Appendix C. The worst-case sound levels at all 443 receptors are well below the 40 dB(A) threshold that is used as industry standard.

Table 3 shows the maximum modeled sound levels that are predicted to be experienced at each receptor for any wind speed from 4.0 m/s to 12.0 m/s. The highest worst-case sound level modelled to be experienced was 29.6 dB(A).

Table 3: E-44 noise impact assessment summary of the 10 receptors predicted to receive the highest impact for any wind speed modelled between and including 4 to 12 m/s.

Receptor ID	Worst Case Max Sound Level from WTG [dB(A)]	Compliance with New Brunswick and industry threshold
NT	29.6	Yes
NL	28.6	Yes
NU	28.6	Yes
NW	28.6	Yes
NK	28.5	Yes
NV	28.5	Yes
NX	28.5	Yes
OB	28.5	Yes
OQ	28.4	Yes
OC	28.3	Yes

3.2. E-82 Results

The results for all receptors from the WindPRO analysis using the E-82 model are included in Appendix D. The worst-case sound levels at all 443 receptors are well below the 40 dB(A) threshold that is used as industry standard.

Table 3 shows the maximum modeled sound levels that are predicted to be experienced at each receptor for any wind speed from 4.0 m/s to 12.0 m/s. The highest worst-case sound level modelled to be experienced was 28.0 dB(A).

Table 4 E-82 noise impact assessment summary of the 10 receptors predicted to receive the highest impact for any wind speed modelled between and including 4 to 12 m/s.

Receptor ID	Worst Case Max Sound Level from WTG [dB(A)]	Compliance with New Brunswick and industry threshold
NT	28.0	Yes
NL	26.9	Yes
NK	26.8	Yes
NU	26.8	Yes
NV	26.8	Yes
NW	26.8	Yes
OQ	26.8	Yes
NX	26.7	Yes
OB	26.7	Yes
A	26.6	Yes

4. Proposed Mitigation

As all receptors are well below the selected thresholds, it is not expected that any mitigation measures will be necessary. However, engagement with the community will be ongoing throughout the operation of the Project and any sound level concerns, and mitigation strategies, will be assessed as necessary.

If sound level concerns arise, potential mitigations measures may will be discussed and tailored to the individual receptor experiencing concerns..

Should receptors experience undesirable sound levels and formalize a complaint, the complaint will be addressed following a Complaint Resolution Plan. The steps included in the Complaint Resolution Plan will describe the study that will occur following a complaint. The specific date, time, and local weather conditions will be noted for each incident of excessive noise as well as the duration of the event. Following this step, the Operations Team for the project will determine the direction of the wind relative to the receptor and the wind speed during the event. Finally, the details of the event will be tracked and reported to analyze the specific conditions present.

5. Discussion and Conclusions

Natural Forces has completed an assessment to evaluate the noise impact of the proposed Nain Wind Micro-Grid Project at receptor locations within 4 km of the proposed WTG(s).

Based on the parameters used in WindPRO noise prediction model, it has been shown that in the worst-case scenario the predicted sound pressure levels emitted by the proposed WTG model in the 2-turbine E-44 layout is less than 40 dB(A) at all receptors. The max sound level from the WTG's predicted to be perceived at a receptor is 29.6 dB(A).

In the 1-turbine E-82 layout the predicted sound pressure levels are also under 40 dB(A) at all receptors. The max sound level from the WTG predicted to be perceived at a receptor is 28.0 dB(A).

Various measures may be used to mitigate the effect of noise perceived at receptors should there be any concerns from local residents.

Natural Forces feels confident that receptors will not receive excessive levels of noise as demonstrated in the modelled worst-case scenario. However, the Natural Forces will work closely with the Nunatsiavut Government, homeowners, and businesses to observe occurrences of excessive noise impacts during operation and apply mitigation as mentioned.

References

New Brunswick Ministry of Environment and Local Government. *Environmental Impact Assessment Regulation – Clean Environment Act.* New Brunswick.

New Brunswick Ministry of Environment and Local Government. *Additional Information Requirements For Wind Turbines– Clean Environment Act.* New Brunswick.

Enercon GmbH ed. (2004). *Data Sheet – Enercon Wind Energy Converter E-44*. Germany.

Enercon GmbH ed. (2004). *Data Sheet – Enercon Wind Energy Converter E-82*. Germany.

International Organization for Standardization (1996). *ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*. WindPRO.

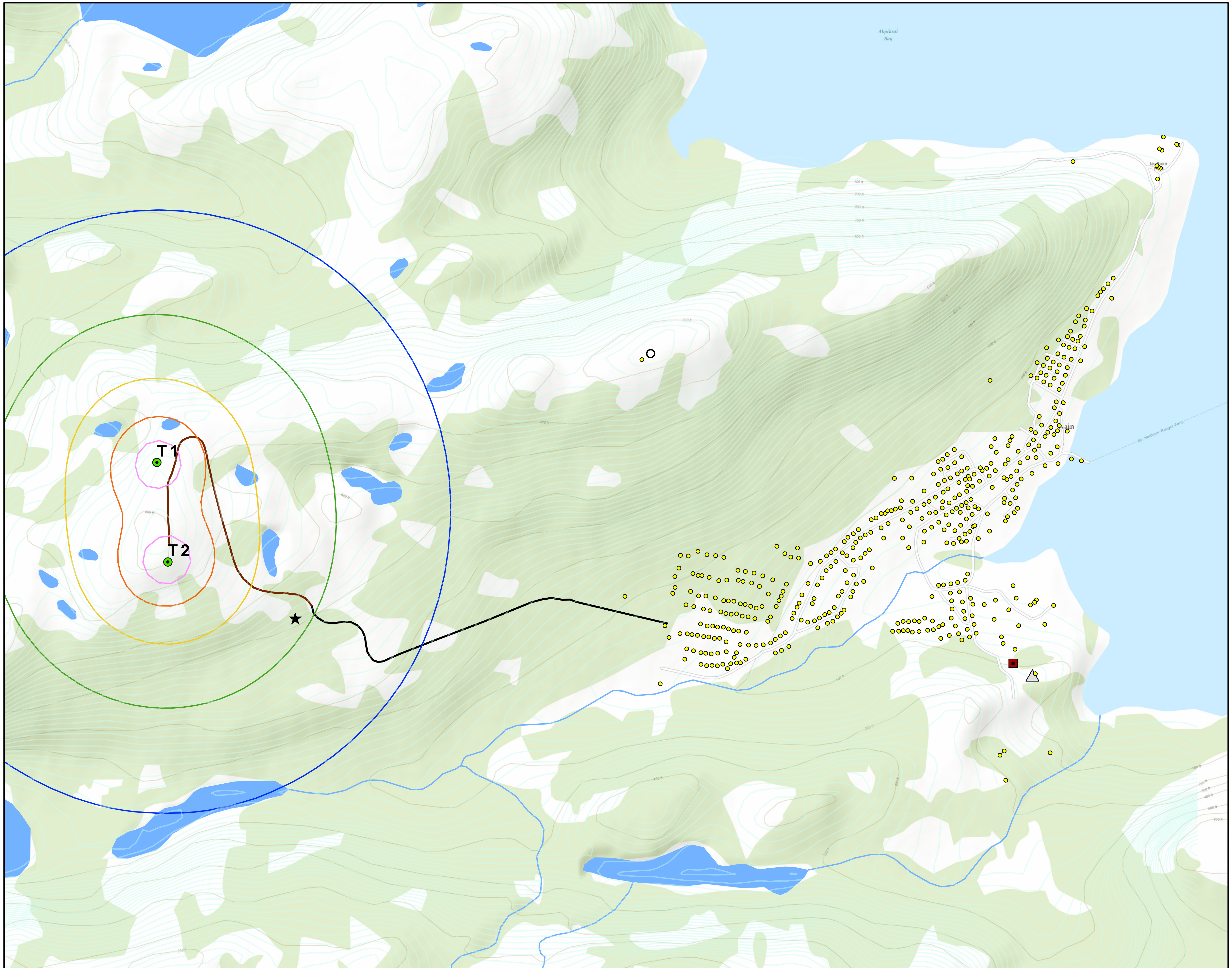
Ontario Ministry of the Environment (2008). *Noise guidelines for wind farms*.

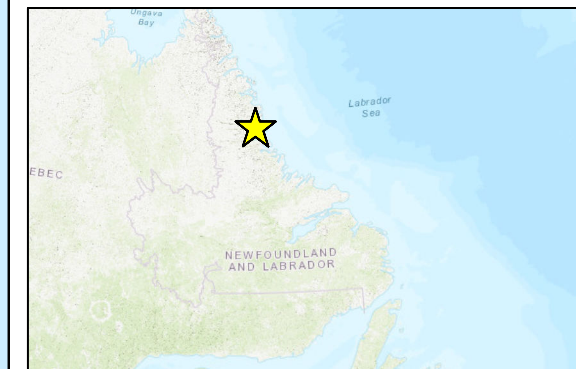
APPENDIX A:

Site Layout Map with Sound Levels E-44

Nain Wind Micro-Grid Project

Worst Case Noise Map





Legend

- Proposed Turbines
- Receptors
- Preliminary Battery Location
- Telecommunication Towers
- Diesel Plant
- Water Tower
- New Road
- Exisiting Road

Noise Lines

- 35 dB(A)
- 40 dB(A)
- 45 dB(A)
- 50 dB(A)
- 55 dB(A)

Notes
1.

Sources
Basedata provided by the Province of Newfoundland and Labrador
Basemap: ESRI World Topo Map

N

1:12,857

0 0.1 0.2 0.4 0.6 Kilometers

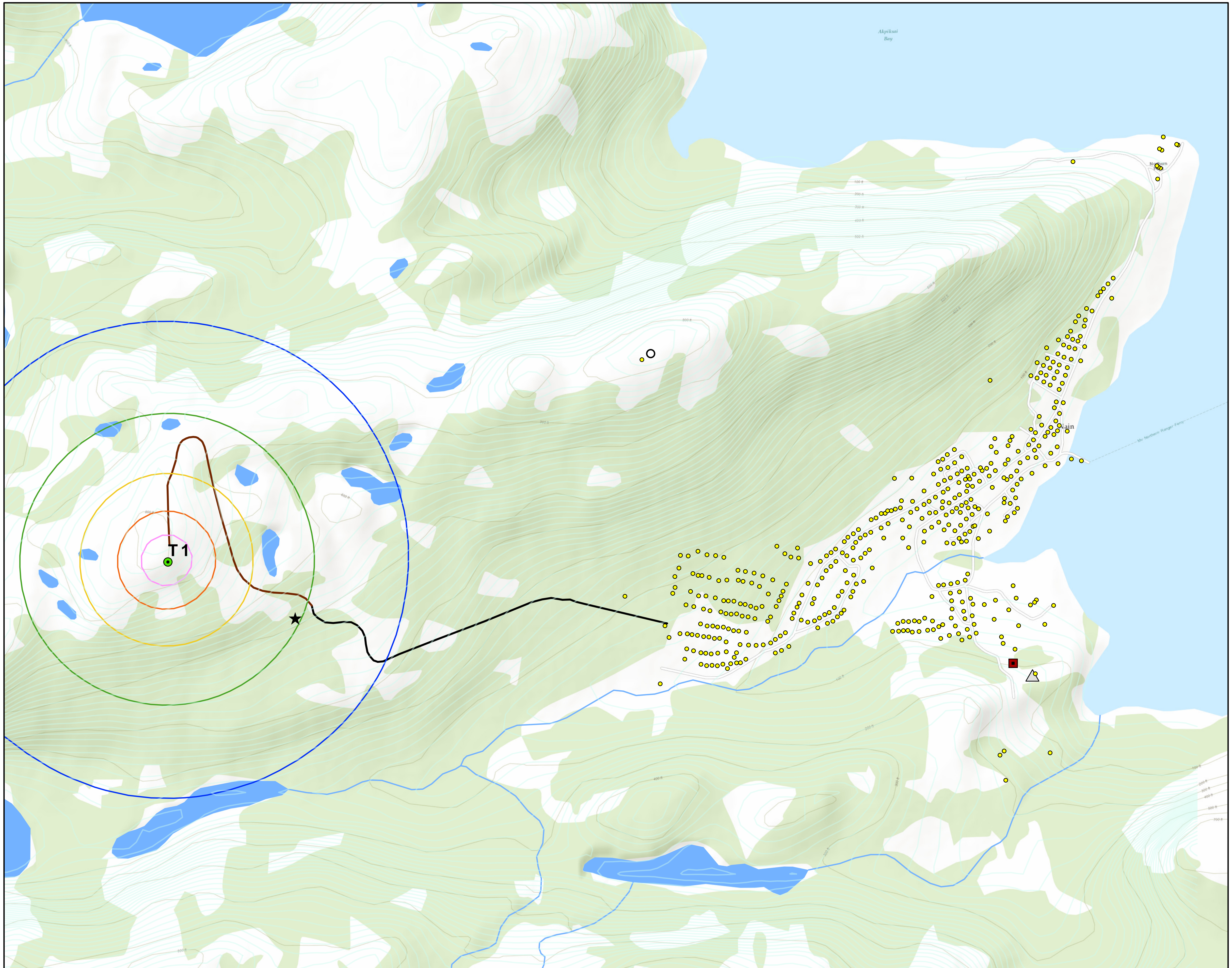
Spatial Reference: WGS 1984 Complex UTM Zone 20N
Page Size: 11" x 17"

Production Date: Jan 27, 2021

natural forces

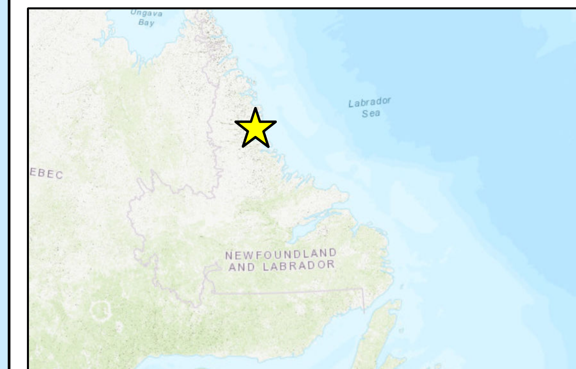
APPENDIX B:

Site Layout Map with Sound Levels E-82



Nain Wind Micro-Grid Project

Worst Case Noise Map



Legend

- Proposed Turbine
- Receptors
- Preliminary Battery Location
- Telecommunication Towers
- Diesel Plant
- Water Tower
- New Road
- Exisiting Road

Noise Lines

- 35 dB(A)
- 40 dB(A)
- 45 dB(A)
- 50 dB(A)
- 55 dB(A)

Notes
1.

Sources
Basedata provided by the Province of Newfoundland and Labrador
Basemap: ESRI World Topo Map

N

1:12,857

0 0.1 0.2 0.4 0.6 Kilometers

Spatial Reference: WGS 1984 Complex UTM Zone 20N
Page Size: 11" x 17"

Production Date: Jan 27, 2021

natural forces

APPENDIX C:

WindPRO v3.1, Decibel Module Calculation Results E-44: Worst Case

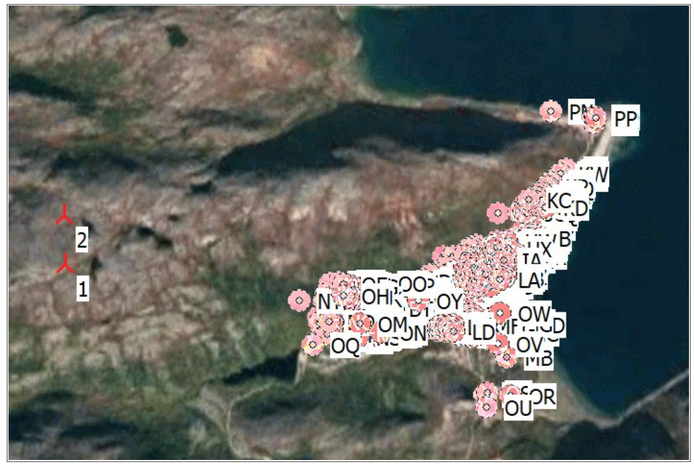
Project:
Nain

Licensed user:
Natural Forces Wind Inc
1801 Hollis Street, Suite 1205
CA-HALIFAX, Nova Scotia B3J 3N4
902 422 9663
Jill / jbyrne@naturalforces.ca
Calculated:
1/18/2021 12:21 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

Noise calculation model:
ISO 9613-2 General
Wind speed:
4.0 m/s - 12.0 m/s, step 1.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones: 0.0 dB(A)
Height above ground level, when no value in NSA object:
4.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:50,000
New WTG   Noise sensitive area

WTGs

	Longitude	Latitude	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	[m/s]	[dB(A)]	
1	-61.738726° E	56.541033° N	235.0	ENERCON E-44 900 44.0 !-! ...	Yes	ENERCON	E-44-900	900	44.0	55.0	EMD	Level 0 - official - OM I - Rev. 2 - 03/2011	4.0	96.6	12.0	103.0	No g
2	-61.739241° E	56.544129° N	231.7	ENERCON E-44 900 44.0 !-! ...	Yes	ENERCON	E-44-900	900	44.0	55.0	EMD	Level 0 - official - OM I - Rev. 2 - 03/2011	4.0	96.6	12.0	103.0	No g

h) Generic octave distribution used
g) Data calculated from data for other wind speed (uncertain)

Calculation Results

Sound level

Noise sensitive area No.	Name	Longitude	Latitude	Z	Imission height	Demands Min Noise	Sound level Max From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (1)	-61.710039° E	56.538514° N	46.2	4.5	40.0	28.2	1,226	Yes
B	Noise sensitive point: User defined (2)	-61.709058° E	56.538451° N	44.3	4.5	40.0	27.9	1,287	Yes
C	Noise sensitive point: User defined (3)	-61.708542° E	56.539667° N	52.2	4.5	40.0	27.8	1,294	Yes
D	Noise sensitive point: User defined (4)	-61.708691° E	56.539264° N	49.3	4.5	40.0	27.9	1,292	Yes
E	Noise sensitive point: User defined (5)	-61.708874° E	56.538804° N	46.0	4.5	40.0	27.9	1,290	Yes
F	Noise sensitive point: User defined (6)	-61.708016° E	56.539604° N	50.6	4.5	40.0	27.6	1,327	Yes
G	Noise sensitive point: User defined (7)	-61.708884° E	56.537909° N	40.5	4.5	40.0	27.7	1,311	Yes
H	Noise sensitive point: User defined (8)	-61.708891° E	56.537551° N	39.1	4.5	40.0	27.7	1,320	Yes
I	Noise sensitive point: User defined (9)	-61.707548° E	56.539512° N	48.3	4.5	40.0	27.5	1,357	Yes
J	Noise sensitive point: User defined (10)	-61.708332° E	56.539207° N	48.1	4.5	40.0	27.7	1,315	Yes
K	Noise sensitive point: User defined (11)	-61.708505° E	56.538736° N	45.0	4.5	40.0	27.7	1,314	Yes
L	Noise sensitive point: User defined (12)	-61.708712° E	56.538408° N	43.3	4.5	40.0	27.7	1,308	Yes
M	Noise sensitive point: User defined (13)	-61.708613° E	56.537891° N	40.0	4.5	40.0	27.6	1,328	Yes
N	Noise sensitive point: User defined (14)	-61.708576° E	56.537505° N	38.1	4.5	40.0	27.5	1,340	Yes
O	Noise sensitive point: User defined (15)	-61.708309° E	56.537866° N	39.3	4.5	40.0	27.5	1,346	Yes
P	Noise sensitive point: User defined (16)	-61.708419° E	56.538394° N	42.6	4.5	40.0	27.6	1,326	Yes
Q	Noise sensitive point: User defined (17)	-61.708109° E	56.538345° N	41.6	4.5	40.0	27.5	1,346	Yes
R	Noise sensitive point: User defined (18)	-61.708274° E	56.537513° N	37.4	4.5	40.0	27.4	1,358	Yes
S	Noise sensitive point: User defined (19)	-61.707720° E	56.539165° N	46.4	4.5	40.0	27.5	1,353	Yes
T	Noise sensitive point: User defined (20)	-61.707937° E	56.537887° N	38.5	4.5	40.0	27.4	1,368	Yes
U	Noise sensitive point: User defined (21)	-61.707972° E	56.537495° N	36.6	4.5	40.0	27.3	1,376	Yes
V	Noise sensitive point: User defined (22)	-61.708187° E	56.538731° N	44.3	4.5	40.0	27.6	1,333	Yes
W	Noise sensitive point: User defined (23)	-61.707436° E	56.539109° N	45.1	4.5	40.0	27.4	1,371	Yes
X	Noise sensitive point: User defined (24)	-61.707663° E	56.537541° N	36.1	4.5	40.0	27.2	1,394	Yes
Y	Noise sensitive point: User defined (25)	-61.707224° E	56.537551° N	35.1	4.5	40.0	27.1	1,420	Yes
Z	Noise sensitive point: User defined (26)	-61.707917° E	56.538698° N	43.4	4.5	40.0	27.5	1,350	Yes
AA	Noise sensitive point: User defined (27)	-61.707819° E	56.538346° N	40.8	4.5	40.0	27.4	1,364	Yes

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
AB	Noise sensitive point: User defined (28)	-61.707457° E	56.538231° N	39.2	4.5	40.0	27.3	1,388	Yes
AC	Noise sensitive point: User defined (29)	-61.707459° E	56.537925° N	37.6	4.5	40.0	27.2	1,396	Yes
AD	Noise sensitive point: User defined (30)	-61.707017° E	56.537748° N	35.6	4.5	40.0	27.0	1,427	Yes
AE	Noise sensitive point: User defined (31)	-61.706885° E	56.537888° N	36.0	4.5	40.0	27.0	1,431	Yes
AF	Noise sensitive point: User defined (32)	-61.706676° E	56.538140° N	36.6	4.5	40.0	27.0	1,437	Yes
AG	Noise sensitive point: User defined (33)	-61.706673° E	56.537576° N	33.8	4.5	40.0	26.9	1,452	Yes
AH	Noise sensitive point: User defined (34)	-61.707409° E	56.537401° N	35.0	4.5	40.0	27.1	1,413	Yes
AI	Noise sensitive point: User defined (35)	-61.706891° E	56.537573° N	34.5	4.5	40.0	27.0	1,439	Yes
AJ	Noise sensitive point: User defined (36)	-61.706199° E	56.538120° N	35.0	4.5	40.0	26.8	1,466	Yes
AK	Noise sensitive point: User defined (37)	-61.705775° E	56.538106° N	33.1	4.5	40.0	26.7	1,492	Yes
AL	Noise sensitive point: User defined (38)	-61.707146° E	56.539090° N	44.0	4.5	40.0	27.3	1,389	Yes
AM	Noise sensitive point: User defined (39)	-61.706839° E	56.539095° N	42.8	4.5	40.0	27.2	1,407	Yes
AN	Noise sensitive point: User defined (40)	-61.707594° E	56.538691° N	42.6	4.5	40.0	27.4	1,370	Yes
AO	Noise sensitive point: User defined (41)	-61.707309° E	56.538634° N	41.3	4.5	40.0	27.3	1,388	Yes
AP	Noise sensitive point: User defined (42)	-61.707026° E	56.538575° N	40.0	4.5	40.0	27.2	1,406	Yes
AQ	Noise sensitive point: User defined (43)	-61.706735° E	56.538560° N	39.0	4.5	40.0	27.1	1,424	Yes
AR	Noise sensitive point: User defined (44)	-61.706527° E	56.539023° N	41.1	4.5	40.0	27.0	1,428	Yes
AS	Noise sensitive point: User defined (45)	-61.707291° E	56.539501° N	47.3	4.5	40.0	27.4	1,373	Yes
AT	Noise sensitive point: User defined (46)	-61.706976° E	56.539491° N	46.0	4.5	40.0	27.3	1,392	Yes
AU	Noise sensitive point: User defined (47)	-61.706616° E	56.539405° N	43.9	4.5	40.0	27.1	1,415	Yes
AV	Noise sensitive point: User defined (48)	-61.706196° E	56.538996° N	39.4	4.5	40.0	26.9	1,448	Yes
AW	Noise sensitive point: User defined (49)	-61.705815° E	56.538936° N	37.5	4.5	40.0	26.8	1,472	Yes
AX	Noise sensitive point: User defined (50)	-61.706347° E	56.539383° N	42.4	4.5	40.0	27.0	1,432	Yes
AY	Noise sensitive point: User defined (51)	-61.706037° E	56.539322° N	40.4	4.5	40.0	26.9	1,452	Yes
AZ	Noise sensitive point: User defined (52)	-61.705736° E	56.539263° N	38.7	4.5	40.0	26.8	1,471	Yes
BA	Noise sensitive point: User defined (53)	-61.705401° E	56.539310° N	37.3	4.5	40.0	26.7	1,491	Yes
BB	Noise sensitive point: User defined (54)	-61.706715° E	56.540447° N	52.3	4.5	40.0	27.3	1,395	Yes
BC	Noise sensitive point: User defined (55)	-61.706298° E	56.540405° N	49.5	4.5	40.0	27.1	1,421	Yes
BD	Noise sensitive point: User defined (56)	-61.705814° E	56.540351° N	46.2	4.5	40.0	26.9	1,451	Yes
BE	Noise sensitive point: User defined (57)	-61.705956° E	56.540044° N	44.6	4.5	40.0	27.0	1,446	Yes
BF	Noise sensitive point: User defined (58)	-61.705325° E	56.540258° N	42.7	4.5	40.0	26.7	1,482	Yes
BG	Noise sensitive point: User defined (59)	-61.704770° E	56.540129° N	38.9	4.5	40.0	26.5	1,518	Yes
BH	Noise sensitive point: User defined (60)	-61.705524° E	56.539931° N	41.5	4.5	40.0	26.8	1,474	Yes
BI	Noise sensitive point: User defined (61)	-61.705036° E	56.539694° N	37.6	4.5	40.0	26.6	1,507	Yes
BJ	Noise sensitive point: User defined (62)	-61.704063° E	56.540934° N	42.5	4.5	40.0	26.4	1,553	Yes
BK	Noise sensitive point: User defined (63)	-61.703730° E	56.540827° N	39.6	4.5	40.0	26.2	1,574	Yes
BL	Noise sensitive point: User defined (64)	-61.703295° E	56.540791° N	36.8	4.5	40.0	26.1	1,601	Yes
BM	Noise sensitive point: User defined (65)	-61.704011° E	56.539989° N	34.3	4.5	40.0	26.3	1,566	Yes
BN	Noise sensitive point: User defined (66)	-61.704208° E	56.539770° N	34.1	4.5	40.0	26.3	1,557	Yes
BO	Noise sensitive point: User defined (67)	-61.704315° E	56.539621° N	33.8	4.5	40.0	26.3	1,552	Yes
BP	Noise sensitive point: User defined (68)	-61.704445° E	56.539481° N	33.7	4.5	40.0	26.4	1,546	Yes
BQ	Noise sensitive point: User defined (69)	-61.704605° E	56.539301° N	33.5	4.5	40.0	26.4	1,539	Yes
BR	Noise sensitive point: User defined (70)	-61.704935° E	56.538979° N	33.7	4.5	40.0	26.5	1,525	Yes
BS	Noise sensitive point: User defined (71)	-61.705098° E	56.538845° N	33.9	4.5	40.0	26.5	1,518	Yes
BT	Noise sensitive point: User defined (72)	-61.703148° E	56.539644° N	27.9	4.5	40.0	26.0	1,623	Yes
BU	Noise sensitive point: User defined (73)	-61.703315° E	56.539393° N	27.6	4.5	40.0	26.0	1,616	Yes
BV	Noise sensitive point: User defined (74)	-61.703434° E	56.539268° N	27.6	4.5	40.0	26.0	1,611	Yes
BW	Noise sensitive point: User defined (75)	-61.703621° E	56.539086° N	27.7	4.5	40.0	26.1	1,603	Yes
BX	Noise sensitive point: User defined (76)	-61.703722° E	56.538918° N	27.3	4.5	40.0	26.1	1,600	Yes
BY	Noise sensitive point: User defined (77)	-61.704117° E	56.538482° N	27.1	4.5	40.0	26.2	1,584	Yes
BZ	Noise sensitive point: User defined (78)	-61.704404° E	56.538384° N	28.1	4.5	40.0	26.2	1,569	Yes
CA	Noise sensitive point: User defined (79)	-61.704689° E	56.538278° N	29.1	4.5	40.0	26.3	1,554	Yes
CB	Noise sensitive point: User defined (80)	-61.704955° E	56.538173° N	29.7	4.5	40.0	26.4	1,540	Yes
CC	Noise sensitive point: User defined (81)	-61.705375° E	56.538119° N	31.3	4.5	40.0	26.5	1,516	Yes
CD	Noise sensitive point: User defined (82)	-61.704355° E	56.537933° N	25.5	4.5	40.0	26.2	1,582	Yes
CE	Noise sensitive point: User defined (83)	-61.704704° E	56.537860° N	26.9	4.5	40.0	26.3	1,562	Yes
CF	Noise sensitive point: User defined (84)	-61.703215° E	56.538865° N	24.2	4.5	40.0	25.9	1,631	Yes
CG	Noise sensitive point: User defined (85)	-61.702470° E	56.539523° N	23.6	4.5	40.0	25.7	1,666	Yes
CH	Noise sensitive point: User defined (86)	-61.702574° E	56.539367° N	23.3	4.5	40.0	25.7	1,662	Yes
CI	Noise sensitive point: User defined (87)	-61.702264° E	56.539947° N	24.4	4.5	40.0	25.7	1,673	Yes
CJ	Noise sensitive point: User defined (88)	-61.702792° E	56.539999° N	27.6	4.5	40.0	25.9	1,640	Yes
CK	Noise sensitive point: User defined (89)	-61.702850° E	56.538797° N	21.6	4.5	40.0	25.8	1,655	Yes

To be continued on next page...

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1/18/2021 12:21 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
CL	Noise sensitive point: User defined (90)	-61.702295° E	56.538615° N	17.8	4.5	40.0	25.6	1,692	Yes
CM	Noise sensitive point: User defined (91)	-61.702470° E	56.538833° N	19.6	4.5	40.0	25.7	1,677	Yes
CN	Noise sensitive point: User defined (92)	-61.702190° E	56.538920° N	18.7	4.5	40.0	25.6	1,692	Yes
CO	Noise sensitive point: User defined (93)	-61.701744° E	56.538748° N	15.7	4.5	40.0	25.4	1,723	Yes
CP	Noise sensitive point: User defined (94)	-61.701890° E	56.539021° N	17.6	4.5	40.0	25.5	1,709	Yes
CQ	Noise sensitive point: User defined (95)	-61.701437° E	56.538811° N	15.0	4.5	40.0	25.3	1,740	Yes
CR	Noise sensitive point: User defined (96)	-61.701635° E	56.539082° N	16.6	4.5	40.0	25.4	1,724	Yes
CS	Noise sensitive point: User defined (97)	-61.701179° E	56.538943° N	15.0	4.5	40.0	25.3	1,754	Yes
CT	Noise sensitive point: User defined (98)	-61.700960° E	56.539053° N	15.0	4.5	40.0	25.2	1,765	Yes
CU	Noise sensitive point: User defined (99)	-61.701344° E	56.539233° N	16.0	4.5	40.0	25.3	1,739	Yes
CV	Noise sensitive point: User defined (100)	-61.702000° E	56.540159° N	24.1	4.5	40.0	25.6	1,687	Yes
CW	Noise sensitive point: User defined (101)	-61.701105° E	56.539587° N	16.9	4.5	40.0	25.3	1,749	Yes
CX	Noise sensitive point: User defined (102)	-61.700803° E	56.539149° N	15.0	4.5	40.0	25.2	1,773	Yes
CY	Noise sensitive point: User defined (103)	-61.700892° E	56.539730° N	16.8	4.5	40.0	25.2	1,760	Yes
CZ	Noise sensitive point: User defined (104)	-61.702630° E	56.540614° N	31.0	4.5	40.0	25.9	1,644	Yes
DA	Noise sensitive point: User defined (105)	-61.702080° E	56.540676° N	28.4	4.5	40.0	25.7	1,677	Yes
DB	Noise sensitive point: User defined (106)	-61.701762° E	56.540383° N	24.3	4.5	40.0	25.6	1,699	Yes
DC	Noise sensitive point: User defined (107)	-61.701490° E	56.540513° N	24.1	4.5	40.0	25.5	1,714	Yes
DD	Noise sensitive point: User defined (108)	-61.701726° E	56.540844° N	28.2	4.5	40.0	25.6	1,697	Yes
DE	Noise sensitive point: User defined (109)	-61.700282° E	56.539722° N	14.3	4.5	40.0	25.1	1,797	Yes
DF	Noise sensitive point: User defined (110)	-61.700404° E	56.539554° N	13.8	4.5	40.0	25.1	1,792	Yes
DG	Noise sensitive point: User defined (111)	-61.700082° E	56.539955° N	14.8	4.5	40.0	25.0	1,806	Yes
DH	Noise sensitive point: User defined (112)	-61.701206° E	56.540664° N	24.1	4.5	40.0	25.4	1,731	Yes
DI	Noise sensitive point: User defined (113)	-61.701468° E	56.540940° N	27.7	4.5	40.0	25.5	1,712	Yes
DJ	Noise sensitive point: User defined (114)	-61.700227° E	56.540693° N	20.0	4.5	40.0	25.1	1,790	Yes
DK	Noise sensitive point: User defined (115)	-61.701207° E	56.541049° N	27.4	4.5	40.0	25.4	1,727	Yes
DL	Noise sensitive point: User defined (116)	-61.700230° E	56.541078° N	23.1	4.5	40.0	25.1	1,787	Yes
DM	Noise sensitive point: User defined (117)	-61.700684° E	56.540375° N	19.7	4.5	40.0	25.2	1,765	Yes
DN	Noise sensitive point: User defined (118)	-61.700602° E	56.539995° N	17.1	4.5	40.0	25.2	1,774	Yes
DO	Noise sensitive point: User defined (119)	-61.699170° E	56.540439° N	14.0	4.5	40.0	24.8	1,857	Yes
DP	Noise sensitive point: User defined (120)	-61.700582° E	56.540833° N	22.7	4.5	40.0	25.2	1,767	Yes
DQ	Noise sensitive point: User defined (121)	-61.700831° E	56.540928° N	24.5	4.5	40.0	25.3	1,751	Yes
DR	Noise sensitive point: User defined (122)	-61.700711° E	56.541274° N	27.0	4.5	40.0	25.3	1,756	Yes
DS	Noise sensitive point: User defined (123)	-61.699803° E	56.540759° N	18.6	4.5	40.0	25.0	1,816	Yes
DT	Noise sensitive point: User defined (124)	-61.699554° E	56.540899° N	18.5	4.5	40.0	24.9	1,830	Yes
DU	Noise sensitive point: User defined (125)	-61.700073° E	56.541243° N	23.6	4.5	40.0	25.1	1,796	Yes
DV	Noise sensitive point: User defined (126)	-61.700504° E	56.541408° N	27.4	4.5	40.0	25.2	1,769	Yes
DW	Noise sensitive point: User defined (127)	-61.700194° E	56.541514° N	26.8	4.5	40.0	25.1	1,787	Yes
DX	Noise sensitive point: User defined (128)	-61.699310° E	56.541007° N	18.3	4.5	40.0	24.8	1,844	Yes
DY	Noise sensitive point: User defined (129)	-61.699812° E	56.541378° N	23.4	4.5	40.0	25.0	1,811	Yes
DZ	Noise sensitive point: User defined (130)	-61.699905° E	56.541639° N	26.4	4.5	40.0	25.0	1,805	Yes
EA	Noise sensitive point: User defined (131)	-61.699529° E	56.541469° N	22.7	4.5	40.0	24.9	1,828	Yes
EB	Noise sensitive point: User defined (132)	-61.698492° E	56.541361° N	18.2	4.5	40.0	24.6	1,892	Yes
EC	Noise sensitive point: User defined (133)	-61.699214° E	56.541547° N	21.9	4.5	40.0	24.8	1,847	Yes
ED	Noise sensitive point: User defined (134)	-61.699177° E	56.541939° N	25.3	4.5	40.0	24.8	1,848	Yes
EE	Noise sensitive point: User defined (135)	-61.698905° E	56.541991° N	24.8	4.5	40.0	24.7	1,865	Yes
EF	Noise sensitive point: User defined (136)	-61.698606° E	56.542123° N	25.2	4.5	40.0	24.6	1,883	Yes
EG	Noise sensitive point: User defined (137)	-61.698384° E	56.542128° N	24.5	4.5	40.0	24.6	1,897	Yes
EH	Noise sensitive point: User defined (138)	-61.698246° E	56.542205° N	24.8	4.5	40.0	24.5	1,905	Yes
EI	Noise sensitive point: User defined (139)	-61.698036° E	56.542207° N	24.2	4.5	40.0	24.5	1,918	Yes
EJ	Noise sensitive point: User defined (140)	-61.697811° E	56.542252° N	24.0	4.5	40.0	24.4	1,932	Yes
EK	Noise sensitive point: User defined (141)	-61.699668° E	56.540027° N	13.6	4.5	40.0	24.9	1,831	Yes
EL	Noise sensitive point: User defined (142)	-61.697427° E	56.541351° N	15.3	4.5	40.0	24.3	1,958	Yes
EM	Noise sensitive point: User defined (143)	-61.697105° E	56.541050° N	12.4	4.5	40.0	24.2	1,979	Yes
EN	Noise sensitive point: User defined (144)	-61.696244° E	56.541214° N	10.1	4.5	40.0	23.9	2,031	Yes
EO	Noise sensitive point: User defined (145)	-61.697427° E	56.541914° N	19.4	4.5	40.0	24.3	1,956	Yes
EP	Noise sensitive point: User defined (146)	-61.698630° E	56.541678° N	21.0	4.5	40.0	24.6	1,883	Yes
EQ	Noise sensitive point: User defined (147)	-61.698232° E	56.541808° N	21.1	4.5	40.0	24.5	1,907	Yes
ER	Noise sensitive point: User defined (148)	-61.697525° E	56.542290° N	23.4	4.5	40.0	24.3	1,949	Yes
ES	Noise sensitive point: User defined (149)	-61.697827° E	56.543205° N	35.4	4.5	40.0	24.4	1,932	Yes
ET	Noise sensitive point: User defined (150)	-61.696856° E	56.543205° N	29.2	4.5	40.0	24.1	1,992	Yes
EU	Noise sensitive point: User defined (151)	-61.697460° E	56.542509° N	25.1	4.5	40.0	24.3	1,953	Yes

To be continued on next page...

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DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
EV	Noise sensitive point: User defined (152)	-61.696834° E	56.542484° N	21.5	4.5	40.0	24.1	1,992	Yes
EW	Noise sensitive point: User defined (153)	-61.696948° E	56.542143° N	19.0	4.5	40.0	24.2	1,985	Yes
EX	Noise sensitive point: User defined (154)	-61.697037° E	56.541695° N	16.1	4.5	40.0	24.2	1,981	Yes
EY	Noise sensitive point: User defined (155)	-61.696595° E	56.542249° N	18.2	4.5	40.0	24.1	2,007	Yes
EZ	Noise sensitive point: User defined (156)	-61.696321° E	56.541949° N	14.6	4.5	40.0	24.0	2,024	Yes
FA	Noise sensitive point: User defined (157)	-61.696201° E	56.541551° N	11.9	4.5	40.0	23.9	2,032	Yes
FB	Noise sensitive point: User defined (158)	-61.695789° E	56.541669° N	11.2	4.5	40.0	23.8	2,057	Yes
FC	Noise sensitive point: User defined (159)	-61.695891° E	56.542113° N	14.0	4.5	40.0	23.8	2,050	Yes
FD	Noise sensitive point: User defined (160)	-61.696197° E	56.542379° N	17.2	4.5	40.0	23.9	2,031	Yes
FE	Noise sensitive point: User defined (161)	-61.696178° E	56.542799° N	20.2	4.5	40.0	23.9	2,033	Yes
FF	Noise sensitive point: User defined (162)	-61.695906° E	56.542473° N	16.4	4.5	40.0	23.9	2,049	Yes
FG	Noise sensitive point: User defined (163)	-61.695547° E	56.542125° N	13.3	4.5	40.0	23.7	2,071	Yes
FH	Noise sensitive point: User defined (164)	-61.695385° E	56.541820° N	11.2	4.5	40.0	23.7	2,082	Yes
FI	Noise sensitive point: User defined (165)	-61.695094° E	56.541579° N	9.3	4.5	40.0	23.6	2,100	Yes
FJ	Noise sensitive point: User defined (166)	-61.695544° E	56.542599° N	16.1	4.5	40.0	23.7	2,071	Yes
FK	Noise sensitive point: User defined (167)	-61.694962° E	56.542042° N	11.3	4.5	40.0	23.6	2,107	Yes
FL	Noise sensitive point: User defined (168)	-61.695623° E	56.543320° N	22.2	4.5	40.0	23.8	2,068	Yes
FM	Noise sensitive point: User defined (169)	-61.694127° E	56.541196° N	5.1	4.5	40.0	23.3	2,161	Yes
FN	Noise sensitive point: User defined (170)	-61.693852° E	56.541214° N	5.0	4.5	40.0	23.3	2,178	Yes
FO	Noise sensitive point: User defined (171)	-61.693177° E	56.541290° N	5.0	4.5	40.0	23.1	2,219	Yes
FP	Noise sensitive point: User defined (172)	-61.693653° E	56.541515° N	5.4	4.5	40.0	23.2	2,189	Yes
FQ	Noise sensitive point: User defined (173)	-61.694256° E	56.541308° N	6.0	4.5	40.0	23.4	2,153	Yes
FR	Noise sensitive point: User defined (174)	-61.694580° E	56.541152° N	5.9	4.5	40.0	23.5	2,134	Yes
FS	Noise sensitive point: User defined (175)	-61.694953° E	56.541175° N	6.7	4.5	40.0	23.6	2,111	Yes
FT	Noise sensitive point: User defined (176)	-61.694489° E	56.541546° N	7.8	4.5	40.0	23.4	2,138	Yes
FU	Noise sensitive point: User defined (177)	-61.694160° E	56.541712° N	7.7	4.5	40.0	23.4	2,158	Yes
FV	Noise sensitive point: User defined (178)	-61.694826° E	56.541736° N	9.6	4.5	40.0	23.5	2,116	Yes
FW	Noise sensitive point: User defined (179)	-61.693833° E	56.541905° N	7.6	4.5	40.0	23.3	2,177	Yes
FX	Noise sensitive point: User defined (180)	-61.693499° E	56.542042° N	7.4	4.5	40.0	23.2	2,197	Yes
FY	Noise sensitive point: User defined (181)	-61.694620° E	56.542138° N	10.8	4.5	40.0	23.5	2,128	Yes
FZ	Noise sensitive point: User defined (182)	-61.694165° E	56.542112° N	9.4	4.5	40.0	23.4	2,156	Yes
GA	Noise sensitive point: User defined (183)	-61.693720° E	56.542248° N	8.9	4.5	40.0	23.2	2,183	Yes
GB	Noise sensitive point: User defined (184)	-61.695177° E	56.542262° N	12.9	4.5	40.0	23.6	2,094	Yes
GC	Noise sensitive point: User defined (185)	-61.694784° E	56.542414° N	12.6	4.5	40.0	23.5	2,118	Yes
GD	Noise sensitive point: User defined (186)	-61.695143° E	56.542454° N	13.8	4.5	40.0	23.6	2,096	Yes
GE	Noise sensitive point: User defined (187)	-61.694080° E	56.542328° N	10.2	4.5	40.0	23.3	2,161	Yes
GF	Noise sensitive point: User defined (188)	-61.693552° E	56.542507° N	9.6	4.5	40.0	23.2	2,194	Yes
GG	Noise sensitive point: User defined (189)	-61.695103° E	56.542750° N	15.6	4.5	40.0	23.6	2,099	Yes
GH	Noise sensitive point: User defined (190)	-61.694836° E	56.542851° N	15.3	4.5	40.0	23.5	2,115	Yes
GI	Noise sensitive point: User defined (191)	-61.695366° E	56.542992° N	18.3	4.5	40.0	23.7	2,083	Yes
GJ	Noise sensitive point: User defined (192)	-61.695022° E	56.543112° N	17.7	4.5	40.0	23.6	2,105	Yes
GK	Noise sensitive point: User defined (193)	-61.695219° E	56.543465° N	21.3	4.5	40.0	23.7	2,094	Yes
GL	Noise sensitive point: User defined (194)	-61.695096° E	56.543773° N	24.4	4.5	40.0	23.6	2,103	Yes
GM	Noise sensitive point: User defined (195)	-61.695356° E	56.543701° N	25.0	4.5	40.0	23.7	2,086	Yes
GN	Noise sensitive point: User defined (196)	-61.694833° E	56.543914° N	24.5	4.5	40.0	23.5	2,120	Yes
GO	Noise sensitive point: User defined (197)	-61.694432° E	56.544066° N	24.0	4.5	40.0	23.4	2,145	Yes
GP	Noise sensitive point: User defined (198)	-61.694028° E	56.543840° N	20.0	4.5	40.0	23.3	2,169	Yes
GQ	Noise sensitive point: User defined (199)	-61.694430° E	56.543657° N	19.7	4.5	40.0	23.4	2,143	Yes
GR	Noise sensitive point: User defined (200)	-61.694815° E	56.543513° N	19.7	4.5	40.0	23.5	2,119	Yes
GS	Noise sensitive point: User defined (201)	-61.694682° E	56.543189° N	17.1	4.5	40.0	23.5	2,126	Yes
GT	Noise sensitive point: User defined (202)	-61.694294° E	56.543311° N	16.6	4.5	40.0	23.4	2,150	Yes
GU	Noise sensitive point: User defined (203)	-61.694039° E	56.543398° N	16.4	4.5	40.0	23.3	2,166	Yes
GV	Noise sensitive point: User defined (204)	-61.693728° E	56.543481° N	15.9	4.5	40.0	23.2	2,185	Yes
GW	Noise sensitive point: User defined (205)	-61.694211° E	56.543040° N	14.6	4.5	40.0	23.4	2,154	Yes
GX	Noise sensitive point: User defined (206)	-61.693843° E	56.543133° N	14.1	4.5	40.0	23.3	2,177	Yes
GY	Noise sensitive point: User defined (207)	-61.693678° E	56.543225° N	14.1	4.5	40.0	23.2	2,188	Yes
GZ	Noise sensitive point: User defined (208)	-61.693350° E	56.543291° N	13.6	4.5	40.0	23.1	2,208	Yes
HA	Noise sensitive point: User defined (209)	-61.693595° E	56.543141° N	13.4	4.5	40.0	23.2	2,192	Yes
HB	Noise sensitive point: User defined (210)	-61.693722° E	56.542940° N	12.6	4.5	40.0	23.2	2,184	Yes
HC	Noise sensitive point: User defined (211)	-61.692342° E	56.542869° N	8.7	4.5	40.0	22.9	2,269	Yes
HD	Noise sensitive point: User defined (212)	-61.691665° E	56.542521° N	5.8	4.5	40.0	22.7	2,310	Yes
HE	Noise sensitive point: User defined (213)	-61.693823° E	56.542413° N	9.9	4.5	40.0	23.3	2,177	Yes

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DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
HF	Noise sensitive point: User defined (214)	-61.694194° E	56.542661° N	12.3	4.5	40.0	23.4	2,154	Yes
HG	Noise sensitive point: User defined (215)	-61.694374° E	56.542242° N	10.6	4.5	40.0	23.4	2,143	Yes
HH	Noise sensitive point: User defined (216)	-61.693786° E	56.542762° N	11.7	4.5	40.0	23.3	2,180	Yes
HI	Noise sensitive point: User defined (217)	-61.693450° E	56.542914° N	11.6	4.5	40.0	23.2	2,201	Yes
HJ	Noise sensitive point: User defined (218)	-61.693051° E	56.543069° N	11.5	4.5	40.0	23.1	2,226	Yes
HK	Noise sensitive point: User defined (219)	-61.691425° E	56.543720° N	10.9	4.5	40.0	22.6	2,328	Yes
HL	Noise sensitive point: User defined (220)	-61.691592° E	56.543585° N	10.6	4.5	40.0	22.7	2,317	Yes
HM	Noise sensitive point: User defined (221)	-61.692081° E	56.543956° N	14.4	4.5	40.0	22.8	2,289	Yes
HN	Noise sensitive point: User defined (222)	-61.692151° E	56.543388° N	11.0	4.5	40.0	22.8	2,282	Yes
HO	Noise sensitive point: User defined (223)	-61.692388° E	56.543617° N	13.1	4.5	40.0	22.9	2,268	Yes
HP	Noise sensitive point: User defined (224)	-61.692504° E	56.543225° N	11.0	4.5	40.0	22.9	2,260	Yes
HQ	Noise sensitive point: User defined (225)	-61.692638° E	56.543465° N	12.8	4.5	40.0	22.9	2,252	Yes
HR	Noise sensitive point: User defined (226)	-61.692894° E	56.543396° N	13.0	4.5	40.0	23.0	2,236	Yes
HS	Noise sensitive point: User defined (227)	-61.692987° E	56.543487° N	13.9	4.5	40.0	23.0	2,231	Yes
HT	Noise sensitive point: User defined (228)	-61.692359° E	56.544135° N	16.7	4.5	40.0	22.8	2,273	Yes
HU	Noise sensitive point: User defined (229)	-61.691411° E	56.544154° N	13.6	4.5	40.0	22.6	2,331	Yes
HV	Noise sensitive point: User defined (230)	-61.691297° E	56.544314° N	14.3	4.5	40.0	22.6	2,339	Yes
HW	Noise sensitive point: User defined (231)	-61.691174° E	56.544437° N	14.6	4.5	40.0	22.5	2,348	Yes
HX	Noise sensitive point: User defined (232)	-61.690848° E	56.543976° N	10.6	4.5	40.0	22.5	2,365	Yes
HY	Noise sensitive point: User defined (233)	-61.690756° E	56.543618° N	8.5	4.5	40.0	22.4	2,368	Yes
HZ	Noise sensitive point: User defined (234)	-61.690949° E	56.543366° N	7.7	4.5	40.0	22.5	2,356	Yes
IA	Noise sensitive point: User defined (235)	-61.691277° E	56.543200° N	7.7	4.5	40.0	22.6	2,335	Yes
IB	Noise sensitive point: User defined (236)	-61.691510° E	56.543103° N	7.8	4.5	40.0	22.6	2,320	Yes
IC	Noise sensitive point: User defined (237)	-61.691677° E	56.543162° N	8.5	4.5	40.0	22.7	2,310	Yes
ID	Noise sensitive point: User defined (238)	-61.691041° E	56.542533° N	5.0	4.5	40.0	22.5	2,348	Yes
IE	Noise sensitive point: User defined (239)	-61.691200° E	56.542777° N	5.5	4.5	40.0	22.6	2,339	Yes
IF	Noise sensitive point: User defined (240)	-61.690945° E	56.542952° N	5.7	4.5	40.0	22.5	2,355	Yes
IG	Noise sensitive point: User defined (241)	-61.690710° E	56.543114° N	5.7	4.5	40.0	22.4	2,370	Yes
IH	Noise sensitive point: User defined (242)	-61.690097° E	56.543284° N	5.0	4.5	40.0	22.3	2,408	Yes
II	Noise sensitive point: User defined (243)	-61.689352° E	56.543510° N	5.0	4.5	40.0	22.1	2,454	Yes
IJ	Noise sensitive point: User defined (244)	-61.690320° E	56.543768° N	7.8	4.5	40.0	22.3	2,396	Yes
IK	Noise sensitive point: User defined (245)	-61.688625° E	56.543568° N	5.0	4.5	40.0	21.9	2,499	Yes
IL	Noise sensitive point: User defined (246)	-61.689852° E	56.543773° N	6.3	4.5	40.0	22.2	2,425	Yes
IM	Noise sensitive point: User defined (247)	-61.690250° E	56.544171° N	9.7	4.5	40.0	22.3	2,403	Yes
IN	Noise sensitive point: User defined (248)	-61.689930° E	56.543998° N	7.7	4.5	40.0	22.2	2,421	Yes
IO	Noise sensitive point: User defined (249)	-61.689677° E	56.544130° N	7.6	4.5	40.0	22.1	2,438	Yes
IP	Noise sensitive point: User defined (250)	-61.689019° E	56.543896° N	5.0	4.5	40.0	22.0	2,477	Yes
IQ	Noise sensitive point: User defined (251)	-61.689978° E	56.544320° N	9.7	4.5	40.0	22.2	2,420	Yes
IR	Noise sensitive point: User defined (252)	-61.688652° E	56.544090° N	5.0	4.5	40.0	21.9	2,500	Yes
IS	Noise sensitive point: User defined (253)	-61.689859° E	56.544543° N	10.4	4.5	40.0	22.2	2,430	Yes
IT	Noise sensitive point: User defined (254)	-61.690107° E	56.544648° N	12.0	4.5	40.0	22.2	2,415	Yes
IU	Noise sensitive point: User defined (255)	-61.689321° E	56.544423° N	7.9	4.5	40.0	22.0	2,462	Yes
IV	Noise sensitive point: User defined (256)	-61.689501° E	56.544774° N	10.3	4.5	40.0	22.1	2,453	Yes
IW	Noise sensitive point: User defined (257)	-61.689164° E	56.544548° N	7.8	4.5	40.0	22.0	2,472	Yes
IX	Noise sensitive point: User defined (258)	-61.688987° E	56.544693° N	7.9	4.5	40.0	22.0	2,484	Yes
IY	Noise sensitive point: User defined (259)	-61.689626° E	56.545043° N	12.3	4.5	40.0	22.1	2,448	Yes
IZ	Noise sensitive point: User defined (260)	-61.688825° E	56.544474° N	6.2	4.5	40.0	21.9	2,492	Yes
JA	Noise sensitive point: User defined (262)	-61.688620° E	56.544588° N	5.7	4.5	40.0	21.9	2,506	Yes
JB	Noise sensitive point: User defined (263)	-61.688512° E	56.544749° N	5.9	4.5	40.0	21.8	2,514	Yes
JC	Noise sensitive point: User defined (266)	-61.688702° E	56.544894° N	7.6	4.5	40.0	21.9	2,503	Yes
JD	Noise sensitive point: User defined (267)	-61.688264° E	56.545456° N	7.6	4.5	40.0	21.7	2,536	Yes
JE	Noise sensitive point: User defined (268)	-61.688483° E	56.545123° N	7.4	4.5	40.0	21.8	2,519	Yes
JF	Noise sensitive point: User defined (269)	-61.688656° E	56.545486° N	10.1	4.5	40.0	21.8	2,512	Yes
JG	Noise sensitive point: User defined (270)	-61.688770° E	56.545305° N	9.9	4.5	40.0	21.9	2,503	Yes
JH	Noise sensitive point: User defined (271)	-61.688482° E	56.545870° N	10.7	4.5	40.0	21.8	2,528	Yes
JI	Noise sensitive point: User defined (272)	-61.688982° E	56.546012° N	14.4	4.5	40.0	21.9	2,499	Yes
JJ	Noise sensitive point: User defined (273)	-61.689334° E	56.546113° N	17.4	4.5	40.0	22.0	2,479	Yes
JK	Noise sensitive point: User defined (274)	-61.689711° E	56.546238° N	20.6	4.5	40.0	22.1	2,457	Yes
JL	Noise sensitive point: User defined (275)	-61.690052° E	56.546313° N	23.7	4.5	40.0	22.2	2,438	Yes
JM	Noise sensitive point: User defined (276)	-61.688297° E	56.546059° N	10.5	4.5	40.0	21.7	2,541	Yes
JN	Noise sensitive point: User defined (277)	-61.688753° E	56.546221° N	14.1	4.5	40.0	21.8	2,516	Yes
JO	Noise sensitive point: User defined (278)	-61.689196° E	56.546319° N	17.8	4.5	40.0	21.9	2,490	Yes

To be continued on next page...

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1/18/2021 12:21 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
JP	Noise sensitive point: User defined (279)	-61.689492° E	56.546398° N	20.3	4.5	40.0	22.0	2,473	Yes
JQ	Noise sensitive point: User defined (280)	-61.688114° E	56.546306° N	10.6	4.5	40.0	21.7	2,556	Yes
JR	Noise sensitive point: User defined (281)	-61.688575° E	56.546418° N	14.1	4.5	40.0	21.8	2,529	Yes
JS	Noise sensitive point: User defined (282)	-61.688974° E	56.546540° N	17.6	4.5	40.0	21.9	2,507	Yes
JT	Noise sensitive point: User defined (283)	-61.689338° E	56.546623° N	20.8	4.5	40.0	22.0	2,486	Yes
JU	Noise sensitive point: User defined (284)	-61.689690° E	56.546714° N	24.2	4.5	40.0	22.0	2,466	Yes
JV	Noise sensitive point: User defined (285)	-61.687997° E	56.546543° N	11.1	4.5	40.0	21.6	2,566	Yes
JW	Noise sensitive point: User defined (286)	-61.688448° E	56.546630° N	14.5	4.5	40.0	21.7	2,540	Yes
JX	Noise sensitive point: User defined (287)	-61.688786° E	56.546725° N	17.4	4.5	40.0	21.8	2,521	Yes
JY	Noise sensitive point: User defined (288)	-61.689109° E	56.546842° N	20.7	4.5	40.0	21.9	2,503	Yes
JZ	Noise sensitive point: User defined (289)	-61.687771° E	56.546799° N	11.5	4.5	40.0	21.6	2,584	Yes
KA	Noise sensitive point: User defined (290)	-61.688173° E	56.546869° N	14.3	4.5	40.0	21.6	2,560	Yes
KB	Noise sensitive point: User defined (291)	-61.688514° E	56.546977° N	17.5	4.5	40.0	21.7	2,542	Yes
KC	Noise sensitive point: User defined (292)	-61.689141° E	56.547171° N	24.8	4.5	40.0	21.9	2,507	Yes
KD	Noise sensitive point: User defined (293)	-61.687240° E	56.546747° N	8.5	4.5	40.0	21.4	2,615	Yes
KE	Noise sensitive point: User defined (294)	-61.687551° E	56.547122° N	12.6	4.5	40.0	21.5	2,602	Yes
KF	Noise sensitive point: User defined (295)	-61.687879° E	56.547172° N	14.8	4.5	40.0	21.6	2,583	Yes
KG	Noise sensitive point: User defined (296)	-61.688184° E	56.547249° N	17.7	4.5	40.0	21.6	2,566	Yes
KH	Noise sensitive point: User defined (297)	-61.688469° E	56.547408° N	22.1	4.5	40.0	21.7	2,552	Yes
KI	Noise sensitive point: User defined (298)	-61.687002° E	56.547185° N	10.1	4.5	40.0	21.3	2,637	Yes
KJ	Noise sensitive point: User defined (299)	-61.687372° E	56.547360° N	13.5	4.5	40.0	21.4	2,617	Yes
KK	Noise sensitive point: User defined (300)	-61.687666° E	56.547417° N	15.7	4.5	40.0	21.5	2,601	Yes
KL	Noise sensitive point: User defined (301)	-61.687773° E	56.547674° N	19.1	4.5	40.0	21.5	2,599	Yes
KM	Noise sensitive point: User defined (302)	-61.687236° E	56.547504° N	13.9	4.5	40.0	21.4	2,628	Yes
KN	Noise sensitive point: User defined (303)	-61.687006° E	56.547820° N	15.0	4.5	40.0	21.3	2,648	Yes
KO	Noise sensitive point: User defined (304)	-61.687491° E	56.547961° N	20.2	4.5	40.0	21.4	2,621	Yes
KP	Noise sensitive point: User defined (305)	-61.687301° E	56.548142° N	21.1	4.5	40.0	21.3	2,636	Yes
KQ	Noise sensitive point: User defined (306)	-61.686938° E	56.548009° N	16.5	4.5	40.0	21.3	2,656	Yes
KR	Noise sensitive point: User defined (307)	-61.686857° E	56.548366° N	19.7	4.5	40.0	21.2	2,668	Yes
KS	Noise sensitive point: User defined (308)	-61.686549° E	56.548285° N	15.7	4.5	40.0	21.2	2,685	Yes
KT	Noise sensitive point: User defined (309)	-61.685326° E	56.549292° N	16.9	4.5	40.0	20.8	2,780	Yes
KU	Noise sensitive point: User defined (310)	-61.685430° E	56.548669° N	10.9	4.5	40.0	20.9	2,760	Yes
KV	Noise sensitive point: User defined (311)	-61.685622° E	56.549117° N	17.4	4.5	40.0	20.9	2,759	Yes
KW	Noise sensitive point: User defined (312)	-61.685883° E	56.548970° N	18.0	4.5	40.0	20.9	2,740	Yes
KX	Noise sensitive point: User defined (313)	-61.686048° E	56.548873° N	18.4	4.5	40.0	21.0	2,727	Yes
KY	Noise sensitive point: User defined (314)	-61.686207° E	56.548753° N	18.3	4.5	40.0	21.0	2,715	Yes
KZ	Noise sensitive point: User defined (315)	-61.690946° E	56.542205° N	5.0	4.5	40.0	22.5	2,354	Yes
LA	Noise sensitive point: User defined (316)	-61.691518° E	56.541952° N	5.0	4.5	40.0	22.6	2,319	Yes
LB	Noise sensitive point: User defined (317)	-61.691132° E	56.542072° N	5.0	4.5	40.0	22.5	2,343	Yes
LC	Noise sensitive point: User defined (318)	-61.696277° E	56.538851° N	14.3	4.5	40.0	23.8	2,053	Yes
LD	Noise sensitive point: User defined (319)	-61.696125° E	56.538474° N	18.9	4.5	40.0	23.7	2,069	Yes
LE	Noise sensitive point: User defined (320)	-61.696595° E	56.538750° N	15.3	4.5	40.0	23.9	2,036	Yes
LF	Noise sensitive point: User defined (321)	-61.696611° E	56.538441° N	19.6	4.5	40.0	23.9	2,040	Yes
LG	Noise sensitive point: User defined (322)	-61.696858° E	56.538774° N	14.9	4.5	40.0	24.0	2,019	Yes
LH	Noise sensitive point: User defined (323)	-61.696988° E	56.538427° N	19.7	4.5	40.0	24.0	2,017	Yes
LI	Noise sensitive point: User defined (324)	-61.697186° E	56.538755° N	14.9	4.5	40.0	24.1	2,000	Yes
LJ	Noise sensitive point: User defined (325)	-61.697240° E	56.538479° N	18.8	4.5	40.0	24.1	2,001	Yes
LK	Noise sensitive point: User defined (326)	-61.697490° E	56.538765° N	14.5	4.5	40.0	24.1	1,981	Yes
LL	Noise sensitive point: User defined (327)	-61.697487° E	56.538476° N	18.8	4.5	40.0	24.1	1,986	Yes
LM	Noise sensitive point: User defined (328)	-61.697795° E	56.538706° N	14.8	4.5	40.0	24.2	1,963	Yes
LN	Noise sensitive point: User defined (329)	-61.697753° E	56.538461° N	18.6	4.5	40.0	24.2	1,970	Yes
LO	Noise sensitive point: User defined (330)	-61.698093° E	56.538461° N	17.6	4.5	40.0	24.3	1,949	Yes
LP	Noise sensitive point: User defined (331)	-61.695848° E	56.539518° N	9.3	4.5	40.0	23.7	2,070	Yes
LQ	Noise sensitive point: User defined (332)	-61.695799° E	56.538488° N	18.6	4.5	40.0	23.7	2,088	Yes
LR	Noise sensitive point: User defined (333)	-61.695494° E	56.538579° N	17.5	4.5	40.0	23.6	2,105	Yes
LS	Noise sensitive point: User defined (334)	-61.695272° E	56.538639° N	16.8	4.5	40.0	23.5	2,118	Yes
LT	Noise sensitive point: User defined (335)	-61.694789° E	56.538839° N	13.8	4.5	40.0	23.4	2,144	Yes
LU	Noise sensitive point: User defined (336)	-61.694566° E	56.538591° N	15.7	4.5	40.0	23.3	2,162	Yes
LV	Noise sensitive point: User defined (337)	-61.694210° E	56.538152° N	20.9	4.5	40.0	23.2	2,191	Yes
LW	Noise sensitive point: User defined (338)	-61.694394° E	56.538349° N	18.3	4.5	40.0	23.3	2,176	Yes
LX	Noise sensitive point: User defined (339)	-61.695398° E	56.538212° N	23.0	4.5	40.0	23.5	2,117	Yes
LY	Noise sensitive point: User defined (340)	-61.694910° E	56.538300° N	20.3	4.5	40.0	23.4	2,145	Yes

To be continued on next page...

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DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
LZ	Noise sensitive point: User defined (341)	-61.693775° E	56.538241° N	18.5	4.5	40.0	23.1	2,215	Yes
MA	Noise sensitive point: User defined (342)	-61.693404° E	56.538355° N	15.9	4.5	40.0	23.0	2,236	Yes
MB	Noise sensitive point: User defined (343)	-61.690123° E	56.537061° N	27.7	4.5	40.0	22.0	2,459	Yes
MC	Noise sensitive point: User defined (344)	-61.694017° E	56.538812° N	12.3	4.5	40.0	23.2	2,192	Yes
MD	Noise sensitive point: User defined (345)	-61.693898° E	56.538479° N	15.1	4.5	40.0	23.1	2,204	Yes
ME	Noise sensitive point: User defined (346)	-61.693511° E	56.538630° N	13.0	4.5	40.0	23.0	2,225	Yes
MF	Noise sensitive point: User defined (347)	-61.693609° E	56.538898° N	10.6	4.5	40.0	23.1	2,216	Yes
MG	Noise sensitive point: User defined (348)	-61.692378° E	56.538774° N	10.1	4.5	40.0	22.7	2,292	Yes
MH	Noise sensitive point: User defined (349)	-61.694080° E	56.539043° N	10.4	4.5	40.0	23.2	2,185	Yes
MI	Noise sensitive point: User defined (350)	-61.694731° E	56.539119° N	11.2	4.5	40.0	23.4	2,144	Yes
MJ	Noise sensitive point: User defined (351)	-61.694747° E	56.539375° N	9.4	4.5	40.0	23.4	2,140	Yes
MK	Noise sensitive point: User defined (352)	-61.693681° E	56.539440° N	6.8	4.5	40.0	23.1	2,204	Yes
ML	Noise sensitive point: User defined (353)	-61.693557° E	56.539256° N	7.9	4.5	40.0	23.1	2,214	Yes
MM	Noise sensitive point: User defined (354)	-61.694145° E	56.539333° N	8.4	4.5	40.0	23.3	2,177	Yes
MN	Noise sensitive point: User defined (355)	-61.694294° E	56.539647° N	6.6	4.5	40.0	23.3	2,164	Yes
MO	Noise sensitive point: User defined (356)	-61.694806° E	56.539613° N	7.9	4.5	40.0	23.5	2,133	Yes
MP	Noise sensitive point: User defined (357)	-61.695180° E	56.539873° N	6.3	4.5	40.0	23.6	2,107	Yes
MQ	Noise sensitive point: User defined (358)	-61.694769° E	56.539901° N	5.7	4.5	40.0	23.5	2,132	Yes
MR	Noise sensitive point: User defined (359)	-61.693815° E	56.540196° N	5.0	4.5	40.0	23.2	2,188	Yes
MS	Noise sensitive point: User defined (360)	-61.693963° E	56.540005° N	5.0	4.5	40.0	23.2	2,180	Yes
MT	Noise sensitive point: User defined (361)	-61.694392° E	56.539940° N	5.0	4.5	40.0	23.4	2,155	Yes
MU	Noise sensitive point: User defined (362)	-61.695464° E	56.539860° N	6.5	4.5	40.0	23.6	2,090	Yes
MV	Noise sensitive point: User defined (363)	-61.691900° E	56.538022° N	18.9	4.5	40.0	22.6	2,333	Yes
MW	Noise sensitive point: User defined (364)	-61.691986° E	56.538225° N	16.2	4.5	40.0	22.6	2,325	Yes
MX	Noise sensitive point: User defined (365)	-61.692915° E	56.539239° N	6.6	4.5	40.0	22.9	2,253	Yes
MY	Noise sensitive point: User defined (366)	-61.692283° E	56.539366° N	5.0	4.5	40.0	22.8	2,290	Yes
MZ	Noise sensitive point: User defined (367)	-61.691011° E	56.538563° N	10.8	4.5	40.0	22.4	2,379	Yes
NA	Noise sensitive point: User defined (368)	-61.691548° E	56.539060° N	7.2	4.5	40.0	22.5	2,339	Yes
NB	Noise sensitive point: User defined (369)	-61.691119° E	56.539419° N	5.0	4.5	40.0	22.5	2,361	Yes
NC	Noise sensitive point: User defined (370)	-61.689539° E	56.538588° N	8.2	4.5	40.0	22.0	2,468	Yes
ND	Noise sensitive point: User defined (371)	-61.689025° E	56.539169° N	5.0	4.5	40.0	21.9	2,492	Yes
NE	Noise sensitive point: User defined (372)	-61.689986° E	56.539351° N	5.0	4.5	40.0	22.2	2,431	Yes
NF	Noise sensitive point: User defined (373)	-61.690087° E	56.539278° N	5.0	4.5	40.0	22.2	2,426	Yes
NG	Noise sensitive point: User defined (374)	-61.690324° E	56.539198° N	5.0	4.5	40.0	22.2	2,412	Yes
NH	Noise sensitive point: User defined (375)	-61.709795° E	56.537719° N	41.4	4.5	40.0	28.0	1,262	Yes
NI	Noise sensitive point: User defined (376)	-61.709676° E	56.538038° N	42.8	4.5	40.0	28.0	1,260	Yes
NJ	Noise sensitive point: User defined (377)	-61.709296° E	56.537975° N	41.8	4.5	40.0	27.9	1,285	Yes
NK	Noise sensitive point: User defined (378)	-61.710657° E	56.538402° N	46.5	4.5	40.0	28.5	1,192	Yes
NL	Noise sensitive point: User defined (379)	-61.710873° E	56.538766° N	49.1	4.5	40.0	28.6	1,170	Yes
NM	Noise sensitive point: User defined (380)	-61.709400° E	56.539817° N	54.8	4.5	40.0	28.2	1,239	Yes
NN	Noise sensitive point: User defined (381)	-61.708953° E	56.539675° N	53.0	4.5	40.0	28.0	1,269	Yes
NO	Noise sensitive point: User defined (382)	-61.709234° E	56.539345° N	50.9	4.5	40.0	28.1	1,257	Yes
NP	Noise sensitive point: User defined (383)	-61.709671° E	56.539404° N	52.2	4.5	40.0	28.2	1,230	Yes
NQ	Noise sensitive point: User defined (384)	-61.709627° E	56.538504° N	45.3	4.5	40.0	28.1	1,251	Yes
NR	Noise sensitive point: User defined (385)	-61.709365° E	56.538477° N	45.0	4.5	40.0	28.0	1,268	Yes
NS	Noise sensitive point: User defined (386)	-61.706368° E	56.537682° N	33.0	4.5	40.0	26.8	1,467	Yes
NT	Noise sensitive point: User defined (387)	-61.713091° E	56.539705° N	63.0	4.5	40.0	29.6	1,017	Yes
NU	Noise sensitive point: User defined (388)	-61.710402° E	56.539769° N	56.2	4.5	40.0	28.6	1,179	Yes
NV	Noise sensitive point: User defined (389)	-61.710266° E	56.539952° N	57.6	4.5	40.0	28.5	1,184	Yes
NW	Noise sensitive point: User defined (390)	-61.710265° E	56.540288° N	60.6	4.5	40.0	28.6	1,180	Yes
NX	Noise sensitive point: User defined (391)	-61.710028° E	56.540550° N	63.3	4.5	40.0	28.5	1,191	Yes
NY	Noise sensitive point: User defined (392)	-61.709249° E	56.540372° N	59.4	4.5	40.0	28.2	1,241	Yes
NZ	Noise sensitive point: User defined (393)	-61.708959° E	56.540311° N	58.4	4.5	40.0	28.1	1,259	Yes
OA	Noise sensitive point: User defined (394)	-61.708746° E	56.540303° N	57.8	4.5	40.0	28.0	1,272	Yes
OB	Noise sensitive point: User defined (395)	-61.709930° E	56.540943° N	68.3	4.5	40.0	28.5	1,193	Yes
OC	Noise sensitive point: User defined (396)	-61.709495° E	56.540919° N	66.5	4.5	40.0	28.3	1,220	Yes
OD	Noise sensitive point: User defined (397)	-61.708941° E	56.541060° N	66.9	4.5	40.0	28.1	1,253	Yes
OE	Noise sensitive point: User defined (398)	-61.708439° E	56.540946° N	63.6	4.5	40.0	27.9	1,285	Yes
OF	Noise sensitive point: User defined (399)	-61.707955° E	56.540915° N	61.7	4.5	40.0	27.7	1,315	Yes
OG	Noise sensitive point: User defined (400)	-61.707494° E	56.540856° N	59.4	4.5	40.0	27.6	1,343	Yes
OH	Noise sensitive point: User defined (401)	-61.708340° E	56.540245° N	56.2	4.5	40.0	27.8	1,298	Yes
OI	Noise sensitive point: User defined (402)	-61.707806° E	56.540138° N	53.9	4.5	40.0	27.6	1,332	Yes

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Calculation: Nain E-44 Worst Case Noise

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Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
OJ	Noise sensitive point: User defined (403)	-61.707349° E	56.540150° N	52.6	4.5	40.0	27.5	1,360	Yes
OK	Noise sensitive point: User defined (404)	-61.706708° E	56.540137° N	49.4	4.5	40.0	27.2	1,399	Yes
OL	Noise sensitive point: User defined (405)	-61.706442° E	56.540100° N	47.5	4.5	40.0	27.1	1,416	Yes
OM	Noise sensitive point: User defined (406)	-61.706311° E	56.538519° N	37.3	4.5	40.0	26.9	1,451	Yes
ON	Noise sensitive point: User defined (407)	-61.703938° E	56.538054° N	24.0	4.5	40.0	26.0	1,604	Yes
OO	Noise sensitive point: User defined (408)	-61.704504° E	56.541170° N	47.3	4.5	40.0	26.5	1,524	Yes
OP	Noise sensitive point: User defined (409)	-61.703344° E	56.541103° N	40.3	4.5	40.0	26.1	1,596	Yes
OQ	Noise sensitive point: User defined (410)	-61.711201° E	56.536969° N	43.4	4.5	40.0	28.4	1,202	Yes
OR	Noise sensitive point: User defined (411)	-61.689378° E	56.534597° N	33.8	4.5	40.0	21.6	2,565	Yes
OS	Noise sensitive point: User defined (412)	-61.691957° E	56.534681° N	50.7	4.5	40.0	22.2	2,409	Yes
OT	Noise sensitive point: User defined (413)	-61.692196° E	56.534555° N	53.8	4.5	40.0	22.3	2,399	Yes
OU	Noise sensitive point: User defined (414)	-61.691898° E	56.533772° N	57.4	4.5	40.0	22.1	2,442	Yes
OV	Noise sensitive point: User defined (415)	-61.691239° E	56.537834° N	20.7	4.5	40.0	22.4	2,377	Yes
OW	Noise sensitive point: User defined (416)	-61.691277° E	56.539805° N	5.0	4.5	40.0	22.5	2,347	Yes
OX	Noise sensitive point: User defined (417)	-61.695841° E	56.538760° N	15.3	4.5	40.0	23.7	2,081	Yes
OY	Noise sensitive point: User defined (418)	-61.700221° E	56.540229° N	17.0	4.5	40.0	25.1	1,795	Yes
OZ	Noise sensitive point: User defined (419)	-61.693924° E	56.541436° N	5.8	4.5	40.0	23.3	2,173	Yes
PA	Noise sensitive point: User defined (420)	-61.693462° E	56.541670° N	5.6	4.5	40.0	23.2	2,201	Yes
PB	Noise sensitive point: User defined (421)	-61.693366° E	56.541690° N	5.4	4.5	40.0	23.1	2,206	Yes
PC	Noise sensitive point: User defined (422)	-61.692539° E	56.541514° N	5.0	4.5	40.0	22.9	2,258	Yes
PD	Noise sensitive point: User defined (423)	-61.691642° E	56.541820° N	5.0	4.5	40.0	22.7	2,312	Yes
PE	Noise sensitive point: User defined (424)	-61.692643° E	56.542051° N	5.4	4.5	40.0	22.9	2,250	Yes
PF	Noise sensitive point: User defined (425)	-61.693132° E	56.542211° N	7.2	4.5	40.0	23.1	2,220	Yes
PG	Noise sensitive point: User defined (426)	-61.693341° E	56.542281° N	8.0	4.5	40.0	23.1	2,207	Yes
PH	Noise sensitive point: User defined (427)	-61.694457° E	56.542566° N	12.6	4.5	40.0	23.4	2,138	Yes
PI	Noise sensitive point: User defined (428)	-61.691696° E	56.542387° N	5.2	4.5	40.0	22.7	2,308	Yes
PJ	Noise sensitive point: User defined (429)	-61.691355° E	56.542362° N	5.0	4.5	40.0	22.6	2,329	Yes
PK	Noise sensitive point: User defined (430)	-61.692146° E	56.544383° N	17.8	4.5	40.0	22.8	2,288	Yes
PL	Noise sensitive point: User defined (431)	-61.692352° E	56.546193° N	39.8	4.5	40.0	22.8	2,296	Yes
PM	Noise sensitive point: User defined (432)	-61.687956° E	56.547506° N	18.7	4.5	40.0	21.5	2,585	Yes
PN	Noise sensitive point: User defined (433)	-61.687459° E	56.552932° N	12.2	4.5	40.0	20.8	2,760	Yes
PO	Noise sensitive point: User defined (434)	-61.682718° E	56.552342° N	7.7	4.5	40.0	19.9	3,018	Yes
PP	Noise sensitive point: User defined (435)	-61.682552° E	56.552676° N	6.1	4.5	40.0	19.8	3,038	Yes
PQ	Noise sensitive point: User defined (436)	-61.682675° E	56.552713° N	6.2	4.5	40.0	19.8	3,032	Yes
PR	Noise sensitive point: User defined (437)	-61.682748° E	56.552753° N	6.1	4.5	40.0	19.8	3,029	Yes

Distances (m)

	WTG	
NSA	1	2
A	1786	1902
B	1847	1961
C	1863	1952
D	1858	1955
E	1853	1959
F	1895	1985
G	1868	1991
H	1875	2005
I	1925	2016
J	1880	1978
K	1876	1983
L	1869	1983
M	1885	2008
N	1895	2025
O	1904	2026
P	1887	2000
Q	1907	2020
R	1913	2042
S	1918	2016
T	1926	2047
U	1932	2060
V	1896	2002

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

	WTG	
NSA	1	2
W	1936	2034
X	1950	2076
Y	1976	2101
Z	1912	2019
AA	1924	2037
AB	1948	2062
AC	1954	2073
AD	1984	2105
AE	1989	2108
AF	1997	2111
AG	2008	2132
AH	1968	2096
AI	1995	2119
AJ	2027	2139
AK	2053	2165
AL	1954	2052
AM	1973	2070
AN	1932	2038
AO	1951	2057
AP	1969	2075
AQ	1987	2093
AR	1993	2091
AS	1941	2031
AT	1960	2050
AU	1983	2074
AV	2013	2111
AW	2037	2135
AX	2000	2091
AY	2019	2111
AZ	2038	2131
BA	2058	2149
BB	1970	2042
BC	1995	2068
BD	2025	2098
BE	2018	2097
BF	2056	2130
BG	2091	2166
BH	2046	2125
BI	2077	2161
BJ	2132	2192
BK	2152	2215
BL	2179	2242
BM	2138	2215
BN	2127	2208
BO	2122	2206
BP	2115	2202
BQ	2107	2197
BR	2091	2186
BS	2082	2181
BT	2193	2275
BU	2185	2271
BV	2179	2268
BW	2170	2261
BX	2166	2260
BY	2147	2250
BZ	2131	2236
CA	2116	2222
CB	2101	2210
CC	2077	2188
CD	2142	2254
CE	2122	2236
CF	2197	2292
CG	2236	2319
CH	2231	2316
CI	2246	2321

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Project:
Nain

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DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

	WTG	
NSA	1	2
CJ	2213	2288
CK	2220	2315
CL	2257	2354
CM	2243	2337
CN	2259	2351
CO	2289	2383
CP	2276	2366
CQ	2307	2399
CR	2291	2380
CS	2321	2411
CT	2333	2421
CU	2308	2393
CV	2261	2332
CW	2319	2399
CX	2342	2428
CY	2331	2409
CZ	2220	2285
DA	2254	2317
DB	2274	2342
DC	2291	2356
DD	2276	2336
DE	2369	2446
DF	2363	2442
DG	2380	2453
DH	2308	2371
DI	2291	2350
DJ	2368	2430
DK	2307	2364
DL	2367	2423
DM	2341	2408
DN	2347	2420
DO	2434	2498
DP	2346	2406
DQ	2331	2389
DR	2338	2391
DS	2394	2454
DT	2409	2467
DU	2377	2430
DV	2351	2401
DW	2370	2419
DX	2424	2480
DY	2393	2444
DZ	2388	2435
EA	2411	2460
EB	2475	2525
EC	2431	2478
ED	2434	2476
EE	2451	2492
EF	2470	2509
EG	2484	2522
EH	2493	2530
EI	2506	2543
EJ	2520	2556
EK	2405	2476
EL	2540	2590
EM	2560	2614
EN	2613	2664
EO	2542	2583
EP	2467	2512
EQ	2492	2535
ER	2538	2573
ES	2527	2549
ET	2586	2608
EU	2543	2576
EV	2581	2614

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DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

	WTG	
NSA	1	2
EW	2572	2610
EX	2565	2609
EY	2594	2631
EZ	2610	2651
FA	2616	2662
FB	2641	2686
FC	2637	2675
FD	2620	2654
FE	2624	2652
FF	2638	2671
FG	2658	2696
FH	2667	2709
FI	2684	2730
FJ	2661	2693
FK	2694	2733
FL	2663	2684
FM	2743	2793
FN	2760	2810
FO	2801	2850
FP	2772	2819
FQ	2735	2784
FR	2715	2766
FS	2692	2743
FT	2721	2767
FU	2742	2785
FV	2701	2744
FW	2762	2803
FX	2784	2822
FY	2715	2753
FZ	2743	2781
GA	2771	2807
GB	2682	2718
GC	2707	2741
GD	2685	2718
GE	2749	2784
GF	2783	2815
GG	2689	2719
GH	2707	2734
GI	2675	2701
GJ	2698	2722
GK	2689	2708
GL	2700	2715
GM	2684	2699
GN	2718	2731
GO	2745	2755
GP	2766	2781
GQ	2740	2756
GR	2714	2733
GS	2719	2742
GT	2744	2765
GU	2761	2781
GV	2781	2800
GW	2747	2772
GX	2770	2794
GY	2781	2804
GZ	2802	2824
HA	2785	2809
HB	2776	2802
HC	2860	2887
HD	2899	2931
HE	2766	2799
HF	2745	2775
HG	2731	2767
HH	2770	2799
HI	2792	2819

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

	WTG	
NSA	1	2
HJ	2818	2843
HK	2924	2941
HL	2912	2931
HM	2887	2900
HN	2876	2897
HO	2864	2882
HP	2853	2876
HQ	2847	2867
HR	2831	2851
HS	2826	2845
HT	2872	2883
HU	2930	2941
HV	2939	2948
HW	2949	2956
HX	2962	2976
HY	2964	2982
HZ	2950	2971
IA	2928	2951
IB	2913	2937
IC	2903	2927
ID	2937	2969
IE	2929	2958
IF	2946	2973
IG	2962	2986
IH	3001	3024
II	3049	3069
IJ	2992	3009
IK	3094	3113
IL	3021	3037
IM	3001	3013
IN	3019	3032
IO	3036	3048
IP	3073	3088
IQ	3020	3029
IR	3098	3111
IS	3030	3037
IT	3017	3022
IU	3062	3070
IV	3056	3059
IW	3073	3080
IX	3086	3091
IY	3052	3053
IZ	3093	3100
JA	3107	3113
JB	3115	3120
JC	3106	3109
JD	3142	3138
JE	3123	3123
JF	3119	3114
JG	3109	3106
JH	3136	3127
JI	3109	3098
JJ	3090	3077
JK	3069	3055
JL	3050	3034
JM	3151	3140
JN	3127	3113
JO	3102	3087
JP	3086	3070
JQ	3167	3153
JR	3142	3126
JS	3120	3103
JT	3100	3081
JU	3081	3061
JV	3179	3162

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

	WTG	
NSA	1	2
JW	3154	3136
JX	3136	3116
JY	3119	3097
JZ	3198	3179
KA	3176	3155
KB	3158	3135
KC	3125	3099
KD	3229	3211
KE	3219	3196
KF	3201	3176
KG	3184	3159
KH	3171	3143
KI	3254	3230
KJ	3236	3210
KK	3219	3192
KL	3219	3189
KM	3247	3220
KN	3269	3238
KO	3244	3211
KP	3260	3225
KQ	3278	3245
KR	3292	3255
KS	3308	3273
KT	3410	3365
KU	3386	3347
KV	3387	3343
KW	3367	3325
KX	3355	3313
KY	3342	3301
KZ	2941	2978
LA	2905	2945
LB	2929	2967
LC	2622	2707
LD	2635	2725
LE	2603	2690
LF	2606	2697
LG	2587	2674
LH	2583	2675
LI	2567	2655
LJ	2567	2658
LK	2549	2636
LL	2552	2644
LM	2531	2619
LN	2536	2628
LO	2515	2608
LP	2642	2717
LQ	2655	2744
LR	2673	2760
LS	2686	2772
LT	2713	2796
LU	2729	2816
LV	2756	2848
LW	2743	2832
LX	2683	2776
LY	2712	2802
LZ	2782	2872
MA	2803	2891
MB	3022	3122
MC	2761	2843
MD	2772	2859
ME	2794	2878
MF	2785	2866
MG	2861	2943
MH	2755	2834
MI	2714	2793

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

...continued from previous page

	WTG	
NSA	1	2
MJ	2711	2787
MK	2776	2850
ML	2785	2861
MM	2748	2824
MN	2737	2809
MO	2706	2778
MP	2681	2751
MQ	2706	2775
MR	2764	2828
MS	2755	2822
MT	2729	2797
MU	2664	2734
MV	2899	2990
MW	2891	2979
MX	2824	2900
MY	2862	2936
MZ	2947	3030
NA	2910	2987
NB	2933	3005
NC	3037	3118
ND	3064	3137
NE	3003	3075
NF	2998	3071
NG	2984	3058
NH	1817	1946
NI	1817	1941
NJ	1842	1965
NK	1751	1870
NL	1731	1844
NM	1809	1897
NN	1837	1927
NO	1823	1921
NP	1796	1893
NQ	1812	1926
NR	1828	1942
NS	2025	2145
NT	1583	1682
NU	1748	1839
NV	1754	1842
NW	1752	1833
NX	1766	1840
NY	1814	1891
NZ	1832	1910
OA	1846	1923
OB	1771	1837
OC	1798	1864
OD	1832	1894
OE	1863	1927
OF	1892	1957
OG	1921	1986
OH	1871	1949
OI	1904	1984
OJ	1932	2011
OK	1972	2049
OL	1988	2066
OM	2013	2119
ON	2165	2274
OO	2105	2161
OP	2176	2233
OQ	1752	1900
OR	3118	3245
OS	2962	3092
OT	2951	3083
OU	2991	3132
OV	2942	3034

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DECIBEL - Main Result

Calculation: Nain E-44 Worst Case Noise

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	WTG	
NSA	1	2
OW	2921	2989
OX	2650	2735
OY	2370	2439
OZ	2756	2803
PA	2785	2828
PB	2791	2834
PC	2841	2887
PD	2897	2938
PE	2836	2875
PF	2807	2843
PG	2795	2830
PH	2728	2759
PI	2896	2930
PJ	2917	2951
PK	2889	2896
PL	2909	2892
PM	3204	3176
PN	3419	3331
PO	3667	3594
PP	3689	3613
PQ	3684	3607
PR	3681	3604

APPENDIX D:

WindPRO v3.1, Decibel Module Calculation Results E-82: Worst Case

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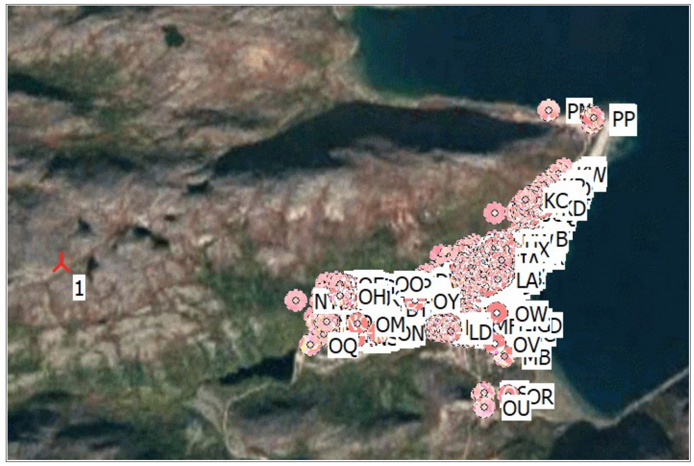
Jill / jbyrne@naturalforces.ca
Calculated:
1/26/2021 2:01 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

Noise calculation model:
ISO 9613-2 General
Wind speed:
4.0 m/s - 12.0 m/s, step 1.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones: 0.0 dB(A)
Height above ground level, when no value in NSA object:
4.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:50,000
New WTG   Noise sensitive area

WTGs

	Longitude	Latitude	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	[m/s]	[dB(A)]	
1	-61.738726° E	56.541033° N	235.0	ENERCON E-82 E4 2350 82....	Yes	ENERCON	E-82 E4-2,350	2,350	82.0	58.9	EMD	Level 0 - official - OM 0 - 06/2015	4.0	91.5	12.0	104.0	No g

h) Generic octave distribution used
g) Data calculated from data for other wind speed (uncertain)

Calculation Results

Sound level

Noise sensitive area No.	Name	Longitude	Latitude	Z	Imission height	Demands Min Noise	Sound level Max From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (1)	-61.710039° E	56.538514° N	46.2	4.5	40.0	26.6	1,282	Yes
B	Noise sensitive point: User defined (2)	-61.709058° E	56.538451° N	44.3	4.5	40.0	26.2	1,342	Yes
C	Noise sensitive point: User defined (3)	-61.708542° E	56.539667° N	52.2	4.5	40.0	26.1	1,357	Yes
D	Noise sensitive point: User defined (4)	-61.708691° E	56.539264° N	49.3	4.5	40.0	26.1	1,353	Yes
E	Noise sensitive point: User defined (5)	-61.708874° E	56.538804° N	46.0	4.5	40.0	26.2	1,348	Yes
F	Noise sensitive point: User defined (6)	-61.708016° E	56.539604° N	50.6	4.5	40.0	25.9	1,390	Yes
G	Noise sensitive point: User defined (7)	-61.708884° E	56.537909° N	40.5	4.5	40.0	26.1	1,364	Yes
H	Noise sensitive point: User defined (8)	-61.708891° E	56.537551° N	39.1	4.5	40.0	26.0	1,372	Yes
I	Noise sensitive point: User defined (9)	-61.707548° E	56.539512° N	48.3	4.5	40.0	25.7	1,419	Yes
J	Noise sensitive point: User defined (10)	-61.708332° E	56.539207° N	48.1	4.5	40.0	26.0	1,375	Yes
K	Noise sensitive point: User defined (11)	-61.708505° E	56.538736° N	45.0	4.5	40.0	26.0	1,371	Yes
L	Noise sensitive point: User defined (12)	-61.708712° E	56.538408° N	43.3	4.5	40.0	26.1	1,364	Yes
M	Noise sensitive point: User defined (13)	-61.708613° E	56.537891° N	40.0	4.5	40.0	26.0	1,381	Yes
N	Noise sensitive point: User defined (14)	-61.708576° E	56.537505° N	38.1	4.5	40.0	25.9	1,392	Yes
O	Noise sensitive point: User defined (15)	-61.708309° E	56.537866° N	39.3	4.5	40.0	25.8	1,400	Yes
P	Noise sensitive point: User defined (16)	-61.708419° E	56.538394° N	42.6	4.5	40.0	25.9	1,382	Yes
Q	Noise sensitive point: User defined (17)	-61.708109° E	56.538345° N	41.6	4.5	40.0	25.8	1,402	Yes
R	Noise sensitive point: User defined (18)	-61.708274° E	56.537513° N	37.4	4.5	40.0	25.8	1,410	Yes
S	Noise sensitive point: User defined (19)	-61.707720° E	56.539165° N	46.4	4.5	40.0	25.8	1,413	Yes
T	Noise sensitive point: User defined (20)	-61.707937° E	56.537887° N	38.5	4.5	40.0	25.7	1,421	Yes
U	Noise sensitive point: User defined (21)	-61.707972° E	56.537495° N	36.6	4.5	40.0	25.7	1,428	Yes
V	Noise sensitive point: User defined (22)	-61.708187° E	56.538731° N	44.3	4.5	40.0	25.9	1,390	Yes
W	Noise sensitive point: User defined (23)	-61.707436° E	56.539109° N	45.1	4.5	40.0	25.6	1,431	Yes
X	Noise sensitive point: User defined (24)	-61.707663° E	56.537541° N	36.1	4.5	40.0	25.6	1,446	Yes
Y	Noise sensitive point: User defined (25)	-61.707224° E	56.537551° N	35.1	4.5	40.0	25.4	1,472	Yes
Z	Noise sensitive point: User defined (26)	-61.707917° E	56.538698° N	43.4	4.5	40.0	25.8	1,407	Yes
AA	Noise sensitive point: User defined (27)	-61.707819° E	56.538346° N	40.8	4.5	40.0	25.7	1,419	Yes
AB	Noise sensitive point: User defined (28)	-61.707457° E	56.538231° N	39.2	4.5	40.0	25.6	1,443	Yes

To be continued on next page...

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DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
AC	Noise sensitive point: User defined (29)	-61.707459° E	56.537925° N	37.6	4.5	40.0	25.5	1,450	Yes
AD	Noise sensitive point: User defined (30)	-61.707017° E	56.537748° N	35.6	4.5	40.0	25.4	1,480	Yes
AE	Noise sensitive point: User defined (31)	-61.706885° E	56.537888° N	36.0	4.5	40.0	25.3	1,485	Yes
AF	Noise sensitive point: User defined (32)	-61.706676° E	56.538140° N	36.6	4.5	40.0	25.3	1,492	Yes
AG	Noise sensitive point: User defined (33)	-61.706673° E	56.537576° N	33.8	4.5	40.0	25.2	1,505	Yes
AH	Noise sensitive point: User defined (34)	-61.707409° E	56.537401° N	35.0	4.5	40.0	25.4	1,464	Yes
AI	Noise sensitive point: User defined (35)	-61.706891° E	56.537573° N	34.5	4.5	40.0	25.3	1,491	Yes
AJ	Noise sensitive point: User defined (36)	-61.706199° E	56.538120° N	35.0	4.5	40.0	25.1	1,522	Yes
AK	Noise sensitive point: User defined (37)	-61.705775° E	56.538106° N	33.1	4.5	40.0	25.0	1,548	Yes
AL	Noise sensitive point: User defined (38)	-61.707146° E	56.539090° N	44.0	4.5	40.0	25.5	1,449	Yes
AM	Noise sensitive point: User defined (39)	-61.706839° E	56.539095° N	42.8	4.5	40.0	25.4	1,468	Yes
AN	Noise sensitive point: User defined (40)	-61.707594° E	56.538691° N	42.6	4.5	40.0	25.7	1,427	Yes
AO	Noise sensitive point: User defined (41)	-61.707309° E	56.538634° N	41.3	4.5	40.0	25.6	1,445	Yes
AP	Noise sensitive point: User defined (42)	-61.707026° E	56.538575° N	40.0	4.5	40.0	25.4	1,464	Yes
AQ	Noise sensitive point: User defined (43)	-61.706735° E	56.538560° N	39.0	4.5	40.0	25.3	1,482	Yes
AR	Noise sensitive point: User defined (44)	-61.706527° E	56.539023° N	41.1	4.5	40.0	25.3	1,488	Yes
AS	Noise sensitive point: User defined (45)	-61.707291° E	56.539501° N	47.3	4.5	40.0	25.6	1,435	Yes
AT	Noise sensitive point: User defined (46)	-61.706976° E	56.539491° N	46.0	4.5	40.0	25.5	1,455	Yes
AU	Noise sensitive point: User defined (47)	-61.706616° E	56.539405° N	43.9	4.5	40.0	25.4	1,478	Yes
AV	Noise sensitive point: User defined (48)	-61.706196° E	56.538996° N	39.4	4.5	40.0	25.2	1,508	Yes
AW	Noise sensitive point: User defined (49)	-61.705815° E	56.538936° N	37.5	4.5	40.0	25.0	1,532	Yes
AX	Noise sensitive point: User defined (50)	-61.706347° E	56.539383° N	42.4	4.5	40.0	25.3	1,494	Yes
AY	Noise sensitive point: User defined (51)	-61.706037° E	56.539322° N	40.4	4.5	40.0	25.1	1,514	Yes
AZ	Noise sensitive point: User defined (52)	-61.705736° E	56.539263° N	38.7	4.5	40.0	25.0	1,533	Yes
BA	Noise sensitive point: User defined (53)	-61.705401° E	56.539310° N	37.3	4.5	40.0	24.9	1,553	Yes
BB	Noise sensitive point: User defined (54)	-61.706715° E	56.540447° N	52.3	4.5	40.0	25.4	1,464	Yes
BC	Noise sensitive point: User defined (55)	-61.706298° E	56.540405° N	49.5	4.5	40.0	25.3	1,490	Yes
BD	Noise sensitive point: User defined (56)	-61.705814° E	56.540351° N	46.2	4.5	40.0	25.1	1,520	Yes
BE	Noise sensitive point: User defined (57)	-61.705956° E	56.540044° N	44.6	4.5	40.0	25.2	1,512	Yes
BF	Noise sensitive point: User defined (58)	-61.705325° E	56.540258° N	42.7	4.5	40.0	24.9	1,550	Yes
BG	Noise sensitive point: User defined (59)	-61.704770° E	56.540129° N	38.9	4.5	40.0	24.7	1,585	Yes
BH	Noise sensitive point: User defined (60)	-61.705524° E	56.539931° N	41.5	4.5	40.0	25.0	1,540	Yes
BI	Noise sensitive point: User defined (61)	-61.705036° E	56.539694° N	37.6	4.5	40.0	24.8	1,572	Yes
BJ	Noise sensitive point: User defined (62)	-61.704063° E	56.540934° N	42.5	4.5	40.0	24.5	1,626	Yes
BK	Noise sensitive point: User defined (63)	-61.703730° E	56.540827° N	39.6	4.5	40.0	24.4	1,646	Yes
BL	Noise sensitive point: User defined (64)	-61.703295° E	56.540791° N	36.8	4.5	40.0	24.2	1,673	Yes
BM	Noise sensitive point: User defined (65)	-61.704011° E	56.539989° N	34.3	4.5	40.0	24.5	1,632	Yes
BN	Noise sensitive point: User defined (66)	-61.704208° E	56.539770° N	34.1	4.5	40.0	24.5	1,622	Yes
BO	Noise sensitive point: User defined (67)	-61.704315° E	56.539621° N	33.8	4.5	40.0	24.6	1,616	Yes
BP	Noise sensitive point: User defined (68)	-61.704445° E	56.539481° N	33.7	4.5	40.0	24.6	1,610	Yes
BQ	Noise sensitive point: User defined (69)	-61.704605° E	56.539301° N	33.5	4.5	40.0	24.6	1,602	Yes
BR	Noise sensitive point: User defined (70)	-61.704935° E	56.538979° N	33.7	4.5	40.0	24.7	1,586	Yes
BS	Noise sensitive point: User defined (71)	-61.705098° E	56.538845° N	33.9	4.5	40.0	24.8	1,577	Yes
BT	Noise sensitive point: User defined (72)	-61.703148° E	56.539644° N	27.9	4.5	40.0	24.2	1,688	Yes
BU	Noise sensitive point: User defined (73)	-61.703315° E	56.539393° N	27.6	4.5	40.0	24.2	1,680	Yes
BV	Noise sensitive point: User defined (74)	-61.703434° E	56.539268° N	27.6	4.5	40.0	24.2	1,674	Yes
BW	Noise sensitive point: User defined (75)	-61.703621° E	56.539086° N	27.7	4.5	40.0	24.3	1,665	Yes
BX	Noise sensitive point: User defined (76)	-61.703722° E	56.538918° N	27.3	4.5	40.0	24.3	1,661	Yes
BY	Noise sensitive point: User defined (77)	-61.704117° E	56.538482° N	27.1	4.5	40.0	24.4	1,642	Yes
BZ	Noise sensitive point: User defined (78)	-61.704404° E	56.538384° N	28.1	4.5	40.0	24.5	1,626	Yes
CA	Noise sensitive point: User defined (79)	-61.704689° E	56.538278° N	29.1	4.5	40.0	24.6	1,611	Yes
CB	Noise sensitive point: User defined (80)	-61.704955° E	56.538173° N	29.7	4.5	40.0	24.7	1,596	Yes
CC	Noise sensitive point: User defined (81)	-61.705375° E	56.538119° N	31.3	4.5	40.0	24.8	1,572	Yes
CD	Noise sensitive point: User defined (82)	-61.704355° E	56.537933° N	25.5	4.5	40.0	24.4	1,637	Yes
CE	Noise sensitive point: User defined (83)	-61.704704° E	56.537860° N	26.9	4.5	40.0	24.6	1,617	Yes
CF	Noise sensitive point: User defined (84)	-61.703215° E	56.538865° N	24.2	4.5	40.0	24.1	1,692	Yes
CG	Noise sensitive point: User defined (85)	-61.702470° E	56.539523° N	23.6	4.5	40.0	23.9	1,730	Yes
CH	Noise sensitive point: User defined (86)	-61.702574° E	56.539367° N	23.3	4.5	40.0	24.0	1,725	Yes
CI	Noise sensitive point: User defined (87)	-61.702264° E	56.539947° N	24.4	4.5	40.0	23.9	1,740	Yes
CJ	Noise sensitive point: User defined (88)	-61.702792° E	56.539999° N	27.6	4.5	40.0	24.1	1,707	Yes
CK	Noise sensitive point: User defined (89)	-61.702850° E	56.538797° N	21.6	4.5	40.0	24.0	1,715	Yes
CL	Noise sensitive point: User defined (90)	-61.702295° E	56.538615° N	17.8	4.5	40.0	23.8	1,752	Yes

To be continued on next page...

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DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

Noise sensitive area		Longitude	Latitude	Z	Imission height	Demands	Sound level		Demands fulfilled ?
No.	Name					Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
CM	Noise sensitive point: User defined (91)	-61.702470° E	56.538833° N	19.6	4.5	40.0	23.9	1,738	Yes
CN	Noise sensitive point: User defined (92)	-61.702190° E	56.538920° N	18.7	4.5	40.0	23.8	1,754	Yes
CO	Noise sensitive point: User defined (93)	-61.701744° E	56.538748° N	15.7	4.5	40.0	23.6	1,784	Yes
CP	Noise sensitive point: User defined (94)	-61.701890° E	56.539021° N	17.6	4.5	40.0	23.7	1,771	Yes
CQ	Noise sensitive point: User defined (95)	-61.701437° E	56.538811° N	15.0	4.5	40.0	23.6	1,802	Yes
CR	Noise sensitive point: User defined (96)	-61.701635° E	56.539082° N	16.6	4.5	40.0	23.6	1,786	Yes
CS	Noise sensitive point: User defined (97)	-61.701179° E	56.538943° N	15.0	4.5	40.0	23.5	1,816	Yes
CT	Noise sensitive point: User defined (98)	-61.700960° E	56.539053° N	15.0	4.5	40.0	23.4	1,828	Yes
CU	Noise sensitive point: User defined (99)	-61.701344° E	56.539233° N	16.0	4.5	40.0	23.5	1,802	Yes
CV	Noise sensitive point: User defined (100)	-61.702000° E	56.540159° N	24.1	4.5	40.0	23.8	1,755	Yes
CW	Noise sensitive point: User defined (101)	-61.701105° E	56.539587° N	16.9	4.5	40.0	23.5	1,813	Yes
CX	Noise sensitive point: User defined (102)	-61.700803° E	56.539149° N	15.0	4.5	40.0	23.4	1,836	Yes
CY	Noise sensitive point: User defined (103)	-61.700892° E	56.539730° N	16.8	4.5	40.0	23.4	1,825	Yes
CZ	Noise sensitive point: User defined (104)	-61.702630° E	56.540614° N	31.0	4.5	40.0	24.0	1,715	Yes
DA	Noise sensitive point: User defined (105)	-61.702080° E	56.540676° N	28.4	4.5	40.0	23.8	1,748	Yes
DB	Noise sensitive point: User defined (106)	-61.701762° E	56.540383° N	24.3	4.5	40.0	23.7	1,769	Yes
DC	Noise sensitive point: User defined (107)	-61.701490° E	56.540513° N	24.1	4.5	40.0	23.6	1,785	Yes
DD	Noise sensitive point: User defined (108)	-61.701726° E	56.540844° N	28.2	4.5	40.0	23.7	1,769	Yes
DE	Noise sensitive point: User defined (109)	-61.700282° E	56.539722° N	14.3	4.5	40.0	23.2	1,863	Yes
DF	Noise sensitive point: User defined (110)	-61.700404° E	56.539554° N	13.8	4.5	40.0	23.3	1,857	Yes
DG	Noise sensitive point: User defined (111)	-61.700082° E	56.539955° N	14.8	4.5	40.0	23.2	1,874	Yes
DH	Noise sensitive point: User defined (112)	-61.701206° E	56.540664° N	24.1	4.5	40.0	23.6	1,802	Yes
DI	Noise sensitive point: User defined (113)	-61.701468° E	56.540940° N	27.7	4.5	40.0	23.6	1,785	Yes
DJ	Noise sensitive point: User defined (114)	-61.700227° E	56.540693° N	20.0	4.5	40.0	23.2	1,862	Yes
DK	Noise sensitive point: User defined (115)	-61.701207° E	56.541049° N	27.4	4.5	40.0	23.6	1,801	Yes
DL	Noise sensitive point: User defined (116)	-61.700230° E	56.541078° N	23.1	4.5	40.0	23.2	1,861	Yes
DM	Noise sensitive point: User defined (117)	-61.700684° E	56.540375° N	19.7	4.5	40.0	23.4	1,835	Yes
DN	Noise sensitive point: User defined (118)	-61.700602° E	56.539995° N	17.1	4.5	40.0	23.3	1,842	Yes
DO	Noise sensitive point: User defined (119)	-61.699170° E	56.540439° N	14.0	4.5	40.0	22.9	1,928	Yes
DP	Noise sensitive point: User defined (120)	-61.700582° E	56.540833° N	22.7	4.5	40.0	23.4	1,840	Yes
DQ	Noise sensitive point: User defined (121)	-61.700831° E	56.540928° N	24.5	4.5	40.0	23.4	1,824	Yes
DR	Noise sensitive point: User defined (122)	-61.700711° E	56.541274° N	27.0	4.5	40.0	23.4	1,832	Yes
DS	Noise sensitive point: User defined (123)	-61.699803° E	56.540759° N	18.6	4.5	40.0	23.1	1,888	Yes
DT	Noise sensitive point: User defined (124)	-61.699554° E	56.540899° N	18.5	4.5	40.0	23.0	1,903	Yes
DU	Noise sensitive point: User defined (125)	-61.700073° E	56.541243° N	23.6	4.5	40.0	23.2	1,871	Yes
DV	Noise sensitive point: User defined (126)	-61.700504° E	56.541408° N	27.4	4.5	40.0	23.3	1,845	Yes
DW	Noise sensitive point: User defined (127)	-61.700194° E	56.541514° N	26.8	4.5	40.0	23.2	1,864	Yes
DX	Noise sensitive point: User defined (128)	-61.699310° E	56.541007° N	18.3	4.5	40.0	23.0	1,918	Yes
DY	Noise sensitive point: User defined (129)	-61.699812° E	56.541378° N	23.4	4.5	40.0	23.1	1,887	Yes
DZ	Noise sensitive point: User defined (130)	-61.699905° E	56.541639° N	26.4	4.5	40.0	23.1	1,882	Yes
EA	Noise sensitive point: User defined (131)	-61.699529° E	56.541469° N	22.7	4.5	40.0	23.0	1,905	Yes
EB	Noise sensitive point: User defined (132)	-61.698492° E	56.541361° N	18.2	4.5	40.0	22.7	1,968	Yes
EC	Noise sensitive point: User defined (133)	-61.699214° E	56.541547° N	21.9	4.5	40.0	22.9	1,924	Yes
ED	Noise sensitive point: User defined (134)	-61.699177° E	56.541939° N	25.3	4.5	40.0	22.9	1,928	Yes
EE	Noise sensitive point: User defined (135)	-61.698905° E	56.541991° N	24.8	4.5	40.0	22.8	1,945	Yes
EF	Noise sensitive point: User defined (136)	-61.698606° E	56.542123° N	25.2	4.5	40.0	22.7	1,964	Yes
EG	Noise sensitive point: User defined (137)	-61.698384° E	56.542128° N	24.5	4.5	40.0	22.7	1,978	Yes
EH	Noise sensitive point: User defined (138)	-61.698246° E	56.542205° N	24.8	4.5	40.0	22.6	1,987	Yes
EI	Noise sensitive point: User defined (139)	-61.698036° E	56.542207° N	24.2	4.5	40.0	22.6	1,999	Yes
EJ	Noise sensitive point: User defined (140)	-61.697811° E	56.542252° N	24.0	4.5	40.0	22.5	2,014	Yes
EK	Noise sensitive point: User defined (141)	-61.699668° E	56.540027° N	13.6	4.5	40.0	23.0	1,899	Yes
EL	Noise sensitive point: User defined (142)	-61.697427° E	56.541351° N	15.3	4.5	40.0	22.4	2,034	Yes
EM	Noise sensitive point: User defined (143)	-61.697105° E	56.541050° N	12.4	4.5	40.0	22.3	2,053	Yes
EN	Noise sensitive point: User defined (144)	-61.696244° E	56.541214° N	10.1	4.5	40.0	22.0	2,106	Yes
EO	Noise sensitive point: User defined (145)	-61.697427° E	56.541914° N	19.4	4.5	40.0	22.4	2,035	Yes
EP	Noise sensitive point: User defined (146)	-61.698630° E	56.541678° N	21.0	4.5	40.0	22.7	1,960	Yes
EQ	Noise sensitive point: User defined (147)	-61.698232° E	56.541808° N	21.1	4.5	40.0	22.6	1,985	Yes
ER	Noise sensitive point: User defined (148)	-61.697525° E	56.542290° N	23.4	4.5	40.0	22.4	2,031	Yes
ES	Noise sensitive point: User defined (149)	-61.697827° E	56.543205° N	35.4	4.5	40.0	22.5	2,020	Yes
ET	Noise sensitive point: User defined (150)	-61.696856° E	56.543205° N	29.2	4.5	40.0	22.2	2,079	Yes
EU	Noise sensitive point: User defined (151)	-61.697460° E	56.542509° N	25.1	4.5	40.0	22.4	2,037	Yes
EV	Noise sensitive point: User defined (152)	-61.696834° E	56.542484° N	21.5	4.5	40.0	22.2	2,075	Yes

To be continued on next page...

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Calculated:
1/26/2021 2:01 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
EW	Noise sensitive point: User defined (153)	-61.696948° E	56.542143° N	19.0	4.5	40.0	22.2	2,066	Yes
EX	Noise sensitive point: User defined (154)	-61.697037° E	56.541695° N	16.1	4.5	40.0	22.3	2,058	Yes
EY	Noise sensitive point: User defined (155)	-61.696595° E	56.542249° N	18.2	4.5	40.0	22.1	2,088	Yes
EZ	Noise sensitive point: User defined (156)	-61.696321° E	56.541949° N	14.6	4.5	40.0	22.1	2,103	Yes
FA	Noise sensitive point: User defined (157)	-61.696201° E	56.541551° N	11.9	4.5	40.0	22.0	2,109	Yes
FB	Noise sensitive point: User defined (158)	-61.695789° E	56.541669° N	11.2	4.5	40.0	21.9	2,135	Yes
FC	Noise sensitive point: User defined (159)	-61.695891° E	56.542113° N	14.0	4.5	40.0	21.9	2,131	Yes
FD	Noise sensitive point: User defined (160)	-61.696197° E	56.542379° N	17.2	4.5	40.0	22.0	2,113	Yes
FE	Noise sensitive point: User defined (161)	-61.696178° E	56.542799° N	20.2	4.5	40.0	22.0	2,117	Yes
FF	Noise sensitive point: User defined (162)	-61.695906° E	56.542473° N	16.4	4.5	40.0	21.9	2,132	Yes
FG	Noise sensitive point: User defined (163)	-61.695547° E	56.542125° N	13.3	4.5	40.0	21.8	2,152	Yes
FH	Noise sensitive point: User defined (164)	-61.695385° E	56.541820° N	11.2	4.5	40.0	21.8	2,160	Yes
FI	Noise sensitive point: User defined (165)	-61.695094° E	56.541579° N	9.3	4.5	40.0	21.7	2,178	Yes
FJ	Noise sensitive point: User defined (166)	-61.695544° E	56.542599° N	16.1	4.5	40.0	21.8	2,155	Yes
FK	Noise sensitive point: User defined (167)	-61.694962° E	56.542042° N	11.3	4.5	40.0	21.7	2,187	Yes
FL	Noise sensitive point: User defined (168)	-61.695623° E	56.543320° N	22.2	4.5	40.0	21.8	2,156	Yes
FM	Noise sensitive point: User defined (169)	-61.694127° E	56.541196° N	5.1	4.5	40.0	21.4	2,236	Yes
FN	Noise sensitive point: User defined (170)	-61.693852° E	56.541214° N	5.0	4.5	40.0	21.4	2,253	Yes
FO	Noise sensitive point: User defined (171)	-61.693177° E	56.541290° N	5.0	4.5	40.0	21.2	2,295	Yes
FP	Noise sensitive point: User defined (172)	-61.693653° E	56.541515° N	5.4	4.5	40.0	21.3	2,266	Yes
FQ	Noise sensitive point: User defined (173)	-61.694256° E	56.541308° N	6.0	4.5	40.0	21.5	2,229	Yes
FR	Noise sensitive point: User defined (174)	-61.694580° E	56.541152° N	5.9	4.5	40.0	21.6	2,209	Yes
FS	Noise sensitive point: User defined (175)	-61.694953° E	56.541175° N	6.7	4.5	40.0	21.7	2,186	Yes
FT	Noise sensitive point: User defined (176)	-61.694489° E	56.541546° N	7.8	4.5	40.0	21.5	2,215	Yes
FU	Noise sensitive point: User defined (177)	-61.694160° E	56.541712° N	7.7	4.5	40.0	21.4	2,235	Yes
FV	Noise sensitive point: User defined (178)	-61.694826° E	56.541736° N	9.6	4.5	40.0	21.6	2,194	Yes
FW	Noise sensitive point: User defined (179)	-61.693833° E	56.541905° N	7.6	4.5	40.0	21.3	2,256	Yes
FX	Noise sensitive point: User defined (180)	-61.693499° E	56.542042° N	7.4	4.5	40.0	21.2	2,277	Yes
FY	Noise sensitive point: User defined (181)	-61.694620° E	56.542138° N	10.8	4.5	40.0	21.6	2,209	Yes
FZ	Noise sensitive point: User defined (182)	-61.694165° E	56.542112° N	9.4	4.5	40.0	21.4	2,237	Yes
GA	Noise sensitive point: User defined (183)	-61.693720° E	56.542248° N	8.9	4.5	40.0	21.3	2,265	Yes
GB	Noise sensitive point: User defined (184)	-61.695177° E	56.542262° N	12.9	4.5	40.0	21.7	2,175	Yes
GC	Noise sensitive point: User defined (185)	-61.694784° E	56.542414° N	12.6	4.5	40.0	21.6	2,200	Yes
GD	Noise sensitive point: User defined (186)	-61.695143° E	56.542454° N	13.8	4.5	40.0	21.7	2,179	Yes
GE	Noise sensitive point: User defined (187)	-61.694080° E	56.542328° N	10.2	4.5	40.0	21.4	2,243	Yes
GF	Noise sensitive point: User defined (188)	-61.693552° E	56.542507° N	9.6	4.5	40.0	21.3	2,277	Yes
GG	Noise sensitive point: User defined (189)	-61.695103° E	56.542750° N	15.6	4.5	40.0	21.7	2,183	Yes
GH	Noise sensitive point: User defined (190)	-61.694836° E	56.542851° N	15.3	4.5	40.0	21.6	2,200	Yes
GI	Noise sensitive point: User defined (191)	-61.695366° E	56.542992° N	18.3	4.5	40.0	21.7	2,169	Yes
GJ	Noise sensitive point: User defined (192)	-61.695022° E	56.543112° N	17.7	4.5	40.0	21.6	2,191	Yes
GK	Noise sensitive point: User defined (193)	-61.695219° E	56.543465° N	21.3	4.5	40.0	21.7	2,182	Yes
GL	Noise sensitive point: User defined (194)	-61.695096° E	56.543773° N	24.4	4.5	40.0	21.6	2,194	Yes
GM	Noise sensitive point: User defined (195)	-61.695356° E	56.543701° N	25.0	4.5	40.0	21.7	2,177	Yes
GN	Noise sensitive point: User defined (196)	-61.694833° E	56.543914° N	24.5	4.5	40.0	21.6	2,211	Yes
GO	Noise sensitive point: User defined (197)	-61.694432° E	56.544066° N	24.0	4.5	40.0	21.4	2,238	Yes
GP	Noise sensitive point: User defined (198)	-61.694028° E	56.543840° N	20.0	4.5	40.0	21.3	2,260	Yes
GQ	Noise sensitive point: User defined (199)	-61.694430° E	56.543657° N	19.7	4.5	40.0	21.5	2,233	Yes
GR	Noise sensitive point: User defined (200)	-61.694815° E	56.543513° N	19.7	4.5	40.0	21.6	2,208	Yes
GS	Noise sensitive point: User defined (201)	-61.694682° E	56.543189° N	17.1	4.5	40.0	21.5	2,212	Yes
GT	Noise sensitive point: User defined (202)	-61.694294° E	56.543311° N	16.6	4.5	40.0	21.4	2,237	Yes
GU	Noise sensitive point: User defined (203)	-61.694039° E	56.543398° N	16.4	4.5	40.0	21.4	2,254	Yes
GV	Noise sensitive point: User defined (204)	-61.693728° E	56.543481° N	15.9	4.5	40.0	21.3	2,274	Yes
GW	Noise sensitive point: User defined (205)	-61.694211° E	56.543040° N	14.6	4.5	40.0	21.4	2,240	Yes
GX	Noise sensitive point: User defined (206)	-61.693843° E	56.543133° N	14.1	4.5	40.0	21.3	2,263	Yes
GY	Noise sensitive point: User defined (207)	-61.693678° E	56.543225° N	14.1	4.5	40.0	21.3	2,274	Yes
GZ	Noise sensitive point: User defined (208)	-61.693350° E	56.543291° N	13.6	4.5	40.0	21.2	2,295	Yes
HA	Noise sensitive point: User defined (209)	-61.693595° E	56.543141° N	13.4	4.5	40.0	21.2	2,279	Yes
HB	Noise sensitive point: User defined (210)	-61.693722° E	56.542940° N	12.6	4.5	40.0	21.3	2,269	Yes
HC	Noise sensitive point: User defined (211)	-61.692342° E	56.542869° N	8.7	4.5	40.0	20.9	2,353	Yes
HD	Noise sensitive point: User defined (212)	-61.691665° E	56.542521° N	5.8	4.5	40.0	20.7	2,393	Yes
HE	Noise sensitive point: User defined (213)	-61.693823° E	56.542413° N	9.9	4.5	40.0	21.3	2,259	Yes
HF	Noise sensitive point: User defined (214)	-61.694194° E	56.542661° N	12.3	4.5	40.0	21.4	2,238	Yes

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1/26/2021 2:01 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
HG	Noise sensitive point: User defined (215)	-61.694374° E	56.542242° N	10.6	4.5	40.0	21.5	2,225	Yes
HH	Noise sensitive point: User defined (216)	-61.693786° E	56.542762° N	11.7	4.5	40.0	21.3	2,264	Yes
HI	Noise sensitive point: User defined (217)	-61.693450° E	56.542914° N	11.6	4.5	40.0	21.2	2,286	Yes
HJ	Noise sensitive point: User defined (218)	-61.693051° E	56.543069° N	11.5	4.5	40.0	21.1	2,311	Yes
HK	Noise sensitive point: User defined (219)	-61.691425° E	56.543720° N	10.9	4.5	40.0	20.6	2,417	Yes
HL	Noise sensitive point: User defined (220)	-61.691592° E	56.543585° N	10.6	4.5	40.0	20.7	2,406	Yes
HM	Noise sensitive point: User defined (221)	-61.692081° E	56.543956° N	14.4	4.5	40.0	20.8	2,380	Yes
HN	Noise sensitive point: User defined (222)	-61.692151° E	56.543388° N	11.0	4.5	40.0	20.8	2,369	Yes
HO	Noise sensitive point: User defined (223)	-61.692388° E	56.543617° N	13.1	4.5	40.0	20.9	2,357	Yes
HP	Noise sensitive point: User defined (224)	-61.692504° E	56.543225° N	11.0	4.5	40.0	20.9	2,346	Yes
HQ	Noise sensitive point: User defined (225)	-61.692638° E	56.543465° N	12.8	4.5	40.0	21.0	2,340	Yes
HR	Noise sensitive point: User defined (226)	-61.692894° E	56.543396° N	13.0	4.5	40.0	21.0	2,324	Yes
HS	Noise sensitive point: User defined (227)	-61.692987° E	56.543487° N	13.9	4.5	40.0	21.1	2,319	Yes
HT	Noise sensitive point: User defined (228)	-61.692359° E	56.544135° N	16.7	4.5	40.0	20.9	2,366	Yes
HU	Noise sensitive point: User defined (229)	-61.691411° E	56.544154° N	13.6	4.5	40.0	20.6	2,424	Yes
HV	Noise sensitive point: User defined (230)	-61.691297° E	56.544314° N	14.3	4.5	40.0	20.6	2,433	Yes
HW	Noise sensitive point: User defined (231)	-61.691174° E	56.544437° N	14.6	4.5	40.0	20.5	2,442	Yes
HX	Noise sensitive point: User defined (232)	-61.690848° E	56.543976° N	10.6	4.5	40.0	20.5	2,456	Yes
HY	Noise sensitive point: User defined (233)	-61.690756° E	56.543618° N	8.5	4.5	40.0	20.5	2,457	Yes
HZ	Noise sensitive point: User defined (234)	-61.690949° E	56.543366° N	7.7	4.5	40.0	20.5	2,443	Yes
IA	Noise sensitive point: User defined (235)	-61.691277° E	56.543200° N	7.7	4.5	40.0	20.6	2,421	Yes
IB	Noise sensitive point: User defined (236)	-61.691510° E	56.543103° N	7.8	4.5	40.0	20.7	2,406	Yes
IC	Noise sensitive point: User defined (237)	-61.691677° E	56.543162° N	8.5	4.5	40.0	20.7	2,396	Yes
ID	Noise sensitive point: User defined (238)	-61.691041° E	56.542533° N	5.0	4.5	40.0	20.6	2,431	Yes
IE	Noise sensitive point: User defined (239)	-61.691200° E	56.542777° N	5.5	4.5	40.0	20.6	2,423	Yes
IF	Noise sensitive point: User defined (240)	-61.690945° E	56.542952° N	5.7	4.5	40.0	20.5	2,440	Yes
IG	Noise sensitive point: User defined (241)	-61.690710° E	56.543114° N	5.7	4.5	40.0	20.5	2,455	Yes
IH	Noise sensitive point: User defined (242)	-61.690097° E	56.543284° N	5.0	4.5	40.0	20.3	2,494	Yes
II	Noise sensitive point: User defined (243)	-61.689352° E	56.543510° N	5.0	4.5	40.0	20.1	2,542	Yes
IJ	Noise sensitive point: User defined (244)	-61.690320° E	56.543768° N	7.8	4.5	40.0	20.3	2,486	Yes
IK	Noise sensitive point: User defined (245)	-61.688625° E	56.543568° N	5.0	4.5	40.0	19.9	2,587	Yes
IL	Noise sensitive point: User defined (246)	-61.689852° E	56.543773° N	6.3	4.5	40.0	20.2	2,514	Yes
IM	Noise sensitive point: User defined (247)	-61.690250° E	56.544171° N	9.7	4.5	40.0	20.3	2,495	Yes
IN	Noise sensitive point: User defined (248)	-61.689930° E	56.543998° N	7.7	4.5	40.0	20.2	2,512	Yes
IO	Noise sensitive point: User defined (249)	-61.689677° E	56.544130° N	7.6	4.5	40.0	20.2	2,529	Yes
IP	Noise sensitive point: User defined (250)	-61.689019° E	56.543896° N	5.0	4.5	40.0	20.0	2,567	Yes
IQ	Noise sensitive point: User defined (251)	-61.689978° E	56.544320° N	9.7	4.5	40.0	20.2	2,513	Yes
IR	Noise sensitive point: User defined (252)	-61.688652° E	56.544090° N	5.0	4.5	40.0	19.9	2,591	Yes
IS	Noise sensitive point: User defined (253)	-61.689859° E	56.544543° N	10.4	4.5	40.0	20.2	2,524	Yes
IT	Noise sensitive point: User defined (254)	-61.690107° E	56.544648° N	12.0	4.5	40.0	20.2	2,510	Yes
IU	Noise sensitive point: User defined (255)	-61.689321° E	56.544423° N	7.9	4.5	40.0	20.1	2,555	Yes
IV	Noise sensitive point: User defined (256)	-61.689501° E	56.544774° N	10.3	4.5	40.0	20.1	2,549	Yes
IW	Noise sensitive point: User defined (257)	-61.689164° E	56.544548° N	7.8	4.5	40.0	20.0	2,566	Yes
IX	Noise sensitive point: User defined (258)	-61.688987° E	56.544693° N	7.9	4.5	40.0	20.0	2,579	Yes
IY	Noise sensitive point: User defined (259)	-61.689626° E	56.545043° N	12.3	4.5	40.0	20.1	2,546	Yes
IZ	Noise sensitive point: User defined (260)	-61.688825° E	56.544474° N	6.2	4.5	40.0	19.9	2,586	Yes
JA	Noise sensitive point: User defined (262)	-61.688620° E	56.544588° N	5.7	4.5	40.0	19.9	2,600	Yes
JB	Noise sensitive point: User defined (263)	-61.688512° E	56.544749° N	5.9	4.5	40.0	19.8	2,609	Yes
JC	Noise sensitive point: User defined (266)	-61.688702° E	56.544894° N	7.6	4.5	40.0	19.9	2,600	Yes
JD	Noise sensitive point: User defined (267)	-61.688264° E	56.545456° N	7.6	4.5	40.0	19.7	2,635	Yes
JE	Noise sensitive point: User defined (268)	-61.688483° E	56.545123° N	7.4	4.5	40.0	19.8	2,616	Yes
JF	Noise sensitive point: User defined (269)	-61.688656° E	56.545486° N	10.1	4.5	40.0	19.8	2,612	Yes
JG	Noise sensitive point: User defined (270)	-61.688770° E	56.545305° N	9.9	4.5	40.0	19.9	2,602	Yes
JH	Noise sensitive point: User defined (271)	-61.688482° E	56.545870° N	10.7	4.5	40.0	19.8	2,629	Yes
JI	Noise sensitive point: User defined (272)	-61.688982° E	56.546012° N	14.4	4.5	40.0	19.9	2,602	Yes
JJ	Noise sensitive point: User defined (273)	-61.689334° E	56.546113° N	17.4	4.5	40.0	19.9	2,583	Yes
JK	Noise sensitive point: User defined (274)	-61.689711° E	56.546238° N	20.6	4.5	40.0	20.0	2,562	Yes
JL	Noise sensitive point: User defined (275)	-61.690052° E	56.546313° N	23.7	4.5	40.0	20.1	2,543	Yes
JM	Noise sensitive point: User defined (276)	-61.688297° E	56.546059° N	10.5	4.5	40.0	19.7	2,644	Yes
JN	Noise sensitive point: User defined (277)	-61.688753° E	56.546221° N	14.1	4.5	40.0	19.8	2,620	Yes
JO	Noise sensitive point: User defined (278)	-61.689196° E	56.546319° N	17.8	4.5	40.0	19.9	2,595	Yes
JP	Noise sensitive point: User defined (279)	-61.689492° E	56.546398° N	20.3	4.5	40.0	20.0	2,579	Yes

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DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
JQ	Noise sensitive point: User defined (280)	-61.688114° E	56.546306° N	10.6	4.5	40.0	19.6	2,660	Yes
JR	Noise sensitive point: User defined (281)	-61.688575° E	56.546418° N	14.1	4.5	40.0	19.7	2,635	Yes
JS	Noise sensitive point: User defined (282)	-61.688974° E	56.546540° N	17.6	4.5	40.0	19.8	2,613	Yes
JT	Noise sensitive point: User defined (283)	-61.689338° E	56.546623° N	20.8	4.5	40.0	19.9	2,593	Yes
JU	Noise sensitive point: User defined (284)	-61.689690° E	56.546714° N	24.2	4.5	40.0	20.0	2,574	Yes
JV	Noise sensitive point: User defined (285)	-61.687997° E	56.546543° N	11.1	4.5	40.0	19.6	2,672	Yes
JW	Noise sensitive point: User defined (286)	-61.688448° E	56.546630° N	14.5	4.5	40.0	19.7	2,647	Yes
JX	Noise sensitive point: User defined (287)	-61.688786° E	56.546725° N	17.4	4.5	40.0	19.8	2,629	Yes
JY	Noise sensitive point: User defined (288)	-61.689109° E	56.546842° N	20.7	4.5	40.0	19.8	2,612	Yes
JZ	Noise sensitive point: User defined (289)	-61.687771° E	56.546799° N	11.5	4.5	40.0	19.5	2,692	Yes
KA	Noise sensitive point: User defined (290)	-61.688173° E	56.546869° N	14.3	4.5	40.0	19.6	2,669	Yes
KB	Noise sensitive point: User defined (291)	-61.688514° E	56.546977° N	17.5	4.5	40.0	19.7	2,651	Yes
KC	Noise sensitive point: User defined (292)	-61.689141° E	56.547171° N	24.8	4.5	40.0	19.8	2,618	Yes
KD	Noise sensitive point: User defined (293)	-61.687240° E	56.546747° N	8.5	4.5	40.0	19.4	2,722	Yes
KE	Noise sensitive point: User defined (294)	-61.687551° E	56.547122° N	12.6	4.5	40.0	19.4	2,712	Yes
KF	Noise sensitive point: User defined (295)	-61.687879° E	56.547172° N	14.8	4.5	40.0	19.5	2,694	Yes
KG	Noise sensitive point: User defined (296)	-61.688184° E	56.547249° N	17.7	4.5	40.0	19.6	2,677	Yes
KH	Noise sensitive point: User defined (297)	-61.688469° E	56.547408° N	22.1	4.5	40.0	19.6	2,664	Yes
KI	Noise sensitive point: User defined (298)	-61.687002° E	56.547185° N	10.1	4.5	40.0	19.3	2,747	Yes
KJ	Noise sensitive point: User defined (299)	-61.687372° E	56.547360° N	13.5	4.5	40.0	19.4	2,729	Yes
KK	Noise sensitive point: User defined (300)	-61.687666° E	56.547417° N	15.7	4.5	40.0	19.4	2,713	Yes
KL	Noise sensitive point: User defined (301)	-61.687773° E	56.547674° N	19.1	4.5	40.0	19.4	2,712	Yes
KM	Noise sensitive point: User defined (302)	-61.687236° E	56.547504° N	13.9	4.5	40.0	19.3	2,740	Yes
KN	Noise sensitive point: User defined (303)	-61.687006° E	56.547820° N	15.0	4.5	40.0	19.2	2,762	Yes
KO	Noise sensitive point: User defined (304)	-61.687491° E	56.547961° N	20.2	4.5	40.0	19.3	2,737	Yes
KP	Noise sensitive point: User defined (305)	-61.687301° E	56.548142° N	21.1	4.5	40.0	19.3	2,753	Yes
KQ	Noise sensitive point: User defined (306)	-61.686938° E	56.548009° N	16.5	4.5	40.0	19.2	2,771	Yes
KR	Noise sensitive point: User defined (307)	-61.686857° E	56.548366° N	19.7	4.5	40.0	19.1	2,785	Yes
KS	Noise sensitive point: User defined (308)	-61.686549° E	56.548285° N	15.7	4.5	40.0	19.1	2,801	Yes
KT	Noise sensitive point: User defined (309)	-61.685326° E	56.549292° N	16.9	4.5	40.0	18.7	2,903	Yes
KU	Noise sensitive point: User defined (310)	-61.685430° E	56.548669° N	10.9	4.5	40.0	18.8	2,879	Yes
KV	Noise sensitive point: User defined (311)	-61.685622° E	56.549117° N	17.4	4.5	40.0	18.8	2,880	Yes
KW	Noise sensitive point: User defined (312)	-61.685883° E	56.548970° N	18.0	4.5	40.0	18.8	2,860	Yes
KX	Noise sensitive point: User defined (313)	-61.686048° E	56.548873° N	18.4	4.5	40.0	18.9	2,848	Yes
KY	Noise sensitive point: User defined (314)	-61.686207° E	56.548753° N	18.3	4.5	40.0	18.9	2,835	Yes
KZ	Noise sensitive point: User defined (315)	-61.690946° E	56.542205° N	5.0	4.5	40.0	20.6	2,435	Yes
LA	Noise sensitive point: User defined (316)	-61.691518° E	56.541952° N	5.0	4.5	40.0	20.7	2,399	Yes
LB	Noise sensitive point: User defined (317)	-61.691132° E	56.542072° N	5.0	4.5	40.0	20.6	2,423	Yes
LC	Noise sensitive point: User defined (318)	-61.696277° E	56.538851° N	14.3	4.5	40.0	22.0	2,116	Yes
LD	Noise sensitive point: User defined (319)	-61.696125° E	56.538474° N	18.9	4.5	40.0	21.9	2,130	Yes
LE	Noise sensitive point: User defined (320)	-61.696595° E	56.538750° N	15.3	4.5	40.0	22.1	2,098	Yes
LF	Noise sensitive point: User defined (321)	-61.696611° E	56.538441° N	19.6	4.5	40.0	22.1	2,101	Yes
LG	Noise sensitive point: User defined (322)	-61.696858° E	56.538774° N	14.9	4.5	40.0	22.2	2,082	Yes
LH	Noise sensitive point: User defined (323)	-61.696988° E	56.538427° N	19.7	4.5	40.0	22.2	2,078	Yes
LI	Noise sensitive point: User defined (324)	-61.697186° E	56.538755° N	14.9	4.5	40.0	22.3	2,062	Yes
LJ	Noise sensitive point: User defined (325)	-61.697240° E	56.538479° N	18.8	4.5	40.0	22.3	2,062	Yes
LK	Noise sensitive point: User defined (326)	-61.697490° E	56.538765° N	14.5	4.5	40.0	22.3	2,043	Yes
LL	Noise sensitive point: User defined (327)	-61.697487° E	56.538476° N	18.8	4.5	40.0	22.3	2,047	Yes
LM	Noise sensitive point: User defined (328)	-61.697795° E	56.538706° N	14.8	4.5	40.0	22.4	2,025	Yes
LN	Noise sensitive point: User defined (329)	-61.697753° E	56.538461° N	18.6	4.5	40.0	22.4	2,031	Yes
LO	Noise sensitive point: User defined (330)	-61.698093° E	56.538461° N	17.6	4.5	40.0	22.5	2,010	Yes
LP	Noise sensitive point: User defined (331)	-61.695848° E	56.539518° N	9.3	4.5	40.0	21.9	2,137	Yes
LQ	Noise sensitive point: User defined (332)	-61.695799° E	56.538488° N	18.6	4.5	40.0	21.8	2,150	Yes
LR	Noise sensitive point: User defined (333)	-61.695494° E	56.538579° N	17.5	4.5	40.0	21.8	2,168	Yes
LS	Noise sensitive point: User defined (334)	-61.695272° E	56.538639° N	16.8	4.5	40.0	21.7	2,180	Yes
LT	Noise sensitive point: User defined (335)	-61.694789° E	56.538839° N	13.8	4.5	40.0	21.6	2,208	Yes
LU	Noise sensitive point: User defined (336)	-61.694566° E	56.538591° N	15.7	4.5	40.0	21.5	2,224	Yes
LV	Noise sensitive point: User defined (337)	-61.694210° E	56.538152° N	20.9	4.5	40.0	21.4	2,251	Yes
LW	Noise sensitive point: User defined (338)	-61.694394° E	56.538349° N	18.3	4.5	40.0	21.4	2,238	Yes
LX	Noise sensitive point: User defined (339)	-61.695398° E	56.538212° N	23.0	4.5	40.0	21.7	2,178	Yes
LY	Noise sensitive point: User defined (340)	-61.694910° E	56.538300° N	20.3	4.5	40.0	21.6	2,207	Yes
LZ	Noise sensitive point: User defined (341)	-61.693775° E	56.538241° N	18.5	4.5	40.0	21.3	2,277	Yes

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
MA	Noise sensitive point: User defined (342)	-61.693404° E	56.538355° N	15.9	4.5	40.0	21.2	2,298	Yes
MB	Noise sensitive point: User defined (343)	-61.690123° E	56.537061° N	27.7	4.5	40.0	20.2	2,517	Yes
MC	Noise sensitive point: User defined (344)	-61.694017° E	56.538812° N	12.3	4.5	40.0	21.4	2,255	Yes
MD	Noise sensitive point: User defined (345)	-61.693898° E	56.538479° N	15.1	4.5	40.0	21.3	2,266	Yes
ME	Noise sensitive point: User defined (346)	-61.693511° E	56.538630° N	13.0	4.5	40.0	21.2	2,288	Yes
MF	Noise sensitive point: User defined (347)	-61.693609° E	56.538898° N	10.6	4.5	40.0	21.2	2,279	Yes
MG	Noise sensitive point: User defined (348)	-61.692378° E	56.538774° N	10.1	4.5	40.0	20.9	2,356	Yes
MH	Noise sensitive point: User defined (349)	-61.694080° E	56.539043° N	10.4	4.5	40.0	21.4	2,249	Yes
MI	Noise sensitive point: User defined (350)	-61.694731° E	56.539119° N	11.2	4.5	40.0	21.6	2,208	Yes
MJ	Noise sensitive point: User defined (351)	-61.694747° E	56.539375° N	9.4	4.5	40.0	21.6	2,205	Yes
MK	Noise sensitive point: User defined (352)	-61.693681° E	56.539440° N	6.8	4.5	40.0	21.3	2,270	Yes
ML	Noise sensitive point: User defined (353)	-61.693557° E	56.539256° N	7.9	4.5	40.0	21.2	2,279	Yes
MM	Noise sensitive point: User defined (354)	-61.694145° E	56.539333° N	8.4	4.5	40.0	21.4	2,242	Yes
MN	Noise sensitive point: User defined (355)	-61.694294° E	56.539647° N	6.6	4.5	40.0	21.5	2,231	Yes
MO	Noise sensitive point: User defined (356)	-61.694806° E	56.539613° N	7.9	4.5	40.0	21.6	2,200	Yes
MP	Noise sensitive point: User defined (357)	-61.695180° E	56.539873° N	6.3	4.5	40.0	21.7	2,175	Yes
MQ	Noise sensitive point: User defined (358)	-61.694769° E	56.539901° N	5.7	4.5	40.0	21.6	2,200	Yes
MR	Noise sensitive point: User defined (359)	-61.693815° E	56.540196° N	5.0	4.5	40.0	21.3	2,258	Yes
MS	Noise sensitive point: User defined (360)	-61.693963° E	56.540005° N	5.0	4.5	40.0	21.4	2,249	Yes
MT	Noise sensitive point: User defined (361)	-61.694392° E	56.539940° N	5.0	4.5	40.0	21.5	2,223	Yes
MU	Noise sensitive point: User defined (362)	-61.695464° E	56.539860° N	6.5	4.5	40.0	21.8	2,158	Yes
MV	Noise sensitive point: User defined (363)	-61.691900° E	56.538022° N	18.9	4.5	40.0	20.7	2,394	Yes
MW	Noise sensitive point: User defined (364)	-61.691986° E	56.538225° N	16.2	4.5	40.0	20.8	2,386	Yes
MX	Noise sensitive point: User defined (365)	-61.692915° E	56.539239° N	6.6	4.5	40.0	21.1	2,319	Yes
MY	Noise sensitive point: User defined (366)	-61.692283° E	56.539366° N	5.0	4.5	40.0	20.9	2,356	Yes
MZ	Noise sensitive point: User defined (367)	-61.691011° E	56.538563° N	10.8	4.5	40.0	20.5	2,442	Yes
NA	Noise sensitive point: User defined (368)	-61.691548° E	56.539060° N	7.2	4.5	40.0	20.7	2,404	Yes
NB	Noise sensitive point: User defined (369)	-61.691119° E	56.539419° N	5.0	4.5	40.0	20.6	2,427	Yes
NC	Noise sensitive point: User defined (370)	-61.689539° E	56.538588° N	8.2	4.5	40.0	20.2	2,532	Yes
ND	Noise sensitive point: User defined (371)	-61.689025° E	56.539169° N	5.0	4.5	40.0	20.0	2,558	Yes
NE	Noise sensitive point: User defined (372)	-61.689986° E	56.539351° N	5.0	4.5	40.0	20.3	2,497	Yes
NF	Noise sensitive point: User defined (373)	-61.690087° E	56.539278° N	5.0	4.5	40.0	20.3	2,492	Yes
NG	Noise sensitive point: User defined (374)	-61.690324° E	56.539198° N	5.0	4.5	40.0	20.4	2,478	Yes
NH	Noise sensitive point: User defined (375)	-61.709795° E	56.537719° N	41.4	4.5	40.0	26.4	1,313	Yes
NI	Noise sensitive point: User defined (376)	-61.709676° E	56.538038° N	42.8	4.5	40.0	26.4	1,313	Yes
NJ	Noise sensitive point: User defined (377)	-61.709296° E	56.537975° N	41.8	4.5	40.0	26.2	1,338	Yes
NK	Noise sensitive point: User defined (378)	-61.710657° E	56.538402° N	46.5	4.5	40.0	26.8	1,246	Yes
NL	Noise sensitive point: User defined (379)	-61.710873° E	56.538766° N	49.1	4.5	40.0	26.9	1,226	Yes
NM	Noise sensitive point: User defined (380)	-61.709400° E	56.539817° N	54.8	4.5	40.0	26.4	1,303	Yes
NN	Noise sensitive point: User defined (381)	-61.708953° E	56.539675° N	53.0	4.5	40.0	26.3	1,332	Yes
NO	Noise sensitive point: User defined (382)	-61.709234° E	56.539345° N	50.9	4.5	40.0	26.3	1,318	Yes
NP	Noise sensitive point: User defined (383)	-61.709671° E	56.539404° N	52.2	4.5	40.0	26.5	1,291	Yes
NQ	Noise sensitive point: User defined (384)	-61.709627° E	56.538504° N	45.3	4.5	40.0	26.4	1,307	Yes
NR	Noise sensitive point: User defined (385)	-61.709365° E	56.538477° N	45.0	4.5	40.0	26.3	1,323	Yes
NS	Noise sensitive point: User defined (386)	-61.706368° E	56.537682° N	33.0	4.5	40.0	25.1	1,521	Yes
NT	Noise sensitive point: User defined (387)	-61.713091° E	56.539705° N	63.0	4.5	40.0	28.0	1,078	Yes
NU	Noise sensitive point: User defined (388)	-61.710402° E	56.539769° N	56.2	4.5	40.0	26.8	1,242	Yes
NV	Noise sensitive point: User defined (389)	-61.710266° E	56.539952° N	57.6	4.5	40.0	26.8	1,249	Yes
NW	Noise sensitive point: User defined (390)	-61.710265° E	56.540288° N	60.6	4.5	40.0	26.8	1,246	Yes
NX	Noise sensitive point: User defined (391)	-61.710028° E	56.540550° N	63.3	4.5	40.0	26.7	1,260	Yes
NY	Noise sensitive point: User defined (392)	-61.709249° E	56.540372° N	59.4	4.5	40.0	26.4	1,308	Yes
NZ	Noise sensitive point: User defined (393)	-61.708959° E	56.540311° N	58.4	4.5	40.0	26.3	1,327	Yes
OA	Noise sensitive point: User defined (394)	-61.708746° E	56.540303° N	57.8	4.5	40.0	26.2	1,340	Yes
OB	Noise sensitive point: User defined (395)	-61.709930° E	56.540943° N	68.3	4.5	40.0	26.7	1,265	Yes
OC	Noise sensitive point: User defined (396)	-61.709495° E	56.540919° N	66.5	4.5	40.0	26.5	1,292	Yes
OD	Noise sensitive point: User defined (397)	-61.708941° E	56.541060° N	66.9	4.5	40.0	26.3	1,325	Yes
OE	Noise sensitive point: User defined (398)	-61.708439° E	56.540946° N	63.6	4.5	40.0	26.1	1,356	Yes
OF	Noise sensitive point: User defined (399)	-61.707955° E	56.540915° N	61.7	4.5	40.0	25.9	1,386	Yes
OG	Noise sensitive point: User defined (400)	-61.707494° E	56.540856° N	59.4	4.5	40.0	25.7	1,415	Yes
OH	Noise sensitive point: User defined (401)	-61.708340° E	56.540245° N	56.2	4.5	40.0	26.1	1,365	Yes
OI	Noise sensitive point: User defined (402)	-61.707806° E	56.540138° N	53.9	4.5	40.0	25.8	1,398	Yes
OJ	Noise sensitive point: User defined (403)	-61.707349° E	56.540150° N	52.6	4.5	40.0	25.7	1,426	Yes

To be continued on next page...

Licensed user:
Natural Forces Wind Inc
1801 Hollis Street, Suite 1205
CA-HALIFAX, Nova Scotia B3J 3N4
902 422 9663
Jill / jbyrne@naturalforces.ca
Calculated:
1/26/2021 2:01 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

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Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Longitude	Latitude	Z	Imission height	Min Noise	Max From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
OK	Noise sensitive point: User defined (404)	-61.706708° E	56.540137° N	49.4	4.5	40.0	25.4	1,466	Yes
OL	Noise sensitive point: User defined (405)	-61.706442° E	56.540100° N	47.5	4.5	40.0	25.3	1,482	Yes
OM	Noise sensitive point: User defined (406)	-61.706311° E	56.538519° N	37.3	4.5	40.0	25.2	1,508	Yes
ON	Noise sensitive point: User defined (407)	-61.703938° E	56.538054° N	24.0	4.5	40.0	24.3	1,660	Yes
OO	Noise sensitive point: User defined (408)	-61.704504° E	56.541170° N	47.3	4.5	40.0	24.7	1,598	Yes
OP	Noise sensitive point: User defined (409)	-61.703344° E	56.541103° N	40.3	4.5	40.0	24.3	1,670	Yes
OQ	Noise sensitive point: User defined (410)	-61.711201° E	56.536969° N	43.4	4.5	40.0	26.8	1,249	Yes
OR	Noise sensitive point: User defined (411)	-61.689378° E	56.534597° N	33.8	4.5	40.0	19.8	2,615	Yes
OS	Noise sensitive point: User defined (412)	-61.691957° E	56.534681° N	50.7	4.5	40.0	20.5	2,458	Yes
OT	Noise sensitive point: User defined (413)	-61.692196° E	56.534555° N	53.8	4.5	40.0	20.5	2,448	Yes
OU	Noise sensitive point: User defined (414)	-61.691898° E	56.533772° N	57.4	4.5	40.0	20.4	2,489	Yes
OV	Noise sensitive point: User defined (415)	-61.691239° E	56.537834° N	20.7	4.5	40.0	20.6	2,437	Yes
OW	Noise sensitive point: User defined (416)	-61.691277° E	56.539805° N	5.0	4.5	40.0	20.6	2,415	Yes
OX	Noise sensitive point: User defined (417)	-61.695841° E	56.538760° N	15.3	4.5	40.0	21.9	2,144	Yes
OY	Noise sensitive point: User defined (418)	-61.700221° E	56.540229° N	17.0	4.5	40.0	23.2	1,864	Yes
OZ	Noise sensitive point: User defined (419)	-61.693924° E	56.541436° N	5.8	4.5	40.0	21.4	2,249	Yes
PA	Noise sensitive point: User defined (420)	-61.693462° E	56.541670° N	5.6	4.5	40.0	21.2	2,278	Yes
PB	Noise sensitive point: User defined (421)	-61.693366° E	56.541690° N	5.4	4.5	40.0	21.2	2,284	Yes
PC	Noise sensitive point: User defined (422)	-61.692539° E	56.541514° N	5.0	4.5	40.0	21.0	2,334	Yes
PD	Noise sensitive point: User defined (423)	-61.691642° E	56.541820° N	5.0	4.5	40.0	20.8	2,390	Yes
PE	Noise sensitive point: User defined (424)	-61.692643° E	56.542051° N	5.4	4.5	40.0	21.0	2,330	Yes
PF	Noise sensitive point: User defined (425)	-61.693132° E	56.542211° N	7.2	4.5	40.0	21.1	2,301	Yes
PG	Noise sensitive point: User defined (426)	-61.693341° E	56.542281° N	8.0	4.5	40.0	21.2	2,288	Yes
PH	Noise sensitive point: User defined (427)	-61.694457° E	56.542566° N	12.6	4.5	40.0	21.5	2,221	Yes
PI	Noise sensitive point: User defined (428)	-61.691696° E	56.542387° N	5.2	4.5	40.0	20.8	2,390	Yes
PJ	Noise sensitive point: User defined (429)	-61.691355° E	56.542362° N	5.0	4.5	40.0	20.7	2,411	Yes
PK	Noise sensitive point: User defined (430)	-61.692146° E	56.544383° N	17.8	4.5	40.0	20.8	2,382	Yes
PL	Noise sensitive point: User defined (431)	-61.692352° E	56.546193° N	39.8	4.5	40.0	20.7	2,402	Yes
PM	Noise sensitive point: User defined (432)	-61.687956° E	56.547506° N	18.7	4.5	40.0	19.5	2,697	Yes
PN	Noise sensitive point: User defined (433)	-61.687459° E	56.552932° N	12.2	4.5	40.0	18.6	2,912	Yes
PO	Noise sensitive point: User defined (434)	-61.682718° E	56.552342° N	7.7	4.5	40.0	17.7	3,159	Yes
PP	Noise sensitive point: User defined (435)	-61.682552° E	56.552676° N	6.1	4.5	40.0	17.7	3,182	Yes
PQ	Noise sensitive point: User defined (436)	-61.682675° E	56.552713° N	6.2	4.5	40.0	17.7	3,176	Yes
PR	Noise sensitive point: User defined (437)	-61.682748° E	56.552753° N	6.1	4.5	40.0	17.7	3,174	Yes

Distances (m)

	WTG
NSA	1
A	1786
B	1847
C	1863
D	1858
E	1853
F	1895
G	1868
H	1875
I	1925
J	1880
K	1876
L	1869
M	1885
N	1895
O	1904
P	1887
Q	1907
R	1913
S	1918
T	1926
U	1932
V	1896
W	1936

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
X	1950
Y	1976
Z	1912
AA	1924
AB	1948
AC	1954
AD	1984
AE	1989
AF	1997
AG	2008
AH	1968
AI	1995
AJ	2027
AK	2053
AL	1954
AM	1973
AN	1932
AO	1951
AP	1969
AQ	1987
AR	1993
AS	1941
AT	1960
AU	1983
AV	2013
AW	2037
AX	2000
AY	2019
AZ	2038
BA	2058
BB	1970
BC	1995
BD	2025
BE	2018
BF	2056
BG	2091
BH	2046
BI	2077
BJ	2132
BK	2152
BL	2179
BM	2138
BN	2127
BO	2122
BP	2115
BQ	2107
BR	2091
BS	2082
BT	2193
BU	2185
BV	2179
BW	2170
BX	2166
BY	2147
BZ	2131
CA	2116
CB	2101
CC	2077
CD	2142
CE	2122
CF	2197
CG	2236
CH	2231
CI	2246
CJ	2213

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
CK	2220
CL	2257
CM	2243
CN	2259
CO	2289
CP	2276
CQ	2307
CR	2291
CS	2321
CT	2333
CU	2308
CV	2261
CW	2319
CX	2342
CY	2331
CZ	2220
DA	2254
DB	2274
DC	2291
DD	2276
DE	2369
DF	2363
DG	2380
DH	2308
DI	2291
DJ	2368
DK	2307
DL	2367
DM	2341
DN	2347
DO	2434
DP	2346
DQ	2331
DR	2338
DS	2394
DT	2409
DU	2377
DV	2351
DW	2370
DX	2424
DY	2393
DZ	2388
EA	2411
EB	2475
EC	2431
ED	2434
EE	2451
EF	2470
EG	2484
EH	2493
EI	2506
EJ	2520
EK	2405
EL	2540
EM	2560
EN	2613
EO	2542
EP	2467
EQ	2492
ER	2538
ES	2527
ET	2586
EU	2543
EV	2581
EW	2572

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
EX	2565
EY	2594
EZ	2610
FA	2616
FB	2641
FC	2637
FD	2620
FE	2624
FF	2638
FG	2658
FH	2667
FI	2684
FJ	2661
FK	2694
FL	2663
FM	2743
FN	2760
FO	2801
FP	2772
FQ	2735
FR	2715
FS	2692
FT	2721
FU	2742
FV	2701
FW	2762
FX	2784
FY	2715
FZ	2743
GA	2771
GB	2682
GC	2707
GD	2685
GE	2749
GF	2783
GG	2689
GH	2707
GI	2675
GJ	2698
GK	2689
GL	2700
GM	2684
GN	2718
GO	2745
GP	2766
GQ	2740
GR	2714
GS	2719
GT	2744
GU	2761
GV	2781
GW	2747
GX	2770
GY	2781
GZ	2802
HA	2785
HB	2776
HC	2860
HD	2899
HE	2766
HF	2745
HG	2731
HH	2770
HI	2792
HJ	2818

To be continued on next page...

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Jill / jbyrne@naturalforces.ca
Calculated:
1/26/2021 2:01 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
HK	2924
HL	2912
HM	2887
HN	2876
HO	2864
HP	2853
HQ	2847
HR	2831
HS	2826
HT	2872
HU	2930
HV	2939
HW	2949
HX	2962
HY	2964
HZ	2950
IA	2928
IB	2913
IC	2903
ID	2937
IE	2929
IF	2946
IG	2962
IH	3001
II	3049
IJ	2992
IK	3094
IL	3021
IM	3001
IN	3019
IO	3036
IP	3073
IQ	3020
IR	3098
IS	3030
IT	3017
IU	3062
IV	3056
IW	3073
IX	3086
IY	3052
IZ	3093
JA	3107
JB	3115
JC	3106
JD	3142
JE	3123
JF	3119
JG	3109
JH	3136
JI	3109
JJ	3090
JK	3069
JL	3050
JM	3151
JN	3127
JO	3102
JP	3086
JQ	3167
JR	3142
JS	3120
JT	3100
JU	3081
JV	3179
JW	3154

To be continued on next page...

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
JX	3136
JY	3119
JZ	3198
KA	3176
KB	3158
KC	3125
KD	3229
KE	3219
KF	3201
KG	3184
KH	3171
KI	3254
KJ	3236
KK	3219
KL	3219
KM	3247
KN	3269
KO	3244
KP	3260
KQ	3278
KR	3292
KS	3308
KT	3410
KU	3386
KV	3387
KW	3367
KX	3355
KY	3342
KZ	2941
LA	2905
LB	2929
LC	2622
LD	2635
LE	2603
LF	2606
LG	2587
LH	2583
LI	2567
LJ	2567
LK	2549
LL	2552
LM	2531
LN	2536
LO	2515
LP	2642
LQ	2655
LR	2673
LS	2686
LT	2713
LU	2729
LV	2756
LW	2743
LX	2683
LY	2712
LZ	2782
MA	2803
MB	3022
MC	2761
MD	2772
ME	2794
MF	2785
MG	2861
MH	2755
MI	2714
MJ	2711

To be continued on next page...

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Calculated:
1/26/2021 2:01 PM/3.1.633

DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
MK	2776
ML	2785
MM	2748
MN	2737
MO	2706
MP	2681
MQ	2706
MR	2764
MS	2755
MT	2729
MU	2664
MV	2899
MW	2891
MX	2824
MY	2862
MZ	2947
NA	2910
NB	2933
NC	3037
ND	3064
NE	3003
NF	2998
NG	2984
NH	1817
NI	1817
NJ	1842
NK	1751
NL	1731
NM	1809
NN	1837
NO	1823
NP	1796
NQ	1812
NR	1828
NS	2025
NT	1583
NU	1748
NV	1754
NW	1752
NX	1766
NY	1814
NZ	1832
OA	1846
OB	1771
OC	1798
OD	1832
OE	1863
OF	1892
OG	1921
OH	1871
OI	1904
OJ	1932
OK	1972
OL	1988
OM	2013
ON	2165
OO	2105
OP	2176
OQ	1752
OR	3118
OS	2962
OT	2951
OU	2991
OV	2942
OW	2921

To be continued on next page...

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DECIBEL - Main Result

Calculation: Nain Worst Case Noise

...continued from previous page

	WTG
NSA	1
OX	2650
OY	2370
OZ	2756
PA	2785
PB	2791
PC	2841
PD	2897
PE	2836
PF	2807
PG	2795
PH	2728
PI	2896
PJ	2917
PK	2889
PL	2909
PM	3204
PN	3419
PO	3667
PP	3689
PQ	3684
PR	3681

Nain Wind Micro-Grid Project

Shadow Flicker Assessment v.2

January 2021

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1. Introduction

In an effort to reduce reliance on diesel fuel as well as the opportunity to promote economic development, the Nunatsiavut Government has been pursuing a wind project in Nain called the Nain Wind Micro Grid Project. The Nain Wind Micro Grid Project consists of two turbines, a battery storage system, and a micro-grid controller. The turbines are located on the outskirts and to the west of the community of Nain.

Due to the location of the turbines relative to the community and local homes, Natural Forces has undertaken a shadow flicker impact assessment for the proposed Nain Wind Micro-Grid Project on behalf of the Nunatsiavut Government. This assessment will study the potential impact of shadow flicker on the homes located in proximity to the project.

This report will outline background information on the shadow flicker effect, discuss policy and guideline documents, explain the source of shadows and the receptors (homes), provide the prediction methodology, outline the results and propose mitigation methods. The detailed WindPRO software results are included in Appendices C and D, for the E-44 and E-82 turbine models, respectively.

As neither the Nunatsiavut Government nor the Government of Newfoundland and Labrador have regulations surrounding requirements for visual impacts due to shadow flicker, industry best practices will be adopted. Typical thresholds seen in other jurisdictions are that shadow flicker must be limited to 30 hours per year or a maximum of 30 minutes per day based on a "worst case" calculation where mitigation is not feasible. The worst-case calculation is defined in many guidelines and regulations as the maximum shadow conditions between sunrise and sunset on a cloudless day. These conditions have been adopted for this study.

Prior to determining the predicted amount of shadow flicker effect of a project, careful site design is recommended, followed by industry accepted mitigation strategies. This assessment will be used as supporting documentation to demonstrate that shadow flicker is being assessed and that compliance can be reached with careful planning and mitigation.

This shadow flicker analysis was conducted using the Shadow module of the software package, WindPRO version 3.1.

1.1. Background

Flicker is caused by incident light rays on a moving object which then casts an intermittent shadow on a receptor. This intermittent shadow, perceived as a change in light intensity by an observer as it pertains to a wind turbine generator (WTG), is referred to as shadow flicker. Shadow flicker is caused by incident sun rays on the rotor blades as they turn.

For shadow flicker to occur, the following criteria must be met:

1. The sun must be shining and not obscured by any cloud cover or fog;
2. The wind turbine must be located between the sun and the shadow receptor;
3. The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, buildings, awnings etc., will prevent shadow flicker from occurring at the receptor; and,

4. The shadow receptor must be close enough to the turbine to be in the shadow of the turbine rotor.

1.2. Policy and Guidelines

As mentioned, neither the Nunatsiavut Government nor the Government of Newfoundland and Labrador have any regulations surrounding requirements for visual impacts due to shadow flicker. As this is the case, Natural Forces has looked to other jurisdictions for regulations on this potential impact.

The Government of New Brunswick have provincial requirements for the acceptable amount of shadow flicker that can be experienced at a receptor. These requirements are set out in the *Additional Information Requirements for Wind Turbines* document published by New Brunswick Ministry of Environment and Local Government pursuant to Section 5(2) of the *Environmental Impact Assessment Regulation* of the Clean Environment Act.

Under these requirements, mitigation measures should be applied to minimize the shadow flicker effect on sensitive receptors. These mitigation measures can include relocation of turbines, screening of the receptors, and operational controls. Where the proponent demonstrates that the mitigation of any shadow flicker effect on sensitive receptors is not feasible, the amount of shadow flicker must be limited to:

- 30 hours per year for a maximum “worst case” calculation; and,
- 30 minutes per day for a maximum “worst case” calculation.

The requirements also state that the “worst case” scenario describes a model that considers maximum shadow between sunrise and sunset and assumes cloudless skies throughout the year. These requirements will be adopted for the purposes of this assessment.

The New Brunswick guidelines will be used as a benchmark for this assessment as they are in line with the guidelines in many other jurisdictions within Canada.

1.3. Receptors

There are 443 known receptors located within 4 km of the turbine locations that consist of year-long dwellings, seasonal dwellings, and local businesses. They have been identified based on online geographical data and cross referenced with aerial photography. The geographical coordinates of these receptors are included in Appendices C and D. A map of the project area with the receptors is included in Appendices A and B, for the E-44 and E-82 layouts, respectively.

1.4. Turbine Model

The turbine models used for the assessment are the Enercon E-44 and E-82, a 900-kW and 2.35 MW machine, respectively. The geographical coordinates of the 1 or 2 proposed turbine locations are included in Appendices C and D. The specifications of the two considered models are outlined below.

Table 1 E-82 and E-44 Specifications

Turbine Model	**E-82**	**E-44**

Nominal Power Output (kW)	2350	900
Hub Height (m)	59	45-55
Rotor Diameter (m)	82	44
Sweep Area (m^2)	5281	1521

Should the turbine model change, a new noise assessment will be conducted and submitted for review.

2. Shadow Flicker Impact Assessment Methodology

The shadow flicker impact was calculated for the 1-tubine and 2-turbine layouts at each of the 443 known receptors using the Shadow module of the software package WindPRO version 3.1. This was completed using methodologies for the worst-case, detailed below, to calculate the expected hours per year and maximum minutes per day of shadow flicker from the project for each receptor.

2.1. Worst Case Shadow Flicker Assessment

The worst-case shadow flicker assessment follows a conservative methodology by modelling the Earth's orbit and rotation to provide the astronomical maximum shadow. The astronomical maximum shadow calculation assumes that for every day of the year:

1. The sky is cloudless between sunrise and sunset;
2. The turbines are always in operation; and,
3. The wind direction changes throughout the day such that the rotor plane is perpendicular to the incident sun rays at all times causing the maximum amount of shadow.

The position of the sun relative to the wind turbine rotor plane and the resulting shadow is calculated in steps of one-minute intervals throughout a complete year. If the rotor plane, assumed to be a solid disk equivalent in size to the swept area shown in casts a shadow on a receptor window during one of these intervals, it is registered as one minute of potential shadow impact.

The impact of shadow flicker on surrounding receptors is limited by two factors in this worst-case scenario. The first factor is that the angle of the sun over the horizon must be greater than 3 degrees, due to optic conditions in the atmosphere that cause the shadow to dissipate before it could potentially reach a receptor. The second factor is that the blade of the wind turbine must cover at least 20% of the incident solar rays to have a noticeable effect.

To further ensure the worst-case scenario is being modelled, each receptor is treated as a greenhouse with 3.0 m high by 3.0 m wide windows for 360° of the building. Furthermore, no topographical or ground cover shielding caused by buildings, barns, trees, awnings, etc. has been considered between the wind turbines and receptors. This worst-case assumption results in a conservative prediction of the potential shadow flicker impacts, meaning that the shadow flicker impacts from the assessment are likely calculated as higher than they would be experienced.

All assumptions made for the shadow flicker assessment can be found in the Appendices C and D for the E-44 and E-82 models, respectively.

3. Results of Shadow Flicker Impact Assessment

The results of both shadow flicker prediction models at each receptor demonstrate compliance with the selected requirements of no more than 30 hours per year of shadow, and no more than 30 minutes on the worst day of shadow under a worst-case scenario.

The worst-case study of this project demonstrates that all receptors located within 4 km of both the 1-turbine and 2-turbine project layouts are subject to no more than 30 hr/year and 30 min/day of shadow flicker. The results show that all 443 known receptors will experience 0 shadow hours per year. All receptors are outside of the area of influence of the turbines. The detailed results of the shadow assessment study for all receptors in the worst-case scenarios are included in Appendices C and D.

4. Proposed Mitigation

Although this assessment is shown that there will be no shadow flicker impact on the homes near the project under worst case scenario, this report also provides a description of the mitigation measures to be used to mitigate effects on sensitive receptors should they experience unanticipated shadow flicker.

4.1. Tracking the Shadow Flicker

Should receptors experience shadow flicker and formalize a complaint, the complaint will be addressed following a Complaint Resolution Plan. The steps included in the Complaint Resolution Plan will describe the study that will occur following a complaint. To begin, the specific date, time, and local weather conditions will be noted for each incident of shadow flicker as well as the duration of the event. Following this step, the Operations Team for the project will determine the direction of the wind relative to the receptor and the wind speed during the event. Finally, the details of the event will be tracked and reported to analyze the specific conditions that cause shadow flicker at a receptor.

4.2. Screening

Screening efforts are a feasible and effective mitigation measure for reducing shadow flicker impact. It is proposed that if receptors experience an annoyingly high amount of shadow flicker impact during operation, the Proponent could use screening methods that will provide shade to buildings and windows, effectively reducing shadow flicker annoyance.

Screening can be accomplished with existing vegetation, revegetation, and planting additional vegetation to the area which is experiencing shadow flicker. Similar, and sometimes better, results can be obtained by installing awnings and window if it would be preferred by those experiencing the impact. As the climate in Nain is not favorable to large vegetation, it is likely that window treatments or awnings would be the preferred mitigation method for this project.

5. Discussion and Conclusions

Natural Forces has completed an assessment to evaluate the shadow flicker impact of the proposed Nain Wind Micro-Grid Project at known receptor locations within 4 km of the proposed WTGs.

Based on the worst-case modelled results, the amount of shadow flicker predicted at each receptor, will be zero. This is well within the selected threshold based on the regulations in New Brunswick for shadow flicker observed for a receptor.

Various measures may be used to mitigate the effect of shadow flicker perceived at receptors. These mitigation methods may include tracking shadow flicker events and screening of receptors using natural barriers, awnings, or other structures.

Natural Forces feels confident that receptors will not receive exceeding amounts of shadow flicker as demonstrated in the modelled worst-case scenario. However, Natural Forces will work closely with the Nunatsiavut Government, home owners and businesses to observe occurrences of real-case shadow flicker impact during operation and apply mitigation as mentioned.

References

Enercon GmbH ed. (2004). *Data Sheet – Enercon Wind Energy Converter E-44*. Germany.

Enercon GmbH ed. (2004). *Data Sheet – Enercon Wind Energy Converter E-82*. Germany.

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Nielson, P. (2012). *WindPRO 3.1 user guide*. (1st ed.). Denmark: EMD International A/S.

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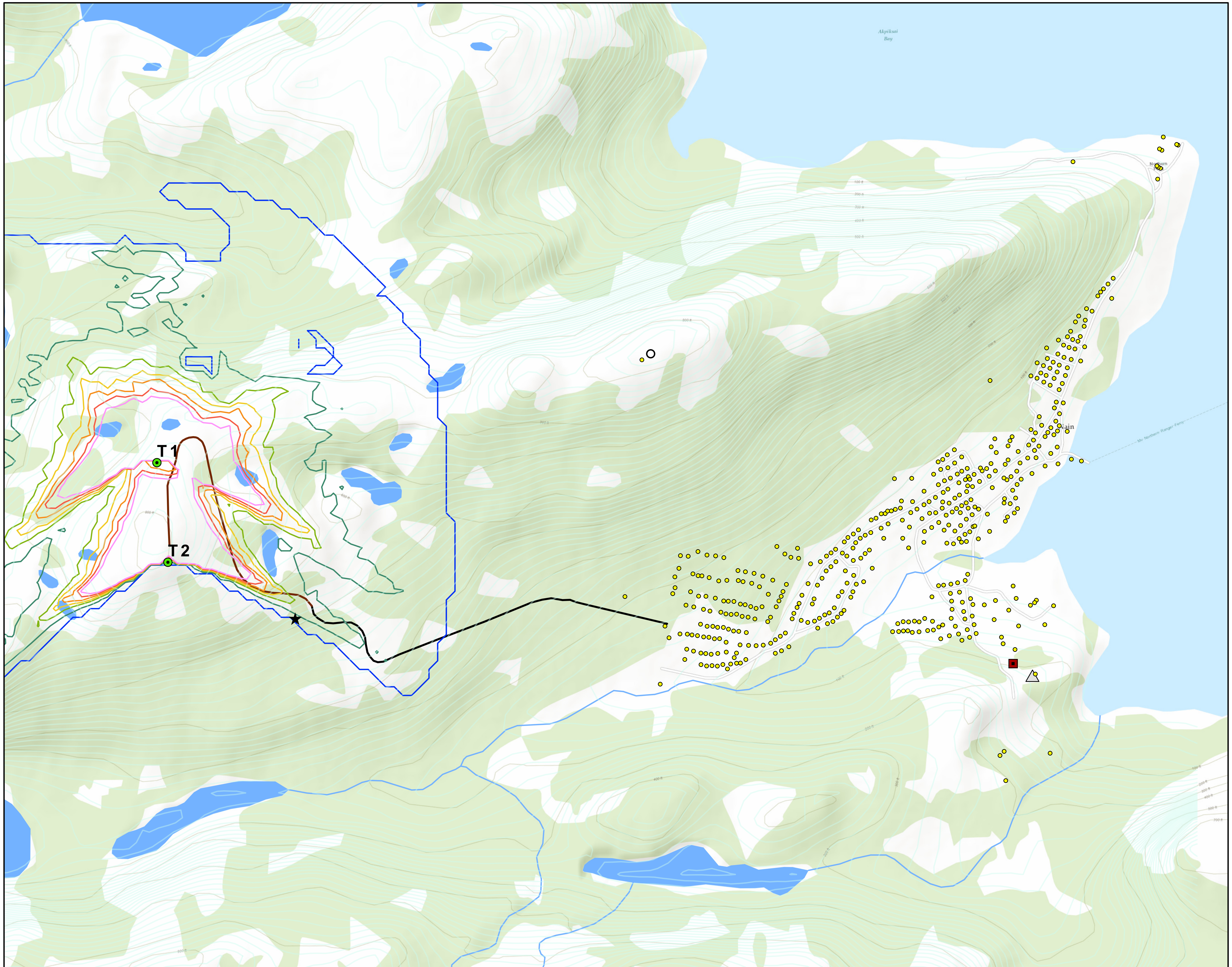
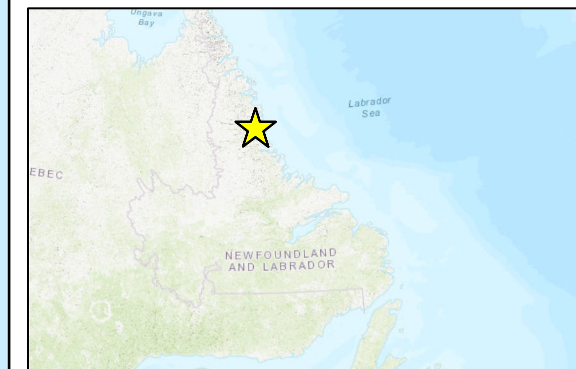
APPENDIX A:

Site Layout Map with Sound Levels E-44



Nain Wind Micro-Grid Project

Worst Case Shadow Map



Legend

- Proposed Turbines
- Receptors
- Preliminary Battery Location
- Telecommunication Towers
- Diesel Plant
- Water Tower
- New Road
- Exisiting Road

Shadow Lines

- 0 hours/year
- 10 hours/year
- 20 hours/year
- 25 hours/year
- 30 hours/year
- 35 hours/year
- 40 hours/year

Notes
1.

Sources
Basedata provided by the Province of Newfoundland and Labrador
Basemap: ESRI World Topo Map

N

1:12,857

0 0.1 0.2 0.4 0.6 Kilometers

Spatial Reference: WGS 1984 Complex UTM Zone 20N
Page Size: 11" x 17"

Production Date: Jan 27, 2021

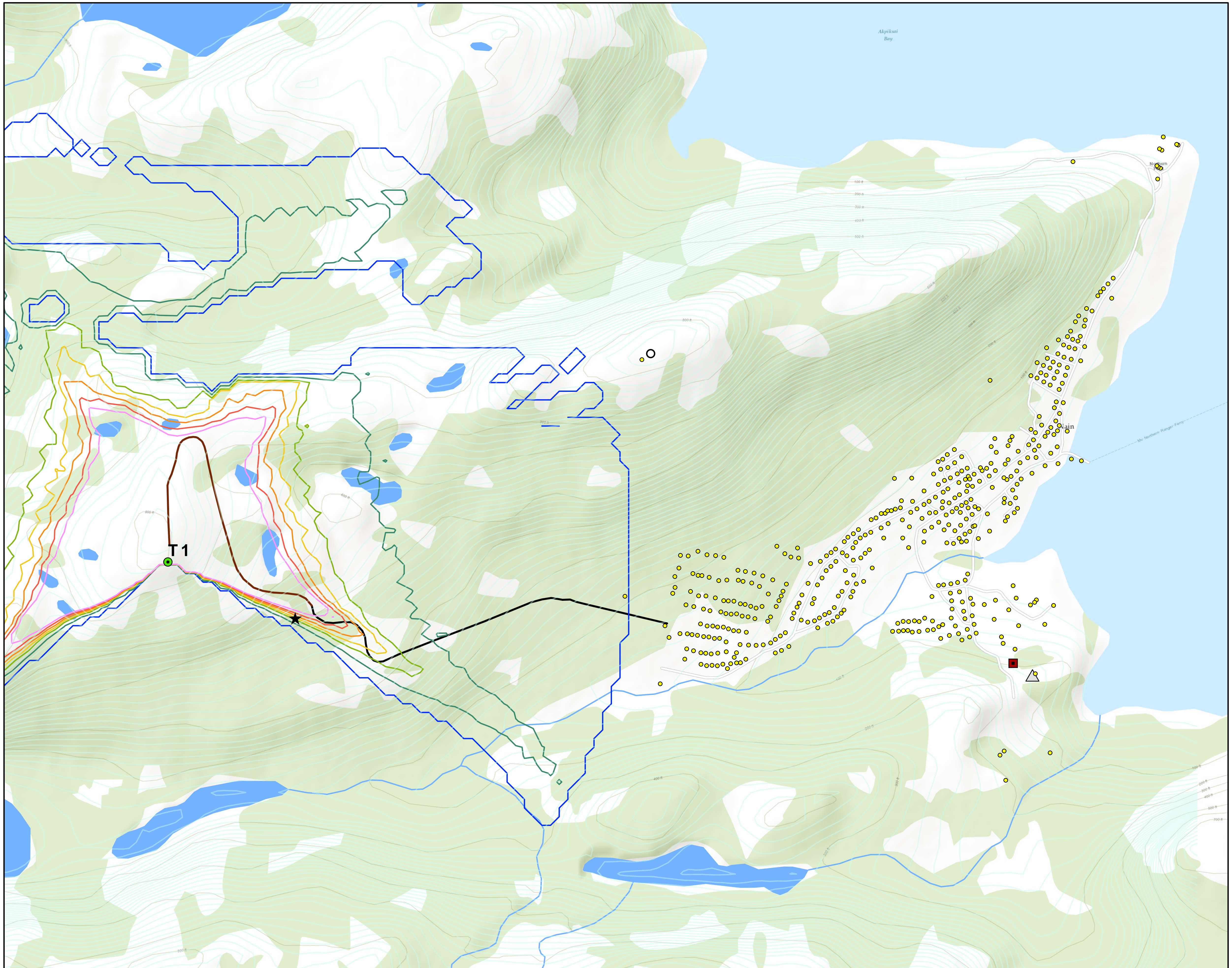
natural forces

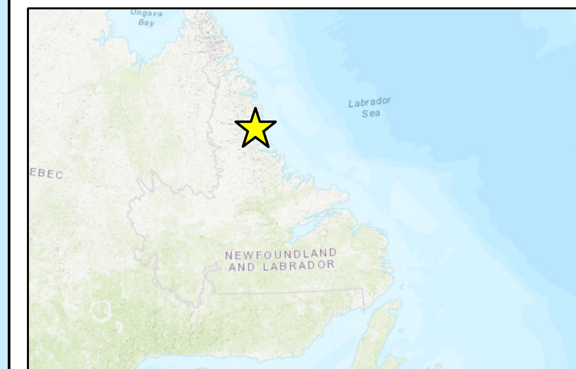
APPENDIX B:

Site Layout Map with Sound Levels E-82

Nain Wind Micro-Grid Project

Worst Case Shadow Map





Legend

- Proposed Turbine
- Receptors
- Preliminary Battery Location
- Telecommunication Towers
- Diesel Plant
- Water Tower
- New Road
- Exisiting Road
- 0 hours/year
- 10 hours/year
- 20 hours/year
- 25 hours/year
- 30 hours/year
- 35 hours/year
- 40 hours/year

Notes
1.

Sources
Basedata provided by the Province of Newfoundland and Labrador
Basemap: ESRI World Topo Map

N

1:12,857

0 0.1 0.2 0.4 0.6 Kilometers

Spatial Reference: WGS 1984 Complex UTM Zone 20N
Page Size: 11" x 17"

Production Date: Jan 27, 2021

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APPENDIX C:

WindPRO v3.1, Decibel Module Calculation Results E-44: Worst Case

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

Assumptions for shadow calculations

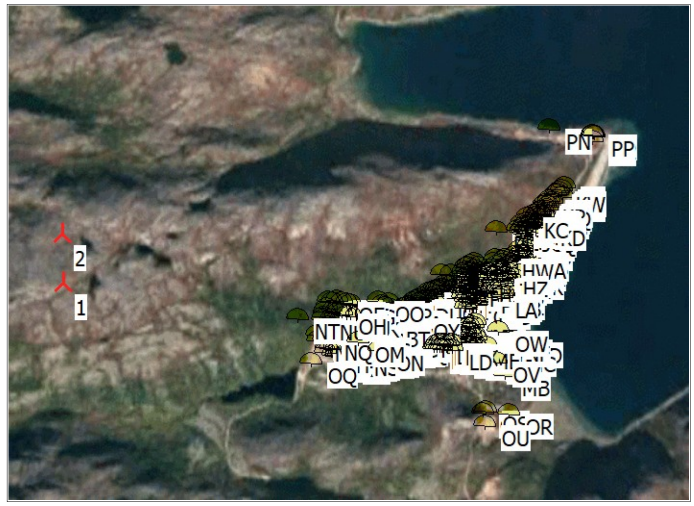
Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Nain_1.wpo (1)
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10.0 m

All coordinates are in
Geo [deg]-WGS84



Scale 1:50,000
New WTG   Shadow receptor

WTGs

	Longitude	Latitude	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	-61.738726° E	56.541033° N	235.0	ENERCON E-44 900 44.0 !-! hub: 55.0 m (T...	Yes	ENERCON	E-44-900	900	44.0	55.0	983	34.0
2	-61.739241° E	56.544129° N	231.7	ENERCON E-44 900 44.0 !-! hub: 55.0 m (T...	Yes	ENERCON	E-44-900	900	44.0	55.0	983	34.0

Shadow receptor-Input

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	-61.710039° E	56.538514° N	46.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
B	-61.709058° E	56.538451° N	44.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
C	-61.708542° E	56.539667° N	52.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
D	-61.708691° E	56.539264° N	49.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
E	-61.708874° E	56.538804° N	46.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
F	-61.708016° E	56.539604° N	50.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
G	-61.708884° E	56.537909° N	40.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
H	-61.708891° E	56.537551° N	39.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
I	-61.707548° E	56.539512° N	48.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
J	-61.708332° E	56.539207° N	48.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
K	-61.708505° E	56.538736° N	45.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
L	-61.708712° E	56.538408° N	43.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
M	-61.708613° E	56.537891° N	40.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
N	-61.708576° E	56.537505° N	38.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
O	-61.708309° E	56.537866° N	39.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
P	-61.708419° E	56.538394° N	42.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
Q	-61.708109° E	56.538345° N	41.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
R	-61.708274° E	56.537513° N	37.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
S	-61.707720° E	56.539165° N	46.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
T	-61.707937° E	56.537887° N	38.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
U	-61.707972° E	56.537495° N	36.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
V	-61.708187° E	56.538731° N	44.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
W	-61.707436° E	56.539109° N	45.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
X	-61.707663° E	56.537541° N	36.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
Y	-61.707224° E	56.537551° N	35.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
Z	-61.707917° E	56.538698° N	43.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AA	-61.707819° E	56.538346° N	40.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
AB	-61.707457° E	56.538231° N	39.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
AC	-61.707459° E	56.537925° N	37.6	1.0	1.0	1.0	0.0	90.0	Fixed direction

To be continued on next page...

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Calculated:
1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
AD	-61.707017° E	56.537748° N	35.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
AE	-61.706885° E	56.537888° N	36.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AF	-61.706676° E	56.538140° N	36.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
AG	-61.706673° E	56.537576° N	33.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
AH	-61.707409° E	56.537401° N	35.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AI	-61.706891° E	56.537573° N	34.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
AJ	-61.706199° E	56.538120° N	35.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AK	-61.705775° E	56.538106° N	33.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
AL	-61.707146° E	56.539090° N	44.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AM	-61.706839° E	56.539095° N	42.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
AN	-61.707594° E	56.538691° N	42.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
AO	-61.707309° E	56.538634° N	41.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
AP	-61.707026° E	56.538575° N	40.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AQ	-61.706735° E	56.538560° N	39.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AR	-61.706527° E	56.539023° N	41.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
AS	-61.707291° E	56.539501° N	47.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
AT	-61.706976° E	56.539491° N	46.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AU	-61.706616° E	56.539405° N	43.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
AV	-61.706196° E	56.538996° N	39.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AW	-61.705815° E	56.538936° N	37.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
AX	-61.706347° E	56.539383° N	42.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AY	-61.706037° E	56.539322° N	40.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AZ	-61.705736° E	56.539263° N	38.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BA	-61.705401° E	56.539310° N	37.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BB	-61.706715° E	56.540447° N	52.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BC	-61.706298° E	56.540405° N	49.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BD	-61.705814° E	56.540351° N	46.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
BE	-61.705956° E	56.540044° N	44.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BF	-61.705325° E	56.540258° N	42.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BG	-61.704770° E	56.540129° N	38.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
BH	-61.705524° E	56.539931° N	41.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BI	-61.705036° E	56.539694° N	37.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BJ	-61.704063° E	56.540934° N	42.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BK	-61.703730° E	56.540827° N	39.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BL	-61.703295° E	56.540791° N	36.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
BM	-61.704011° E	56.539989° N	34.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BN	-61.704208° E	56.539770° N	34.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
BO	-61.704315° E	56.539621° N	33.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
BP	-61.704445° E	56.539481° N	33.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BQ	-61.704605° E	56.539301° N	33.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BR	-61.704935° E	56.538979° N	33.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BS	-61.705098° E	56.538845° N	33.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
BT	-61.703148° E	56.539644° N	27.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
BU	-61.703315° E	56.539393° N	27.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BV	-61.703434° E	56.539268° N	27.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BW	-61.703621° E	56.539086° N	27.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BX	-61.703722° E	56.538918° N	27.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BY	-61.704117° E	56.538482° N	27.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
BZ	-61.704404° E	56.538384° N	28.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
CA	-61.704689° E	56.538278° N	29.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
CB	-61.704955° E	56.538173° N	29.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
CC	-61.705375° E	56.538119° N	31.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
CD	-61.704355° E	56.537933° N	25.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
CE	-61.704704° E	56.537860° N	26.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
CF	-61.703215° E	56.538865° N	24.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
CG	-61.702470° E	56.539523° N	23.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CH	-61.702574° E	56.539367° N	23.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
CI	-61.702264° E	56.539947° N	24.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
CJ	-61.702792° E	56.539999° N	27.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CK	-61.702850° E	56.538797° N	21.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CL	-61.702295° E	56.538615° N	17.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
CM	-61.702470° E	56.538833° N	19.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CN	-61.702190° E	56.538920° N	18.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
CO	-61.701744° E	56.538748° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
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SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
CP	-61.701890° E	56.539021° N	17.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CQ	-61.701437° E	56.538811° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CR	-61.701635° E	56.539082° N	16.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CS	-61.701179° E	56.538943° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CT	-61.700960° E	56.539053° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CU	-61.701344° E	56.539233° N	16.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CV	-61.702000° E	56.540159° N	24.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
CW	-61.701105° E	56.539587° N	16.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
CX	-61.700803° E	56.539149° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CY	-61.700892° E	56.539730° N	16.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
CZ	-61.702630° E	56.540614° N	31.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DA	-61.702080° E	56.540676° N	28.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DB	-61.701762° E	56.540383° N	24.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
DC	-61.701490° E	56.540513° N	24.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DD	-61.701726° E	56.540844° N	28.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
DE	-61.700282° E	56.539722° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
DF	-61.700404° E	56.539554° N	13.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
DG	-61.700082° E	56.539955° N	14.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
DH	-61.701206° E	56.540664° N	24.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DI	-61.701468° E	56.540940° N	27.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
DJ	-61.700227° E	56.540693° N	20.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DK	-61.701207° E	56.541049° N	27.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DL	-61.700230° E	56.541078° N	23.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DM	-61.700684° E	56.540375° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
DN	-61.700602° E	56.539995° N	17.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DO	-61.699170° E	56.540439° N	14.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DP	-61.700582° E	56.540833° N	22.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
DQ	-61.700831° E	56.540928° N	24.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
DR	-61.700711° E	56.541274° N	27.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DS	-61.699803° E	56.540759° N	18.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
DT	-61.699554° E	56.540899° N	18.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
DU	-61.700073° E	56.541243° N	23.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
DV	-61.700504° E	56.541408° N	27.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DW	-61.700194° E	56.541514° N	26.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
DX	-61.699310° E	56.541007° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
DY	-61.699812° E	56.541378° N	23.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DZ	-61.699905° E	56.541639° N	26.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
EA	-61.699529° E	56.541469° N	22.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
EB	-61.698492° E	56.541361° N	18.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EC	-61.699214° E	56.541547° N	21.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
ED	-61.699177° E	56.541939° N	25.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
EE	-61.698905° E	56.541991° N	24.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
EF	-61.698606° E	56.542123° N	25.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EG	-61.698384° E	56.542128° N	24.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
EH	-61.698246° E	56.542205° N	24.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
EI	-61.698036° E	56.542207° N	24.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EJ	-61.697811° E	56.542252° N	24.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
EK	-61.699668° E	56.540027° N	13.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
EL	-61.697427° E	56.541351° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
EM	-61.697105° E	56.541050° N	12.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
EN	-61.696244° E	56.541214° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
EO	-61.697427° E	56.541914° N	19.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
EP	-61.698630° E	56.541678° N	21.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
EQ	-61.698232° E	56.541808° N	21.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
ER	-61.697525° E	56.542290° N	23.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
ES	-61.697827° E	56.543205° N	35.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
ET	-61.696856° E	56.543205° N	29.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EU	-61.697460° E	56.542509° N	25.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
EV	-61.696834° E	56.542484° N	21.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
EW	-61.696948° E	56.542143° N	19.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
EX	-61.697037° E	56.541695° N	16.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
EY	-61.696595° E	56.542249° N	18.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EZ	-61.696321° E	56.541949° N	14.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
FA	-61.696201° E	56.541551° N	11.9	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
FB	-61.695789° E	56.541669° N	11.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FC	-61.695891° E	56.542113° N	14.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FD	-61.696197° E	56.542379° N	17.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FE	-61.696178° E	56.542799° N	20.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FF	-61.695906° E	56.542473° N	16.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
FG	-61.695547° E	56.542125° N	13.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
FH	-61.695385° E	56.541820° N	11.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FI	-61.695094° E	56.541579° N	9.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
FJ	-61.695544° E	56.542599° N	16.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
FK	-61.694962° E	56.542042° N	11.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
FL	-61.695623° E	56.543320° N	22.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FM	-61.694127° E	56.541196° N	5.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
FN	-61.693852° E	56.541214° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FO	-61.693177° E	56.541290° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FP	-61.693653° E	56.541515° N	5.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
FQ	-61.694256° E	56.541308° N	6.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FR	-61.694580° E	56.541152° N	5.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
FS	-61.694953° E	56.541175° N	6.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
FT	-61.694489° E	56.541546° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
FU	-61.694160° E	56.541712° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
FV	-61.694826° E	56.541736° N	9.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
FW	-61.693833° E	56.541905° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
FX	-61.693499° E	56.542042° N	7.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
FY	-61.694620° E	56.542138° N	10.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
FZ	-61.694165° E	56.542112° N	9.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
GA	-61.693720° E	56.542248° N	8.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
GB	-61.695177° E	56.542262° N	12.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
GC	-61.694784° E	56.542414° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GD	-61.695143° E	56.542454° N	13.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
GE	-61.694080° E	56.542328° N	10.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
GF	-61.693552° E	56.542507° N	9.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GG	-61.695103° E	56.542750° N	15.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GH	-61.694836° E	56.542851° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
GI	-61.695366° E	56.542992° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
GJ	-61.695022° E	56.543112° N	17.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
GK	-61.695219° E	56.543465° N	21.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
GL	-61.695096° E	56.543773° N	24.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
GM	-61.695356° E	56.543701° N	25.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
GN	-61.694833° E	56.543914° N	24.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
GO	-61.694432° E	56.544066° N	24.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
GP	-61.694028° E	56.543840° N	20.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
GQ	-61.694430° E	56.543657° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
GR	-61.694815° E	56.543513° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
GS	-61.694682° E	56.543189° N	17.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
GT	-61.694294° E	56.543311° N	16.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GU	-61.694039° E	56.543398° N	16.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
GV	-61.693728° E	56.543481° N	15.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
GW	-61.694211° E	56.543040° N	14.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GX	-61.693843° E	56.543133° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
GY	-61.693678° E	56.543225° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
GZ	-61.693350° E	56.543291° N	13.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HA	-61.693595° E	56.543141° N	13.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
HB	-61.693722° E	56.542940° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HC	-61.692342° E	56.542869° N	8.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
HD	-61.691665° E	56.542521° N	5.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
HE	-61.693823° E	56.542413° N	9.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
HF	-61.694194° E	56.542661° N	12.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
HG	-61.694374° E	56.542242° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HH	-61.693786° E	56.542762° N	11.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
HI	-61.693450° E	56.542914° N	11.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HJ	-61.693051° E	56.543069° N	11.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
HK	-61.691425° E	56.543720° N	10.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
HL	-61.691592° E	56.543585° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HM	-61.692081° E	56.543956° N	14.4	1.0	1.0	1.0	0.0	90.0	Fixed direction

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1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
HN	-61.692151° E	56.543388° N	11.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
HO	-61.692388° E	56.543617° N	13.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
HP	-61.692504° E	56.543225° N	11.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
HQ	-61.692638° E	56.543465° N	12.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
HR	-61.692894° E	56.543396° N	13.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
HS	-61.692987° E	56.543487° N	13.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
HT	-61.692359° E	56.544135° N	16.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
HU	-61.691411° E	56.544154° N	13.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HV	-61.691297° E	56.544314° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
HW	-61.691174° E	56.544437° N	14.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HX	-61.690848° E	56.543976° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HY	-61.690756° E	56.543618° N	8.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
HZ	-61.690949° E	56.543366° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IA	-61.691277° E	56.543200° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IB	-61.691510° E	56.543103° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
IC	-61.691677° E	56.543162° N	8.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
ID	-61.691041° E	56.542533° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IE	-61.691200° E	56.542777° N	5.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
IF	-61.690945° E	56.542952° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IG	-61.690710° E	56.543114° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IH	-61.690097° E	56.543284° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
II	-61.689352° E	56.543510° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IJ	-61.690320° E	56.543768° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
IK	-61.688625° E	56.543568° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IL	-61.689852° E	56.543773° N	6.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
IM	-61.690250° E	56.544171° N	9.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IN	-61.689930° E	56.543998° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IO	-61.689677° E	56.544130° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
IP	-61.689019° E	56.543896° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IQ	-61.689978° E	56.544320° N	9.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IR	-61.688652° E	56.544090° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IS	-61.689859° E	56.544543° N	10.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
IT	-61.690107° E	56.544648° N	12.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IU	-61.689321° E	56.544423° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
IV	-61.689501° E	56.544774° N	10.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
IW	-61.689164° E	56.544548° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
IX	-61.688987° E	56.544693° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
IY	-61.689626° E	56.545043° N	12.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
IZ	-61.688825° E	56.544474° N	6.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
JA	-61.688620° E	56.544588° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JB	-61.688512° E	56.544749° N	5.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
JC	-61.688702° E	56.544894° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JD	-61.688264° E	56.545456° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JE	-61.688483° E	56.545123° N	7.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JF	-61.688656° E	56.545486° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JG	-61.688770° E	56.545305° N	9.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
JH	-61.688482° E	56.545870° N	10.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JI	-61.688982° E	56.546012° N	14.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JJ	-61.689334° E	56.546113° N	17.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JK	-61.689711° E	56.546238° N	20.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JL	-61.690052° E	56.546313° N	23.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JM	-61.688297° E	56.546059° N	10.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
JN	-61.688753° E	56.546221° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JO	-61.689196° E	56.546319° N	17.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
JP	-61.689492° E	56.546398° N	20.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
JQ	-61.688114° E	56.546306° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JR	-61.688575° E	56.546418° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JS	-61.688974° E	56.546540° N	17.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JT	-61.689338° E	56.546623° N	20.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
JU	-61.689690° E	56.546714° N	24.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
JV	-61.687997° E	56.546543° N	11.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JW	-61.688448° E	56.546630° N	14.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
JX	-61.688786° E	56.546725° N	17.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JY	-61.689109° E	56.546842° N	20.7	1.0	1.0	1.0	0.0	90.0	Fixed direction

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1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
JZ	-61.687771° E	56.546799° N	11.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KA	-61.688173° E	56.546869° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
KB	-61.688514° E	56.546977° N	17.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KC	-61.689141° E	56.547171° N	24.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
KD	-61.687240° E	56.546747° N	8.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KE	-61.687551° E	56.547122° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
KF	-61.687879° E	56.547172° N	14.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
KG	-61.688184° E	56.547249° N	17.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KH	-61.688469° E	56.547408° N	22.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KI	-61.687002° E	56.547185° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KJ	-61.687372° E	56.547360° N	13.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KK	-61.687666° E	56.547417° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KL	-61.687773° E	56.547674° N	19.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KM	-61.687236° E	56.547504° N	13.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
KN	-61.687006° E	56.547820° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
KO	-61.687491° E	56.547961° N	20.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
KP	-61.687301° E	56.548142° N	21.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KQ	-61.686938° E	56.548009° N	16.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KR	-61.686857° E	56.548366° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KS	-61.686549° E	56.548285° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KT	-61.685326° E	56.549292° N	16.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
KU	-61.685430° E	56.548669° N	10.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
KV	-61.685622° E	56.549117° N	17.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
KW	-61.685883° E	56.548970° N	18.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
KX	-61.686048° E	56.548873° N	18.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
KY	-61.686207° E	56.548753° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
KZ	-61.690946° E	56.542205° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LA	-61.691518° E	56.541952° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LB	-61.691132° E	56.542072° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LC	-61.696277° E	56.538851° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LD	-61.696125° E	56.538474° N	18.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LE	-61.696595° E	56.538750° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LF	-61.696611° E	56.538441° N	19.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LG	-61.696858° E	56.538774° N	14.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LH	-61.696988° E	56.538427° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
LI	-61.697186° E	56.538755° N	14.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LJ	-61.697240° E	56.538479° N	18.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LK	-61.697490° E	56.538765° N	14.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
LL	-61.697487° E	56.538476° N	18.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LM	-61.697795° E	56.538706° N	14.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LN	-61.697753° E	56.538461° N	18.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LO	-61.698093° E	56.538461° N	17.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LP	-61.695848° E	56.539518° N	9.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LQ	-61.695799° E	56.538488° N	18.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LR	-61.695494° E	56.538579° N	17.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
LS	-61.695272° E	56.538639° N	16.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LT	-61.694789° E	56.538839° N	13.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LU	-61.694566° E	56.538591° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
LV	-61.694210° E	56.538152° N	20.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LW	-61.694394° E	56.538349° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LX	-61.695398° E	56.538212° N	23.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LY	-61.694910° E	56.538300° N	20.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LZ	-61.693775° E	56.538241° N	18.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
MA	-61.693404° E	56.538355° N	15.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MB	-61.690123° E	56.537061° N	27.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
MC	-61.694017° E	56.538812° N	12.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
MD	-61.693898° E	56.538479° N	15.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
ME	-61.693511° E	56.538630° N	13.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MF	-61.693609° E	56.538898° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
MG	-61.692378° E	56.538774° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
MH	-61.694080° E	56.539043° N	10.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
MI	-61.694731° E	56.539119° N	11.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
MJ	-61.694747° E	56.539375° N	9.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
MK	-61.693681° E	56.539440° N	6.8	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
ML	-61.693557° E	56.539256° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MM	-61.694145° E	56.539333° N	8.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
MN	-61.694294° E	56.539647° N	6.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
MO	-61.694806° E	56.539613° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MP	-61.695180° E	56.539873° N	6.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
MQ	-61.694769° E	56.539901° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
MR	-61.693815° E	56.540196° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MS	-61.693963° E	56.540005° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MT	-61.694392° E	56.539940° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MU	-61.695464° E	56.539860° N	6.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
MV	-61.691900° E	56.538022° N	18.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MW	-61.691986° E	56.538225° N	16.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
MX	-61.692915° E	56.539239° N	6.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
MY	-61.692283° E	56.539366° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MZ	-61.691011° E	56.538563° N	10.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NA	-61.691548° E	56.539060° N	7.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
NB	-61.691119° E	56.539419° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NC	-61.689539° E	56.538588° N	8.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
ND	-61.689025° E	56.539169° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NE	-61.689986° E	56.539351° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NF	-61.690087° E	56.539278° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NG	-61.690324° E	56.539198° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NH	-61.709795° E	56.537719° N	41.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
NI	-61.709676° E	56.538038° N	42.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NJ	-61.709296° E	56.537975° N	41.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NK	-61.710657° E	56.538402° N	46.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
NL	-61.710873° E	56.538766° N	49.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
NM	-61.709400° E	56.539817° N	54.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NN	-61.708953° E	56.539675° N	53.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NO	-61.709234° E	56.539345° N	50.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
NP	-61.709671° E	56.539404° N	52.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
NQ	-61.709627° E	56.538504° N	45.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
NR	-61.709365° E	56.538477° N	45.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NS	-61.706368° E	56.537682° N	33.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NT	-61.713091° E	56.539705° N	63.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NU	-61.710402° E	56.539769° N	56.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
NV	-61.710266° E	56.539952° N	57.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
NW	-61.710265° E	56.540288° N	60.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
NX	-61.710028° E	56.540550° N	63.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
NY	-61.709249° E	56.540372° N	59.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
NZ	-61.708959° E	56.540311° N	58.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OA	-61.708746° E	56.540303° N	57.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
OB	-61.709930° E	56.540943° N	68.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OC	-61.709495° E	56.540919° N	66.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
OD	-61.708941° E	56.541060° N	66.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
OE	-61.708439° E	56.540946° N	63.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
OF	-61.707955° E	56.540915° N	61.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
OG	-61.707494° E	56.540856° N	59.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OH	-61.708340° E	56.540245° N	56.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
OI	-61.707806° E	56.540138° N	53.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
OJ	-61.707349° E	56.540150° N	52.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
OK	-61.706708° E	56.540137° N	49.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OL	-61.706442° E	56.540100° N	47.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
OM	-61.706311° E	56.538519° N	37.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
ON	-61.703938° E	56.538054° N	24.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
OO	-61.704504° E	56.541170° N	47.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OP	-61.703344° E	56.541103° N	40.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OQ	-61.711201° E	56.536969° N	43.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OR	-61.689378° E	56.534597° N	33.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
OS	-61.691957° E	56.534681° N	50.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
OT	-61.692196° E	56.534555° N	53.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
OU	-61.691898° E	56.533772° N	57.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OV	-61.691239° E	56.537834° N	20.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
OW	-61.691277° E	56.539805° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
OX	-61.695841° E	56.538760° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OY	-61.700221° E	56.540229° N	17.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
OZ	-61.693924° E	56.541436° N	5.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
PA	-61.693462° E	56.541670° N	5.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
PB	-61.693366° E	56.541690° N	5.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
PC	-61.692539° E	56.541514° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PD	-61.691642° E	56.541820° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PE	-61.692643° E	56.542051° N	5.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
PF	-61.693132° E	56.542211° N	7.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PG	-61.693341° E	56.542281° N	8.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PH	-61.694457° E	56.542566° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
PI	-61.691696° E	56.542387° N	5.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PJ	-61.691355° E	56.542362° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PK	-61.692146° E	56.544383° N	17.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
PL	-61.692352° E	56.546193° N	39.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
PM	-61.687956° E	56.547506° N	18.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
PN	-61.687459° E	56.552932° N	12.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PO	-61.682718° E	56.552342° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
PP	-61.682552° E	56.552676° N	6.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
PQ	-61.682675° E	56.552713° N	6.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PR	-61.682748° E	56.552753° N	6.1	1.0	1.0	1.0	0.0	90.0	Fixed direction

Calculation Results

Shadow receptor

No.	Shadow, worst case Shadow hours per year	Shadow days per year	Max shadow hours per day
	[h/year]	[days/year]	[h/day]
A	0:00	0	0:00
B	0:00	0	0:00
C	0:00	0	0:00
D	0:00	0	0:00
E	0:00	0	0:00
F	0:00	0	0:00
G	0:00	0	0:00
H	0:00	0	0:00
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	0:00	0	0:00
M	0:00	0	0:00
N	0:00	0	0:00
O	0:00	0	0:00
P	0:00	0	0:00
Q	0:00	0	0:00
R	0:00	0	0:00
S	0:00	0	0:00
T	0:00	0	0:00
U	0:00	0	0:00
V	0:00	0	0:00
W	0:00	0	0:00
X	0:00	0	0:00
Y	0:00	0	0:00
Z	0:00	0	0:00
AA	0:00	0	0:00
AB	0:00	0	0:00
AC	0:00	0	0:00
AD	0:00	0	0:00
AE	0:00	0	0:00
AF	0:00	0	0:00
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
AJ	0:00	0	0:00
AK	0:00	0	0:00
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00
BQ	0:00	0	0:00
BR	0:00	0	0:00
BS	0:00	0	0:00
BT	0:00	0	0:00
BU	0:00	0	0:00
BV	0:00	0	0:00
BW	0:00	0	0:00
BX	0:00	0	0:00
BY	0:00	0	0:00
BZ	0:00	0	0:00
CA	0:00	0	0:00
CB	0:00	0	0:00
CC	0:00	0	0:00
CD	0:00	0	0:00
CE	0:00	0	0:00
CF	0:00	0	0:00
CG	0:00	0	0:00
CH	0:00	0	0:00
CI	0:00	0	0:00
CJ	0:00	0	0:00
CK	0:00	0	0:00
CL	0:00	0	0:00
CM	0:00	0	0:00
CN	0:00	0	0:00
CO	0:00	0	0:00
CP	0:00	0	0:00
CQ	0:00	0	0:00
CR	0:00	0	0:00
CS	0:00	0	0:00
CT	0:00	0	0:00

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Calculated:
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SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
CU	0:00	0	0:00
CV	0:00	0	0:00
CW	0:00	0	0:00
CX	0:00	0	0:00
CY	0:00	0	0:00
CZ	0:00	0	0:00
DA	0:00	0	0:00
DB	0:00	0	0:00
DC	0:00	0	0:00
DD	0:00	0	0:00
DE	0:00	0	0:00
DF	0:00	0	0:00
DG	0:00	0	0:00
DH	0:00	0	0:00
DI	0:00	0	0:00
DJ	0:00	0	0:00
DK	0:00	0	0:00
DL	0:00	0	0:00
DM	0:00	0	0:00
DN	0:00	0	0:00
DO	0:00	0	0:00
DP	0:00	0	0:00
DQ	0:00	0	0:00
DR	0:00	0	0:00
DS	0:00	0	0:00
DT	0:00	0	0:00
DU	0:00	0	0:00
DV	0:00	0	0:00
DW	0:00	0	0:00
DX	0:00	0	0:00
DY	0:00	0	0:00
DZ	0:00	0	0:00
EA	0:00	0	0:00
EB	0:00	0	0:00
EC	0:00	0	0:00
ED	0:00	0	0:00
EE	0:00	0	0:00
EF	0:00	0	0:00
EG	0:00	0	0:00
EH	0:00	0	0:00
EI	0:00	0	0:00
EJ	0:00	0	0:00
EK	0:00	0	0:00
EL	0:00	0	0:00
EM	0:00	0	0:00
EN	0:00	0	0:00
EO	0:00	0	0:00
EP	0:00	0	0:00
EQ	0:00	0	0:00
ER	0:00	0	0:00
ES	0:00	0	0:00
ET	0:00	0	0:00
EU	0:00	0	0:00
EV	0:00	0	0:00
EW	0:00	0	0:00
EX	0:00	0	0:00
EY	0:00	0	0:00
EZ	0:00	0	0:00
FA	0:00	0	0:00
FB	0:00	0	0:00
FC	0:00	0	0:00
FD	0:00	0	0:00
FE	0:00	0	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
FF	0:00	0	0:00
FG	0:00	0	0:00
FH	0:00	0	0:00
FI	0:00	0	0:00
FJ	0:00	0	0:00
FK	0:00	0	0:00
FL	0:00	0	0:00
FM	0:00	0	0:00
FN	0:00	0	0:00
FO	0:00	0	0:00
FP	0:00	0	0:00
FQ	0:00	0	0:00
FR	0:00	0	0:00
FS	0:00	0	0:00
FT	0:00	0	0:00
FU	0:00	0	0:00
FV	0:00	0	0:00
FW	0:00	0	0:00
FX	0:00	0	0:00
FY	0:00	0	0:00
FZ	0:00	0	0:00
GA	0:00	0	0:00
GB	0:00	0	0:00
GC	0:00	0	0:00
GD	0:00	0	0:00
GE	0:00	0	0:00
GF	0:00	0	0:00
GG	0:00	0	0:00
GH	0:00	0	0:00
GI	0:00	0	0:00
GJ	0:00	0	0:00
GK	0:00	0	0:00
GL	0:00	0	0:00
GM	0:00	0	0:00
GN	0:00	0	0:00
GO	0:00	0	0:00
GP	0:00	0	0:00
GQ	0:00	0	0:00
GR	0:00	0	0:00
GS	0:00	0	0:00
GT	0:00	0	0:00
GU	0:00	0	0:00
GV	0:00	0	0:00
GW	0:00	0	0:00
GX	0:00	0	0:00
GY	0:00	0	0:00
GZ	0:00	0	0:00
HA	0:00	0	0:00
HB	0:00	0	0:00
HC	0:00	0	0:00
HD	0:00	0	0:00
HE	0:00	0	0:00
HF	0:00	0	0:00
HG	0:00	0	0:00
HH	0:00	0	0:00
HI	0:00	0	0:00
HJ	0:00	0	0:00
HK	0:00	0	0:00
HL	0:00	0	0:00
HM	0:00	0	0:00
HN	0:00	0	0:00
HO	0:00	0	0:00
HP	0:00	0	0:00

To be continued on next page...

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Calculated:
1/18/2021 12:24 PM/3.1.633

SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
HQ	0:00	0	0:00
HR	0:00	0	0:00
HS	0:00	0	0:00
HT	0:00	0	0:00
HU	0:00	0	0:00
HV	0:00	0	0:00
HW	0:00	0	0:00
HX	0:00	0	0:00
HY	0:00	0	0:00
HZ	0:00	0	0:00
IA	0:00	0	0:00
IB	0:00	0	0:00
IC	0:00	0	0:00
ID	0:00	0	0:00
IE	0:00	0	0:00
IF	0:00	0	0:00
IG	0:00	0	0:00
IH	0:00	0	0:00
II	0:00	0	0:00
IJ	0:00	0	0:00
IK	0:00	0	0:00
IL	0:00	0	0:00
IM	0:00	0	0:00
IN	0:00	0	0:00
IO	0:00	0	0:00
IP	0:00	0	0:00
IQ	0:00	0	0:00
IR	0:00	0	0:00
IS	0:00	0	0:00
IT	0:00	0	0:00
IU	0:00	0	0:00
IV	0:00	0	0:00
IW	0:00	0	0:00
IX	0:00	0	0:00
IY	0:00	0	0:00
IZ	0:00	0	0:00
JA	0:00	0	0:00
JB	0:00	0	0:00
JC	0:00	0	0:00
JD	0:00	0	0:00
JE	0:00	0	0:00
JF	0:00	0	0:00
JG	0:00	0	0:00
JH	0:00	0	0:00
JI	0:00	0	0:00
JJ	0:00	0	0:00
JK	0:00	0	0:00
JL	0:00	0	0:00
JM	0:00	0	0:00
JN	0:00	0	0:00
JO	0:00	0	0:00
JP	0:00	0	0:00
JQ	0:00	0	0:00
JR	0:00	0	0:00
JS	0:00	0	0:00
JT	0:00	0	0:00
JU	0:00	0	0:00
JV	0:00	0	0:00
JW	0:00	0	0:00
JX	0:00	0	0:00
JY	0:00	0	0:00
JZ	0:00	0	0:00
KA	0:00	0	0:00

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SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
KB	0:00	0	0:00
KC	0:00	0	0:00
KD	0:00	0	0:00
KE	0:00	0	0:00
KF	0:00	0	0:00
KG	0:00	0	0:00
KH	0:00	0	0:00
KI	0:00	0	0:00
KJ	0:00	0	0:00
KK	0:00	0	0:00
KL	0:00	0	0:00
KM	0:00	0	0:00
KN	0:00	0	0:00
KO	0:00	0	0:00
KP	0:00	0	0:00
KQ	0:00	0	0:00
KR	0:00	0	0:00
KS	0:00	0	0:00
KT	0:00	0	0:00
KU	0:00	0	0:00
KV	0:00	0	0:00
KW	0:00	0	0:00
KX	0:00	0	0:00
KY	0:00	0	0:00
KZ	0:00	0	0:00
LA	0:00	0	0:00
LB	0:00	0	0:00
LC	0:00	0	0:00
LD	0:00	0	0:00
LE	0:00	0	0:00
LF	0:00	0	0:00
LG	0:00	0	0:00
LH	0:00	0	0:00
LI	0:00	0	0:00
LJ	0:00	0	0:00
LK	0:00	0	0:00
LL	0:00	0	0:00
LM	0:00	0	0:00
LN	0:00	0	0:00
LO	0:00	0	0:00
LP	0:00	0	0:00
LQ	0:00	0	0:00
LR	0:00	0	0:00
LS	0:00	0	0:00
LT	0:00	0	0:00
LU	0:00	0	0:00
LV	0:00	0	0:00
LW	0:00	0	0:00
LX	0:00	0	0:00
LY	0:00	0	0:00
LZ	0:00	0	0:00
MA	0:00	0	0:00
MB	0:00	0	0:00
MC	0:00	0	0:00
MD	0:00	0	0:00
ME	0:00	0	0:00
MF	0:00	0	0:00
MG	0:00	0	0:00
MH	0:00	0	0:00
MI	0:00	0	0:00
MJ	0:00	0	0:00
MK	0:00	0	0:00
ML	0:00	0	0:00

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SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
MM	0:00	0	0:00
MN	0:00	0	0:00
MO	0:00	0	0:00
MP	0:00	0	0:00
MQ	0:00	0	0:00
MR	0:00	0	0:00
MS	0:00	0	0:00
MT	0:00	0	0:00
MU	0:00	0	0:00
MV	0:00	0	0:00
MW	0:00	0	0:00
MX	0:00	0	0:00
MY	0:00	0	0:00
MZ	0:00	0	0:00
NA	0:00	0	0:00
NB	0:00	0	0:00
NC	0:00	0	0:00
ND	0:00	0	0:00
NE	0:00	0	0:00
NF	0:00	0	0:00
NG	0:00	0	0:00
NH	0:00	0	0:00
NI	0:00	0	0:00
NJ	0:00	0	0:00
NK	0:00	0	0:00
NL	0:00	0	0:00
NM	0:00	0	0:00
NN	0:00	0	0:00
NO	0:00	0	0:00
NP	0:00	0	0:00
NQ	0:00	0	0:00
NR	0:00	0	0:00
NS	0:00	0	0:00
NT	0:00	0	0:00
NU	0:00	0	0:00
NV	0:00	0	0:00
NW	0:00	0	0:00
NX	0:00	0	0:00
NY	0:00	0	0:00
NZ	0:00	0	0:00
OA	0:00	0	0:00
OB	0:00	0	0:00
OC	0:00	0	0:00
OD	0:00	0	0:00
OE	0:00	0	0:00
OF	0:00	0	0:00
OG	0:00	0	0:00
OH	0:00	0	0:00
OI	0:00	0	0:00
OJ	0:00	0	0:00
OK	0:00	0	0:00
OL	0:00	0	0:00
OM	0:00	0	0:00
ON	0:00	0	0:00
OO	0:00	0	0:00
OP	0:00	0	0:00
OQ	0:00	0	0:00
OR	0:00	0	0:00
OS	0:00	0	0:00
OT	0:00	0	0:00
OU	0:00	0	0:00
OV	0:00	0	0:00
OW	0:00	0	0:00

To be continued on next page...

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SHADOW - Main Result

Calculation: Nain E-44 Worst Case Shadow

...continued from previous page

No.	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
OX	0:00	0	0:00
OY	0:00	0	0:00
OZ	0:00	0	0:00
PA	0:00	0	0:00
PB	0:00	0	0:00
PC	0:00	0	0:00
PD	0:00	0	0:00
PE	0:00	0	0:00
PF	0:00	0	0:00
PG	0:00	0	0:00
PH	0:00	0	0:00
PI	0:00	0	0:00
PJ	0:00	0	0:00
PK	0:00	0	0:00
PL	0:00	0	0:00
PM	0:00	0	0:00
PN	0:00	0	0:00
PO	0:00	0	0:00
PP	0:00	0	0:00
PQ	0:00	0	0:00
PR	0:00	0	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]
1	ENERCON E-44 900 44.0 !-! hub: 55.0 m (TOT: 77.0 m) (1)	0:00
2	ENERCON E-44 900 44.0 !-! hub: 55.0 m (TOT: 77.0 m) (2)	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

APPENDIX D:

WindPRO v3.1, Decibel Module Calculation Results E-82: Worst Case

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1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

Assumptions for shadow calculations

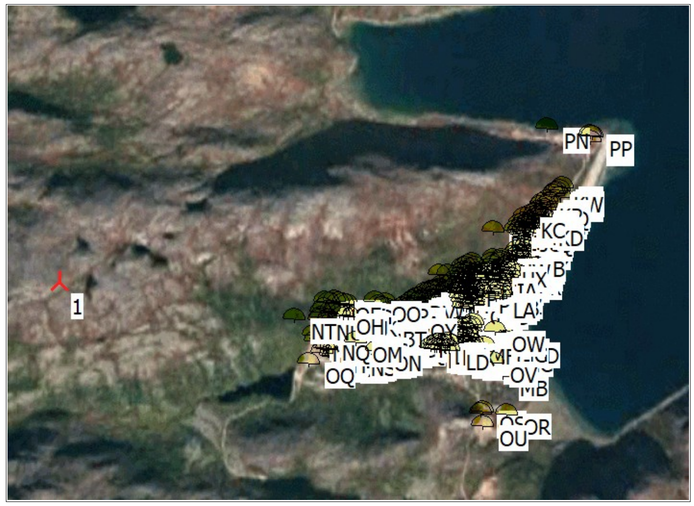
Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Nain_1.wpo (1)
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10.0 m

All coordinates are in
Geo [deg]-WGS84



Scale 1:50,000
New WTG   Shadow receptor

WTGs

					WTG type						Shadow data	
	Longitude	Latitude	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	-61.738726° E	56.541033° N	235.0	ENERCON E-82 E4 2350 82.0 !O! hub: 58.9 ...	Yes	ENERCON	E-82 E4-2,350	2,350	82.0	58.9	1,604	18.0

Shadow receptor-Input

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	-61.710039° E	56.538514° N	46.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
B	-61.709058° E	56.538451° N	44.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
C	-61.708542° E	56.539667° N	52.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
D	-61.708691° E	56.539264° N	49.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
E	-61.708874° E	56.538804° N	46.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
F	-61.708016° E	56.539604° N	50.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
G	-61.708884° E	56.537909° N	40.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
H	-61.708891° E	56.537551° N	39.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
I	-61.707548° E	56.539512° N	48.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
J	-61.708332° E	56.539207° N	48.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
K	-61.708505° E	56.538736° N	45.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
L	-61.708712° E	56.538408° N	43.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
M	-61.708613° E	56.537891° N	40.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
N	-61.708576° E	56.537505° N	38.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
O	-61.708309° E	56.537866° N	39.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
P	-61.708419° E	56.538394° N	42.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
Q	-61.708109° E	56.538345° N	41.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
R	-61.708274° E	56.537513° N	37.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
S	-61.707720° E	56.539165° N	46.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
T	-61.707937° E	56.537887° N	38.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
U	-61.707972° E	56.537495° N	36.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
V	-61.708187° E	56.538731° N	44.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
W	-61.707436° E	56.539109° N	45.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
X	-61.707663° E	56.537541° N	36.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
Y	-61.707224° E	56.537551° N	35.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
Z	-61.707917° E	56.538698° N	43.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AA	-61.707819° E	56.538346° N	40.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
AB	-61.707457° E	56.538231° N	39.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
AC	-61.707459° E	56.537925° N	37.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
AD	-61.707017° E	56.537748° N	35.6	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
AE	-61.706885° E	56.537888° N	36.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AF	-61.706676° E	56.538140° N	36.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
AG	-61.706673° E	56.537576° N	33.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
AH	-61.707409° E	56.537401° N	35.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AI	-61.706891° E	56.537573° N	34.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
AJ	-61.706199° E	56.538120° N	35.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AK	-61.705775° E	56.538106° N	33.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
AL	-61.707146° E	56.539090° N	44.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AM	-61.706839° E	56.539095° N	42.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
AN	-61.707594° E	56.538691° N	42.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
AO	-61.707309° E	56.538634° N	41.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
AP	-61.707026° E	56.538575° N	40.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AQ	-61.706735° E	56.538560° N	39.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AR	-61.706527° E	56.539023° N	41.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
AS	-61.707291° E	56.539501° N	47.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
AT	-61.706976° E	56.539491° N	46.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
AU	-61.706616° E	56.539405° N	43.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
AV	-61.706196° E	56.538996° N	39.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AW	-61.705815° E	56.538936° N	37.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
AX	-61.706347° E	56.539383° N	42.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AY	-61.706037° E	56.539322° N	40.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
AZ	-61.705736° E	56.539263° N	38.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BA	-61.705401° E	56.539310° N	37.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BB	-61.706715° E	56.540447° N	52.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BC	-61.706298° E	56.540405° N	49.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BD	-61.705814° E	56.540351° N	46.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
BE	-61.705956° E	56.540044° N	44.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BF	-61.705325° E	56.540258° N	42.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BG	-61.704770° E	56.540129° N	38.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
BH	-61.705524° E	56.539931° N	41.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BI	-61.705036° E	56.539694° N	37.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BJ	-61.704063° E	56.540934° N	42.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BK	-61.703730° E	56.540827° N	39.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BL	-61.703295° E	56.540791° N	36.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
BM	-61.704011° E	56.539989° N	34.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BN	-61.704208° E	56.539770° N	34.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
BO	-61.704315° E	56.539621° N	33.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
BP	-61.704445° E	56.539481° N	33.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BQ	-61.704605° E	56.539301° N	33.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
BR	-61.704935° E	56.538979° N	33.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BS	-61.705098° E	56.538845° N	33.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
BT	-61.703148° E	56.539644° N	27.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
BU	-61.703315° E	56.539393° N	27.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BV	-61.703434° E	56.539268° N	27.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
BW	-61.703621° E	56.539086° N	27.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
BX	-61.703722° E	56.538918° N	27.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
BY	-61.704117° E	56.538482° N	27.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
BZ	-61.704404° E	56.538384° N	28.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
CA	-61.704689° E	56.538278° N	29.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
CB	-61.704955° E	56.538173° N	29.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
CC	-61.705375° E	56.538119° N	31.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
CD	-61.704355° E	56.537933° N	25.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
CE	-61.704704° E	56.537860° N	26.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
CF	-61.703215° E	56.538865° N	24.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
CG	-61.702470° E	56.539523° N	23.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CH	-61.702574° E	56.539367° N	23.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
CI	-61.702264° E	56.539947° N	24.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
CJ	-61.702792° E	56.539999° N	27.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CK	-61.702850° E	56.538797° N	21.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CL	-61.702295° E	56.538615° N	17.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
CM	-61.702470° E	56.538833° N	19.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CN	-61.702190° E	56.538920° N	18.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
CO	-61.701744° E	56.538748° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
CP	-61.701890° E	56.539021° N	17.6	1.0	1.0	1.0	0.0	90.0	Fixed direction

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SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
CQ	-61.701437° E	56.538811° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CR	-61.701635° E	56.539082° N	16.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
CS	-61.701179° E	56.538943° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CT	-61.700960° E	56.539053° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CU	-61.701344° E	56.539233° N	16.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CV	-61.702000° E	56.540159° N	24.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
CW	-61.701105° E	56.539587° N	16.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
CX	-61.700803° E	56.539149° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
CY	-61.700892° E	56.539730° N	16.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
CZ	-61.702630° E	56.540614° N	31.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DA	-61.702080° E	56.540676° N	28.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DB	-61.701762° E	56.540383° N	24.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
DC	-61.701490° E	56.540513° N	24.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DD	-61.701726° E	56.540844° N	28.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
DE	-61.700282° E	56.539722° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
DF	-61.700404° E	56.539554° N	13.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
DG	-61.700082° E	56.539955° N	14.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
DH	-61.701206° E	56.540664° N	24.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DI	-61.701468° E	56.540940° N	27.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
DJ	-61.700227° E	56.540693° N	20.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DK	-61.701207° E	56.541049° N	27.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DL	-61.700230° E	56.541078° N	23.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DM	-61.700684° E	56.540375° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
DN	-61.700602° E	56.539995° N	17.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
DO	-61.699170° E	56.540439° N	14.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DP	-61.700582° E	56.540833° N	22.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
DQ	-61.700831° E	56.540928° N	24.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
DR	-61.700711° E	56.541274° N	27.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
DS	-61.699803° E	56.540759° N	18.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
DT	-61.699554° E	56.540899° N	18.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
DU	-61.700073° E	56.541243° N	23.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
DV	-61.700504° E	56.541408° N	27.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DW	-61.700194° E	56.541514° N	26.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
DX	-61.699310° E	56.541007° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
DY	-61.699812° E	56.541378° N	23.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
DZ	-61.699905° E	56.541639° N	26.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
EA	-61.699529° E	56.541469° N	22.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
EB	-61.698492° E	56.541361° N	18.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EC	-61.699214° E	56.541547° N	21.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
ED	-61.699177° E	56.541939° N	25.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
EE	-61.698905° E	56.541991° N	24.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
EF	-61.698606° E	56.542123° N	25.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EG	-61.698384° E	56.542128° N	24.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
EH	-61.698246° E	56.542205° N	24.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
EI	-61.698036° E	56.542207° N	24.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EJ	-61.697811° E	56.542252° N	24.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
EK	-61.699668° E	56.540027° N	13.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
EL	-61.697427° E	56.541351° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
EM	-61.697105° E	56.541050° N	12.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
EN	-61.696244° E	56.541214° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
EO	-61.697427° E	56.541914° N	19.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
EP	-61.698630° E	56.541678° N	21.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
EQ	-61.698232° E	56.541808° N	21.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
ER	-61.697525° E	56.542290° N	23.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
ES	-61.697827° E	56.543205° N	35.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
ET	-61.696856° E	56.543205° N	29.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EU	-61.697460° E	56.542509° N	25.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
EV	-61.696834° E	56.542484° N	21.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
EW	-61.696948° E	56.542143° N	19.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
EX	-61.697037° E	56.541695° N	16.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
EY	-61.696595° E	56.542249° N	18.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
EZ	-61.696321° E	56.541949° N	14.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
FA	-61.696201° E	56.541551° N	11.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
FB	-61.695789° E	56.541669° N	11.2	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
FC	-61.695891° E	56.542113° N	14.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FD	-61.696197° E	56.542379° N	17.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FE	-61.696178° E	56.542799° N	20.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FF	-61.695906° E	56.542473° N	16.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
FG	-61.695547° E	56.542125° N	13.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
FH	-61.695385° E	56.541820° N	11.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FI	-61.695094° E	56.541579° N	9.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
FJ	-61.695544° E	56.542599° N	16.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
FK	-61.694962° E	56.542042° N	11.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
FL	-61.695623° E	56.543320° N	22.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
FM	-61.694127° E	56.541196° N	5.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
FN	-61.693852° E	56.541214° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FO	-61.693177° E	56.541290° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FP	-61.693653° E	56.541515° N	5.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
FQ	-61.694256° E	56.541308° N	6.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
FR	-61.694580° E	56.541152° N	5.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
FS	-61.694953° E	56.541175° N	6.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
FT	-61.694489° E	56.541546° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
FU	-61.694160° E	56.541712° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
FV	-61.694826° E	56.541736° N	9.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
FW	-61.693833° E	56.541905° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
FX	-61.693499° E	56.542042° N	7.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
FY	-61.694620° E	56.542138° N	10.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
FZ	-61.694165° E	56.542112° N	9.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
GA	-61.693720° E	56.542248° N	8.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
GB	-61.695177° E	56.542262° N	12.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
GC	-61.694784° E	56.542414° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GD	-61.695143° E	56.542454° N	13.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
GE	-61.694080° E	56.542328° N	10.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
GF	-61.693552° E	56.542507° N	9.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GG	-61.695103° E	56.542750° N	15.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GH	-61.694836° E	56.542851° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
GI	-61.695366° E	56.542992° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
GJ	-61.695022° E	56.543112° N	17.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
GK	-61.695219° E	56.543465° N	21.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
GL	-61.695096° E	56.543773° N	24.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
GM	-61.695356° E	56.543701° N	25.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
GN	-61.694833° E	56.543914° N	24.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
GO	-61.694432° E	56.544066° N	24.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
GP	-61.694028° E	56.543840° N	20.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
GQ	-61.694430° E	56.543657° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
GR	-61.694815° E	56.543513° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
GS	-61.694682° E	56.543189° N	17.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
GT	-61.694294° E	56.543311° N	16.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GU	-61.694039° E	56.543398° N	16.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
GV	-61.693728° E	56.543481° N	15.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
GW	-61.694211° E	56.543040° N	14.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
GX	-61.693843° E	56.543133° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
GY	-61.693678° E	56.543225° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
GZ	-61.693350° E	56.543291° N	13.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HA	-61.693595° E	56.543141° N	13.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
HB	-61.693722° E	56.542940° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HC	-61.692342° E	56.542869° N	8.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
HD	-61.691665° E	56.542521° N	5.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
HE	-61.693823° E	56.542413° N	9.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
HF	-61.694194° E	56.542661° N	12.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
HG	-61.694374° E	56.542242° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HH	-61.693786° E	56.542762° N	11.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
HI	-61.693450° E	56.542914° N	11.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HJ	-61.693051° E	56.543069° N	11.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
HK	-61.691425° E	56.543720° N	10.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
HL	-61.691592° E	56.543585° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HM	-61.692081° E	56.543956° N	14.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
HN	-61.692151° E	56.543388° N	11.0	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
HO	-61.692388° E	56.543617° N	13.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
HP	-61.692504° E	56.543225° N	11.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
HQ	-61.692638° E	56.543465° N	12.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
HR	-61.692894° E	56.543396° N	13.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
HS	-61.692987° E	56.543487° N	13.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
HT	-61.692359° E	56.544135° N	16.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
HU	-61.691411° E	56.544154° N	13.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HV	-61.691297° E	56.544314° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
HW	-61.691174° E	56.544437° N	14.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HX	-61.690848° E	56.543976° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
HY	-61.690756° E	56.543618° N	8.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
HZ	-61.690949° E	56.543366° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IA	-61.691277° E	56.543200° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IB	-61.691510° E	56.543103° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
IC	-61.691677° E	56.543162° N	8.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
ID	-61.691041° E	56.542533° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IE	-61.691200° E	56.542777° N	5.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
IF	-61.690945° E	56.542952° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IG	-61.690710° E	56.543114° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IH	-61.690097° E	56.543284° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
II	-61.689352° E	56.543510° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IJ	-61.690320° E	56.543768° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
IK	-61.688625° E	56.543568° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IL	-61.689852° E	56.543773° N	6.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
IM	-61.690250° E	56.544171° N	9.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IN	-61.689930° E	56.543998° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IO	-61.689677° E	56.544130° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
IP	-61.689019° E	56.543896° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IQ	-61.689978° E	56.544320° N	9.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
IR	-61.688652° E	56.544090° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IS	-61.689859° E	56.544543° N	10.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
IT	-61.690107° E	56.544648° N	12.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
IU	-61.689321° E	56.544423° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
IV	-61.689501° E	56.544774° N	10.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
IW	-61.689164° E	56.544548° N	7.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
IX	-61.688987° E	56.544693° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
IY	-61.689626° E	56.545043° N	12.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
IZ	-61.688825° E	56.544474° N	6.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
JA	-61.688620° E	56.544588° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JB	-61.688512° E	56.544749° N	5.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
JC	-61.688702° E	56.544894° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JD	-61.688264° E	56.545456° N	7.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JE	-61.688483° E	56.545123° N	7.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JF	-61.688656° E	56.545486° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JG	-61.688770° E	56.545305° N	9.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
JH	-61.688482° E	56.545870° N	10.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JI	-61.688982° E	56.546012° N	14.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JJ	-61.689334° E	56.546113° N	17.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JK	-61.689711° E	56.546238° N	20.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JL	-61.690052° E	56.546313° N	23.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JM	-61.688297° E	56.546059° N	10.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
JN	-61.688753° E	56.546221° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JO	-61.689196° E	56.546319° N	17.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
JP	-61.689492° E	56.546398° N	20.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
JQ	-61.688114° E	56.546306° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JR	-61.688575° E	56.546418° N	14.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JS	-61.688974° E	56.546540° N	17.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
JT	-61.689338° E	56.546623° N	20.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
JU	-61.689690° E	56.546714° N	24.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
JV	-61.687997° E	56.546543° N	11.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
JW	-61.688448° E	56.546630° N	14.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
JX	-61.688786° E	56.546725° N	17.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
JY	-61.689109° E	56.546842° N	20.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
JZ	-61.687771° E	56.546799° N	11.5	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
KA	-61.688173° E	56.546869° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
KB	-61.688514° E	56.546977° N	17.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KC	-61.689141° E	56.547171° N	24.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
KD	-61.687240° E	56.546747° N	8.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KE	-61.687551° E	56.547122° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
KF	-61.687879° E	56.547172° N	14.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
KG	-61.688184° E	56.547249° N	17.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KH	-61.688469° E	56.547408° N	22.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KI	-61.687002° E	56.547185° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KJ	-61.687372° E	56.547360° N	13.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KK	-61.687666° E	56.547417° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KL	-61.687773° E	56.547674° N	19.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KM	-61.687236° E	56.547504° N	13.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
KN	-61.687006° E	56.547820° N	15.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
KO	-61.687491° E	56.547961° N	20.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
KP	-61.687301° E	56.548142° N	21.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
KQ	-61.686938° E	56.548009° N	16.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
KR	-61.686857° E	56.548366° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KS	-61.686549° E	56.548285° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
KT	-61.685326° E	56.549292° N	16.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
KU	-61.685430° E	56.548669° N	10.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
KV	-61.685622° E	56.549117° N	17.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
KW	-61.685883° E	56.548970° N	18.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
KX	-61.686048° E	56.548873° N	18.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
KY	-61.686207° E	56.548753° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
KZ	-61.690946° E	56.542205° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LA	-61.691518° E	56.541952° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LB	-61.691132° E	56.542072° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LC	-61.696277° E	56.538851° N	14.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LD	-61.696125° E	56.538474° N	18.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LE	-61.696595° E	56.538750° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LF	-61.696611° E	56.538441° N	19.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LG	-61.696858° E	56.538774° N	14.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LH	-61.696988° E	56.538427° N	19.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
LI	-61.697186° E	56.538755° N	14.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LJ	-61.697240° E	56.538479° N	18.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LK	-61.697490° E	56.538765° N	14.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
LL	-61.697487° E	56.538476° N	18.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LM	-61.697795° E	56.538706° N	14.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LN	-61.697753° E	56.538461° N	18.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LO	-61.698093° E	56.538461° N	17.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LP	-61.695848° E	56.539518° N	9.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LQ	-61.695799° E	56.538488° N	18.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
LR	-61.695494° E	56.538579° N	17.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
LS	-61.695272° E	56.538639° N	16.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LT	-61.694789° E	56.538839° N	13.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
LU	-61.694566° E	56.538591° N	15.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
LV	-61.694210° E	56.538152° N	20.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
LW	-61.694394° E	56.538349° N	18.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LX	-61.695398° E	56.538212° N	23.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
LY	-61.694910° E	56.538300° N	20.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
LZ	-61.693775° E	56.538241° N	18.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
MA	-61.693404° E	56.538355° N	15.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MB	-61.690123° E	56.537061° N	27.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
MC	-61.694017° E	56.538812° N	12.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
MD	-61.693898° E	56.538479° N	15.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
ME	-61.693511° E	56.538630° N	13.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MF	-61.693609° E	56.538898° N	10.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
MG	-61.692378° E	56.538774° N	10.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
MH	-61.694080° E	56.539043° N	10.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
MI	-61.694731° E	56.539119° N	11.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
MJ	-61.694747° E	56.539375° N	9.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
MK	-61.693681° E	56.539440° N	6.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
ML	-61.693557° E	56.539256° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction

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Calculated:
1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
MM	-61.694145° E	56.539333° N	8.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
MN	-61.694294° E	56.539647° N	6.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
MO	-61.694806° E	56.539613° N	7.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MP	-61.695180° E	56.539873° N	6.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
MQ	-61.694769° E	56.539901° N	5.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
MR	-61.693815° E	56.540196° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MS	-61.693963° E	56.540005° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MT	-61.694392° E	56.539940° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MU	-61.695464° E	56.539860° N	6.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
MV	-61.691900° E	56.538022° N	18.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
MW	-61.691986° E	56.538225° N	16.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
MX	-61.692915° E	56.539239° N	6.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
MY	-61.692283° E	56.539366° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
MZ	-61.691011° E	56.538563° N	10.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NA	-61.691548° E	56.539060° N	7.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
NB	-61.691119° E	56.539419° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NC	-61.689539° E	56.538588° N	8.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
ND	-61.689025° E	56.539169° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NE	-61.689986° E	56.539351° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NF	-61.690087° E	56.539278° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NG	-61.690324° E	56.539198° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NH	-61.709795° E	56.537719° N	41.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
NI	-61.709676° E	56.538038° N	42.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NJ	-61.709296° E	56.537975° N	41.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NK	-61.710657° E	56.538402° N	46.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
NL	-61.710873° E	56.538766° N	49.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
NM	-61.709400° E	56.539817° N	54.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
NN	-61.708953° E	56.539675° N	53.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NO	-61.709234° E	56.539345° N	50.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
NP	-61.709671° E	56.539404° N	52.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
NQ	-61.709627° E	56.538504° N	45.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
NR	-61.709365° E	56.538477° N	45.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NS	-61.706368° E	56.537682° N	33.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NT	-61.713091° E	56.539705° N	63.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
NU	-61.710402° E	56.539769° N	56.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
NV	-61.710266° E	56.539952° N	57.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
NW	-61.710265° E	56.540288° N	60.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
NX	-61.710028° E	56.540550° N	63.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
NY	-61.709249° E	56.540372° N	59.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
NZ	-61.708959° E	56.540311° N	58.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OA	-61.708746° E	56.540303° N	57.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
OB	-61.709930° E	56.540943° N	68.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OC	-61.709495° E	56.540919° N	66.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
OD	-61.708941° E	56.541060° N	66.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
OE	-61.708439° E	56.540946° N	63.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
OF	-61.707955° E	56.540915° N	61.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
OG	-61.707494° E	56.540856° N	59.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OH	-61.708340° E	56.540245° N	56.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
OI	-61.707806° E	56.540138° N	53.9	1.0	1.0	1.0	0.0	90.0	Fixed direction
OJ	-61.707349° E	56.540150° N	52.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
OK	-61.706708° E	56.540137° N	49.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OL	-61.706442° E	56.540100° N	47.5	1.0	1.0	1.0	0.0	90.0	Fixed direction
OM	-61.706311° E	56.538519° N	37.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
ON	-61.703938° E	56.538054° N	24.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
OO	-61.704504° E	56.541170° N	47.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OP	-61.703344° E	56.541103° N	40.3	1.0	1.0	1.0	0.0	90.0	Fixed direction
OQ	-61.711201° E	56.536969° N	43.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OR	-61.689378° E	56.534597° N	33.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
OS	-61.691957° E	56.534681° N	50.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
OT	-61.692196° E	56.534555° N	53.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
OU	-61.691898° E	56.533772° N	57.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
OV	-61.691239° E	56.537834° N	20.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
OW	-61.691277° E	56.539805° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
OX	-61.695841° E	56.538760° N	15.3	1.0	1.0	1.0	0.0	90.0	Fixed direction

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1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Longitude	Latitude	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
OY	-61.700221° E	56.540229° N	17.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
OZ	-61.693924° E	56.541436° N	5.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
PA	-61.693462° E	56.541670° N	5.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
PB	-61.693366° E	56.541690° N	5.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
PC	-61.692539° E	56.541514° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PD	-61.691642° E	56.541820° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PE	-61.692643° E	56.542051° N	5.4	1.0	1.0	1.0	0.0	90.0	Fixed direction
PF	-61.693132° E	56.542211° N	7.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PG	-61.693341° E	56.542281° N	8.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PH	-61.694457° E	56.542566° N	12.6	1.0	1.0	1.0	0.0	90.0	Fixed direction
PI	-61.691696° E	56.542387° N	5.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PJ	-61.691355° E	56.542362° N	5.0	1.0	1.0	1.0	0.0	90.0	Fixed direction
PK	-61.692146° E	56.544383° N	17.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
PL	-61.692352° E	56.546193° N	39.8	1.0	1.0	1.0	0.0	90.0	Fixed direction
PM	-61.687956° E	56.547506° N	18.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
PN	-61.687459° E	56.552932° N	12.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PO	-61.682718° E	56.552342° N	7.7	1.0	1.0	1.0	0.0	90.0	Fixed direction
PP	-61.682552° E	56.552676° N	6.1	1.0	1.0	1.0	0.0	90.0	Fixed direction
PQ	-61.682675° E	56.552713° N	6.2	1.0	1.0	1.0	0.0	90.0	Fixed direction
PR	-61.682748° E	56.552753° N	6.1	1.0	1.0	1.0	0.0	90.0	Fixed direction

Calculation Results

Shadow receptor

	Shadow, worst case		
No.	Shadow hours per year	Shadow days per year	Max shadow hours per day
	[h/year]	[days/year]	[h/day]
A	0:00	0	0:00
B	0:00	0	0:00
C	0:00	0	0:00
D	0:00	0	0:00
E	0:00	0	0:00
F	0:00	0	0:00
G	0:00	0	0:00
H	0:00	0	0:00
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	0:00	0	0:00
M	0:00	0	0:00
N	0:00	0	0:00
O	0:00	0	0:00
P	0:00	0	0:00
Q	0:00	0	0:00
R	0:00	0	0:00
S	0:00	0	0:00
T	0:00	0	0:00
U	0:00	0	0:00
V	0:00	0	0:00
W	0:00	0	0:00
X	0:00	0	0:00
Y	0:00	0	0:00
Z	0:00	0	0:00
AA	0:00	0	0:00
AB	0:00	0	0:00
AC	0:00	0	0:00
AD	0:00	0	0:00
AE	0:00	0	0:00
AF	0:00	0	0:00
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00
AJ	0:00	0	0:00

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SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
AK	0:00	0	0:00
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00
BQ	0:00	0	0:00
BR	0:00	0	0:00
BS	0:00	0	0:00
BT	0:00	0	0:00
BU	0:00	0	0:00
BV	0:00	0	0:00
BW	0:00	0	0:00
BX	0:00	0	0:00
BY	0:00	0	0:00
BZ	0:00	0	0:00
CA	0:00	0	0:00
CB	0:00	0	0:00
CC	0:00	0	0:00
CD	0:00	0	0:00
CE	0:00	0	0:00
CF	0:00	0	0:00
CG	0:00	0	0:00
CH	0:00	0	0:00
CI	0:00	0	0:00
CJ	0:00	0	0:00
CK	0:00	0	0:00
CL	0:00	0	0:00
CM	0:00	0	0:00
CN	0:00	0	0:00
CO	0:00	0	0:00
CP	0:00	0	0:00
CQ	0:00	0	0:00
CR	0:00	0	0:00
CS	0:00	0	0:00
CT	0:00	0	0:00
CU	0:00	0	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
CV	0:00	0	0:00
CW	0:00	0	0:00
CX	0:00	0	0:00
CY	0:00	0	0:00
CZ	0:00	0	0:00
DA	0:00	0	0:00
DB	0:00	0	0:00
DC	0:00	0	0:00
DD	0:00	0	0:00
DE	0:00	0	0:00
DF	0:00	0	0:00
DG	0:00	0	0:00
DH	0:00	0	0:00
DI	0:00	0	0:00
DJ	0:00	0	0:00
DK	0:00	0	0:00
DL	0:00	0	0:00
DM	0:00	0	0:00
DN	0:00	0	0:00
DO	0:00	0	0:00
DP	0:00	0	0:00
DQ	0:00	0	0:00
DR	0:00	0	0:00
DS	0:00	0	0:00
DT	0:00	0	0:00
DU	0:00	0	0:00
DV	0:00	0	0:00
DW	0:00	0	0:00
DX	0:00	0	0:00
DY	0:00	0	0:00
DZ	0:00	0	0:00
EA	0:00	0	0:00
EB	0:00	0	0:00
EC	0:00	0	0:00
ED	0:00	0	0:00
EE	0:00	0	0:00
EF	0:00	0	0:00
EG	0:00	0	0:00
EH	0:00	0	0:00
EI	0:00	0	0:00
EJ	0:00	0	0:00
EK	0:00	0	0:00
EL	0:00	0	0:00
EM	0:00	0	0:00
EN	0:00	0	0:00
EO	0:00	0	0:00
EP	0:00	0	0:00
EQ	0:00	0	0:00
ER	0:00	0	0:00
ES	0:00	0	0:00
ET	0:00	0	0:00
EU	0:00	0	0:00
EV	0:00	0	0:00
EW	0:00	0	0:00
EX	0:00	0	0:00
EY	0:00	0	0:00
EZ	0:00	0	0:00
FA	0:00	0	0:00
FB	0:00	0	0:00
FC	0:00	0	0:00
FD	0:00	0	0:00
FE	0:00	0	0:00
FF	0:00	0	0:00

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SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
FG	0:00	0	0:00
FH	0:00	0	0:00
FI	0:00	0	0:00
FJ	0:00	0	0:00
FK	0:00	0	0:00
FL	0:00	0	0:00
FM	0:00	0	0:00
FN	0:00	0	0:00
FO	0:00	0	0:00
FP	0:00	0	0:00
FQ	0:00	0	0:00
FR	0:00	0	0:00
FS	0:00	0	0:00
FT	0:00	0	0:00
FU	0:00	0	0:00
FV	0:00	0	0:00
FW	0:00	0	0:00
FX	0:00	0	0:00
FY	0:00	0	0:00
FZ	0:00	0	0:00
GA	0:00	0	0:00
GB	0:00	0	0:00
GC	0:00	0	0:00
GD	0:00	0	0:00
GE	0:00	0	0:00
GF	0:00	0	0:00
GG	0:00	0	0:00
GH	0:00	0	0:00
GI	0:00	0	0:00
GJ	0:00	0	0:00
GK	0:00	0	0:00
GL	0:00	0	0:00
GM	0:00	0	0:00
GN	0:00	0	0:00
GO	0:00	0	0:00
GP	0:00	0	0:00
GQ	0:00	0	0:00
GR	0:00	0	0:00
GS	0:00	0	0:00
GT	0:00	0	0:00
GU	0:00	0	0:00
GV	0:00	0	0:00
GW	0:00	0	0:00
GX	0:00	0	0:00
GY	0:00	0	0:00
GZ	0:00	0	0:00
HA	0:00	0	0:00
HB	0:00	0	0:00
HC	0:00	0	0:00
HD	0:00	0	0:00
HE	0:00	0	0:00
HF	0:00	0	0:00
HG	0:00	0	0:00
HH	0:00	0	0:00
HI	0:00	0	0:00
HJ	0:00	0	0:00
HK	0:00	0	0:00
HL	0:00	0	0:00
HM	0:00	0	0:00
HN	0:00	0	0:00
HO	0:00	0	0:00
HP	0:00	0	0:00
HQ	0:00	0	0:00

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SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
HR	0:00	0	0:00
HS	0:00	0	0:00
HT	0:00	0	0:00
HU	0:00	0	0:00
HV	0:00	0	0:00
HW	0:00	0	0:00
HX	0:00	0	0:00
HY	0:00	0	0:00
HZ	0:00	0	0:00
IA	0:00	0	0:00
IB	0:00	0	0:00
IC	0:00	0	0:00
ID	0:00	0	0:00
IE	0:00	0	0:00
IF	0:00	0	0:00
IG	0:00	0	0:00
IH	0:00	0	0:00
II	0:00	0	0:00
IJ	0:00	0	0:00
IK	0:00	0	0:00
IL	0:00	0	0:00
IM	0:00	0	0:00
IN	0:00	0	0:00
IO	0:00	0	0:00
IP	0:00	0	0:00
IQ	0:00	0	0:00
IR	0:00	0	0:00
IS	0:00	0	0:00
IT	0:00	0	0:00
IU	0:00	0	0:00
IV	0:00	0	0:00
IW	0:00	0	0:00
IX	0:00	0	0:00
IY	0:00	0	0:00
IZ	0:00	0	0:00
JA	0:00	0	0:00
JB	0:00	0	0:00
JC	0:00	0	0:00
JD	0:00	0	0:00
JE	0:00	0	0:00
JF	0:00	0	0:00
JG	0:00	0	0:00
JH	0:00	0	0:00
JI	0:00	0	0:00
JJ	0:00	0	0:00
JK	0:00	0	0:00
JL	0:00	0	0:00
JM	0:00	0	0:00
JN	0:00	0	0:00
JO	0:00	0	0:00
JP	0:00	0	0:00
JQ	0:00	0	0:00
JR	0:00	0	0:00
JS	0:00	0	0:00
JT	0:00	0	0:00
JU	0:00	0	0:00
JV	0:00	0	0:00
JW	0:00	0	0:00
JX	0:00	0	0:00
JY	0:00	0	0:00
JZ	0:00	0	0:00
KA	0:00	0	0:00
KB	0:00	0	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

No.	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
KC	0:00	0	0:00
KD	0:00	0	0:00
KE	0:00	0	0:00
KF	0:00	0	0:00
KG	0:00	0	0:00
KH	0:00	0	0:00
KI	0:00	0	0:00
KJ	0:00	0	0:00
KK	0:00	0	0:00
KL	0:00	0	0:00
KM	0:00	0	0:00
KN	0:00	0	0:00
KO	0:00	0	0:00
KP	0:00	0	0:00
KQ	0:00	0	0:00
KR	0:00	0	0:00
KS	0:00	0	0:00
KT	0:00	0	0:00
KU	0:00	0	0:00
KV	0:00	0	0:00
KW	0:00	0	0:00
KX	0:00	0	0:00
KY	0:00	0	0:00
KZ	0:00	0	0:00
LA	0:00	0	0:00
LB	0:00	0	0:00
LC	0:00	0	0:00
LD	0:00	0	0:00
LE	0:00	0	0:00
LF	0:00	0	0:00
LG	0:00	0	0:00
LH	0:00	0	0:00
LI	0:00	0	0:00
LJ	0:00	0	0:00
LK	0:00	0	0:00
LL	0:00	0	0:00
LM	0:00	0	0:00
LN	0:00	0	0:00
LO	0:00	0	0:00
LP	0:00	0	0:00
LQ	0:00	0	0:00
LR	0:00	0	0:00
LS	0:00	0	0:00
LT	0:00	0	0:00
LU	0:00	0	0:00
LV	0:00	0	0:00
LW	0:00	0	0:00
LX	0:00	0	0:00
LY	0:00	0	0:00
LZ	0:00	0	0:00
MA	0:00	0	0:00
MB	0:00	0	0:00
MC	0:00	0	0:00
MD	0:00	0	0:00
ME	0:00	0	0:00
MF	0:00	0	0:00
MG	0:00	0	0:00
MH	0:00	0	0:00
MI	0:00	0	0:00
MJ	0:00	0	0:00
MK	0:00	0	0:00
ML	0:00	0	0:00
MM	0:00	0	0:00

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SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
MN	0:00	0	0:00
MO	0:00	0	0:00
MP	0:00	0	0:00
MQ	0:00	0	0:00
MR	0:00	0	0:00
MS	0:00	0	0:00
MT	0:00	0	0:00
MU	0:00	0	0:00
MV	0:00	0	0:00
MW	0:00	0	0:00
MX	0:00	0	0:00
MY	0:00	0	0:00
MZ	0:00	0	0:00
NA	0:00	0	0:00
NB	0:00	0	0:00
NC	0:00	0	0:00
ND	0:00	0	0:00
NE	0:00	0	0:00
NF	0:00	0	0:00
NG	0:00	0	0:00
NH	0:00	0	0:00
NI	0:00	0	0:00
NJ	0:00	0	0:00
NK	0:00	0	0:00
NL	0:00	0	0:00
NM	0:00	0	0:00
NN	0:00	0	0:00
NO	0:00	0	0:00
NP	0:00	0	0:00
NQ	0:00	0	0:00
NR	0:00	0	0:00
NS	0:00	0	0:00
NT	0:00	0	0:00
NU	0:00	0	0:00
NV	0:00	0	0:00
NW	0:00	0	0:00
NX	0:00	0	0:00
NY	0:00	0	0:00
NZ	0:00	0	0:00
OA	0:00	0	0:00
OB	0:00	0	0:00
OC	0:00	0	0:00
OD	0:00	0	0:00
OE	0:00	0	0:00
OF	0:00	0	0:00
OG	0:00	0	0:00
OH	0:00	0	0:00
OI	0:00	0	0:00
OJ	0:00	0	0:00
OK	0:00	0	0:00
OL	0:00	0	0:00
OM	0:00	0	0:00
ON	0:00	0	0:00
OO	0:00	0	0:00
OP	0:00	0	0:00
OQ	0:00	0	0:00
OR	0:00	0	0:00
OS	0:00	0	0:00
OT	0:00	0	0:00
OU	0:00	0	0:00
OV	0:00	0	0:00
OW	0:00	0	0:00
OX	0:00	0	0:00

To be continued on next page...

Licensed user:
Natural Forces Wind Inc
1801 Hollis Street, Suite 1205
CA-HALIFAX, Nova Scotia B3J 3N4
902 422 9663
Jill / jbyrne@naturalforces.ca
Calculated:
1/26/2021 1:47 PM/3.1.633

SHADOW - Main Result

Calculation: Nain Worst Case Shadow

...continued from previous page

	Shadow, worst case		
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
OY	0:00	0	0:00
OZ	0:00	0	0:00
PA	0:00	0	0:00
PB	0:00	0	0:00
PC	0:00	0	0:00
PD	0:00	0	0:00
PE	0:00	0	0:00
PF	0:00	0	0:00
PG	0:00	0	0:00
PH	0:00	0	0:00
PI	0:00	0	0:00
PJ	0:00	0	0:00
PK	0:00	0	0:00
PL	0:00	0	0:00
PM	0:00	0	0:00
PN	0:00	0	0:00
PO	0:00	0	0:00
PP	0:00	0	0:00
PQ	0:00	0	0:00
PR	0:00	0	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]
1	ENERCON E-82 E4 2350 82.0 !O! hub: 58.9 m (TOT: 99.9 m) (1)	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Appendix H – EMI Study

natural forces

Nain EMI Study Memo

Purpose	Summarize results from the EMI study for Nain, NL
Date	March 2020
Location	Nain, NL
Prepared By	Natural Forces

Introduction

Due to the presence of telecommunication towers in the Nain area, an EMI study has been conducted to assess associated site constraints. The infrastructure data for this study was retrieved from the Innovation, Science and Economic Development (ISED) database. ISED (previously known as Industry Canada) is responsible for the regulation of the radio frequency spectrum in Canada. Natural Forces has assigned identifiers to all data retrieved from the ISED database. This study has been completed in alignment with the 'Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems' (2020) guidelines document prepared by the Radio Advisory Board of Canada (RABC) and the Canadian Wind Energy Association (CanWEA).

The consultation zones have been calculated for all relevant licensed infrastructure from the ISED database. Figure 1 shows the locations of all the towers and associated consultation zones within the Nain boundaries. These results are discussed in more detail by equipment type below.

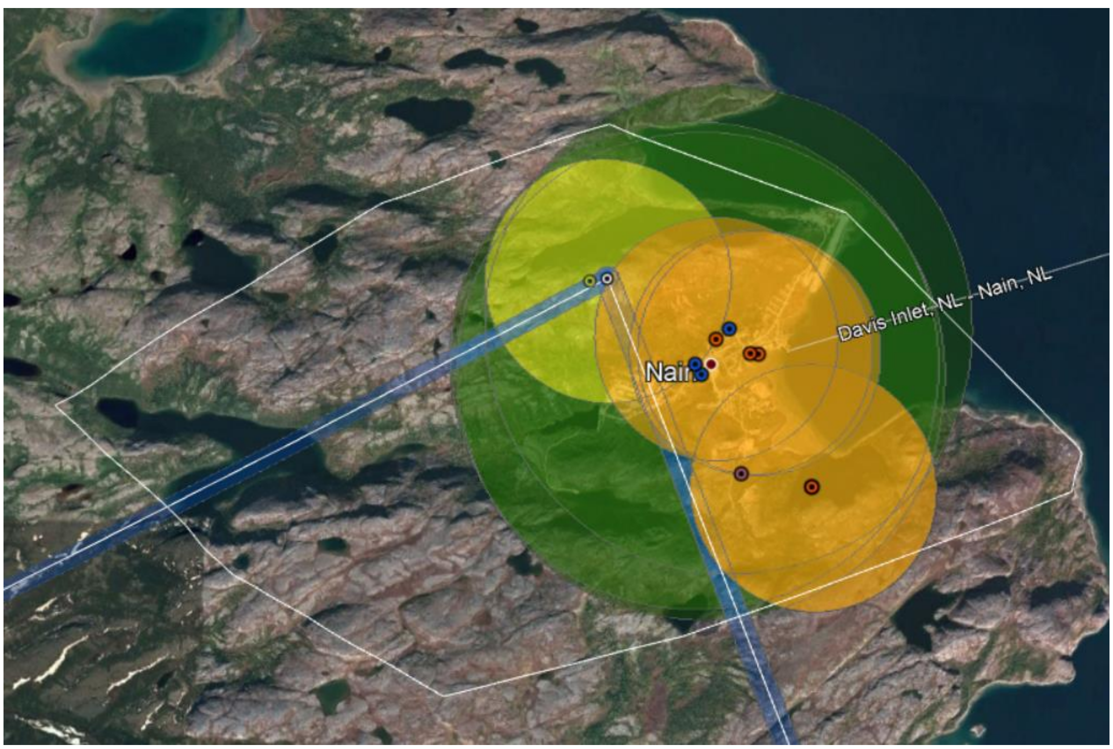

Figure 1: All telecommunication towers (points) and associated consultation zones (blue, green, yellow, orange) within the Nain boundary (white line).

Point-to-Point Microwave Radio Systems

According to the ISED database, there are three relevant point-to-point (PTP) towers owned and operated by Bell Canada in the Nain area, listed in Table 1.

Table 1: Relevant PTP microwave towers.

Tower ID	Location	Licensee	Latitude (WGS84)	Longitude (WGS84)
FT-BC1	Zoar, NL	Bell Canada	56.19277778	-61.40416667
FT-BC2	Nain, NL	Bell Canada	56.54722222	-61.71138889
FT-BC3	Anaktalik, NL	Bell Canada	56.41333333	-62.10166667

The RABC/CanWEA consultation zones for this type of system are as follows:

1) A radius of 1 km around the receive and transmit tower locations; and,
2) A cylinder with a radius of three times the maximum first Fresnel zone from the line-of-sight between the receive and transmit tower locations, plus blade length.

Tower FT-BC2 is the only PTP tower requiring the 1 km radius given that it is the only such tower located in the immediate Nain area. The Fresnel zone is the area in which radio signals could potentially be impacted by physical barriers. This calculation is based on the frequency of the signals, the distance between the transmit and receive tower locations, and the turbine blade length. The turbine blade length used for these calculations is 21.85 m. FT-BC2 communicates with FT-BC1 and FT-BC3 at various frequencies, the lowest of which will produce the largest consultation zones. These calculations are summarized in Table 2 and visualized in Figure 2.

Table 2: Consultation zone calculation summary for PTP microwave radio link signals.

Link ID	Lowest Signal Frequency (GHz)	Distance between Towers (km)	Consultation Zone Cylinder Radius (m)
FT-BC1—FT-BC2	5.9452	43.8	92.4
FT-BC2—FT-BC3	5.9749	28.3	78.4

Figure 2: PTP radio infrastructure, links, and consultation zones (yellow, blue) shown within the Nain boundary (white line).

Broadcast Radio Systems

According to the ISED database, there are three broadcast radio towers in Nain. These towers and their locations are listed in Table 3. All three of these towers are FM transmitters, which require a 2 km consultation zone by the RABC/CanWEA guidelines. The tower locations with the associated consultation zones are shown in Figure 3.

Table 3: Relevant broadcast radio towers.

Tower ID	Licensee	Latitude (WGS84)	Longitude (WGS84)
BT-NRS	Nain Radio Society	56.54444444	-61.69472222
BT-CBC	CBC/Radio-Canada	56.54094444	-61.69797222
BT-OS	Okalakatiget Society	56.54166667	-61.69888889

Figure 3: Broadcast towers and 2 km consultation zones (green) shown within the Nain boundary (white line).

Land Mobile Radio Towers

According to the ISED database, there are five land mobile towers in Nain. These towers and their locations are listed in Table 4. These towers require a 1 km consultation zone by the RABC/CanWEA guidelines. The tower locations and the associated consultation zones are shown in Figure 4.

Table 4: Relevant land mobile towers.

Tower ID	Licensee	Latitude (WGS84)	Longitude (WGS84)
LM-GNL	Government of Newfoundland and Labrador	56.53333333	-61.68222222
LM-MH	Melville Hospital Health Labrador Corporation	56.53333333	-61.68222222
LM-NFD1	Nain Fire Department	56.54277778	-61.69166667
LM-NFD2	Nain Fire Department	56.54277778	-61.69055556
LM-NLSARA	NLSARA	56.54361111	-61.69638889

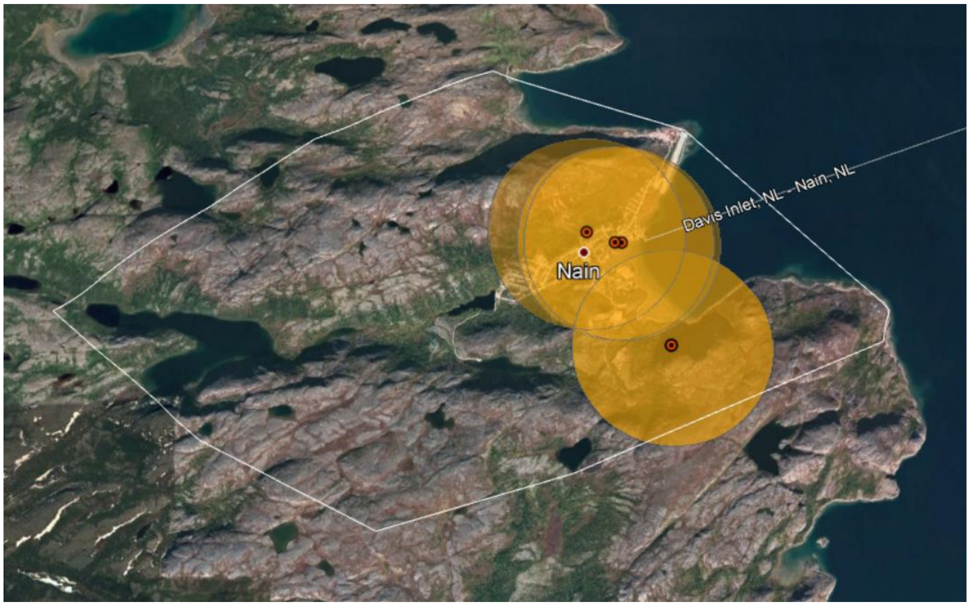

Figure 4: Land mobile towers and 1 km consultation zones (orange) shown within the Nain boundary (white line).

Navigation Canada and Canadian Coast Guard Towers

According to the ISED database, there is one Navigation Canada (NavCan) and one Canadian Coast Guard (CCG) tower in Nain. These towers will require consultation with NavCan and the CCG. The tower locations are listed in Table 5 and shown in Figure 5.

Table 5: NavCan and CCG towers located in Nain.

Tower ID	Licensee	Latitude (WGS84)	Longitude (WGS84)
AT-NC	Nav Canada	56.53388889	-61.69166667
MT-CGC	Canadian Coast Guard	56.54694444	-61.71361111

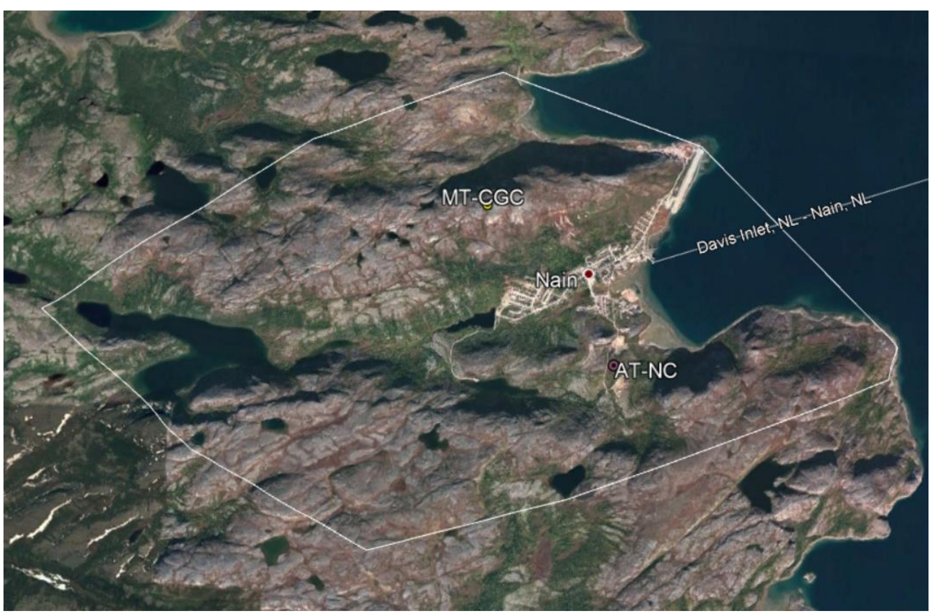

Figure 5: NavCan and CCG towers within the Nain boundary (white line).

Appendix I – Sitefinding Memo

Nain Wind Farm Siting Memo

Purpose	Summarize preliminary wind turbine siting completed for Nain, NL wind farm development
Date	March 2020
Location	Nain, NL
Prepared By	Natural Forces

Introduction

This siting has been completed by Natural Forces to determine the best locations for wind turbine development in Nain, NL. These preliminary conclusions are based on an electromagnetic interference (EMI) study, municipal policy, and elevation data.

Assumptions

The siting work has used the following assumptions:

1) 2-3 turbine project size
2) 50 m hub height
3) 43.7 m rotor diameter
4) Limited to lands within the Nain, NL municipal boundary
5) Limited to lands zoned as Rural

Wind Resource

The company Hatch has completed a preliminary wind resource assessment based on wind data collected from December 2013 through November 2014 from a 35 m meteorological mast installed in Nain. This analysis demonstrates that the estimated long-term wind speed at hub height (40 m) is 6.7 m/s. This wind resource is predicted to be distributed according to the 2013-2014 wind rose shown in Figure 1.

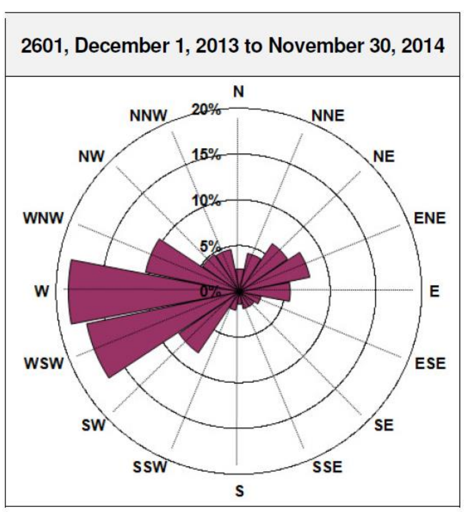

Figure 1: Annual (2013-2014) wind rose for Nain, NL.

Municipal Policy

Based on the 'Land Use Zoning, Subdivision and Advertisement Regulations' (2016) produced by the Nain Inuit Community Government, the lands best suited for wind turbine development are zoned Rural. These are the lands indicated in brown in Figure 2. The lands indicated in yellow are zoned Residential, and the lands indicated in blue are zoned Watershed.

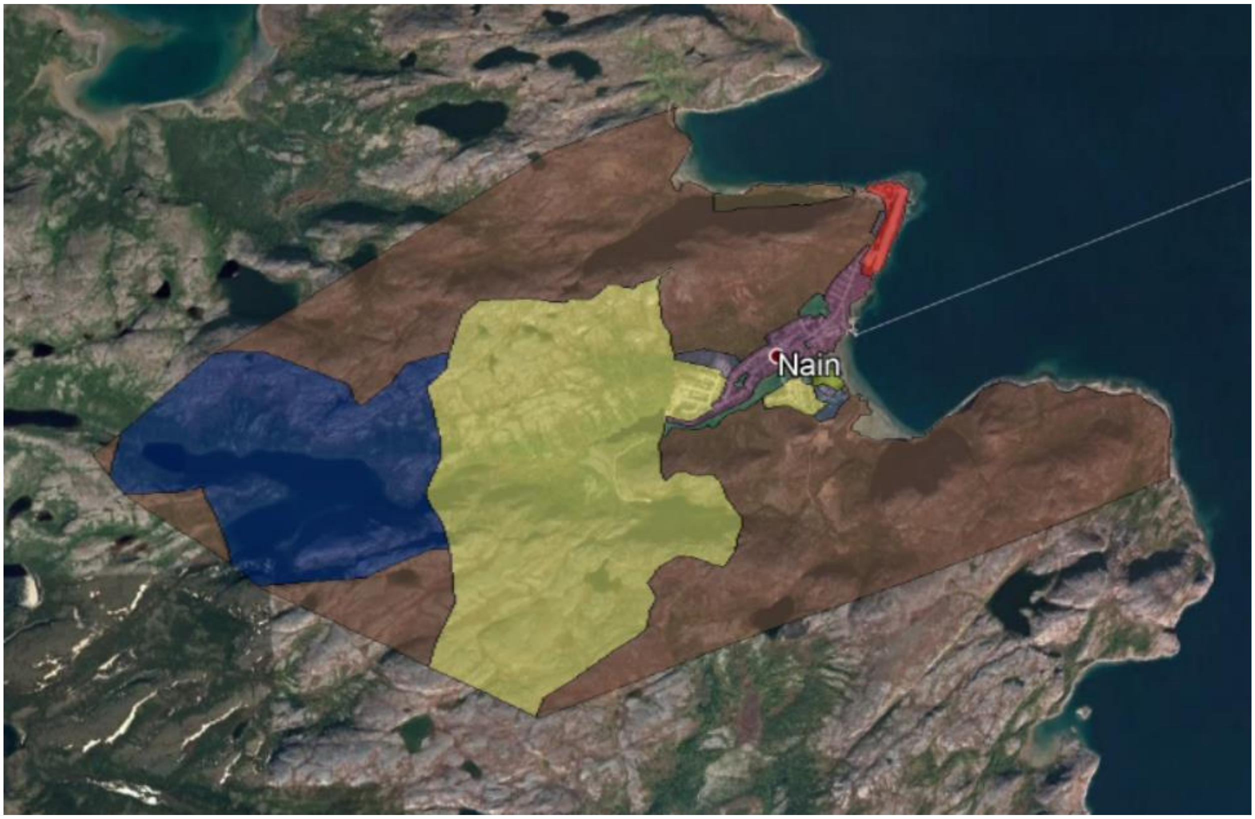

Figure 2: Land use zoning for Nain, NL. The main areas of interest are zoned Rural (brown), Residential (yellow), and Watershed (blue).

EMI Study

Due to the presence of telecommunication towers in the Nain area, an EMI study has been conducted to assess associated site constraints. The infrastructure data for this study was retrieved from the Innovation, Science and Economic Development (ISED) database. ISED (previously known as Industry Canada) is responsible for the regulation of the radio frequency spectrum in Canada. Natural Forces has assigned identifiers to all data retrieved from the ISED database. This study has been completed in alignment with the 'Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems' (2020) guidelines document prepared by the Radio Advisory Board of Canada (RABC) and the Canadian Wind Energy Association (CanWEA).

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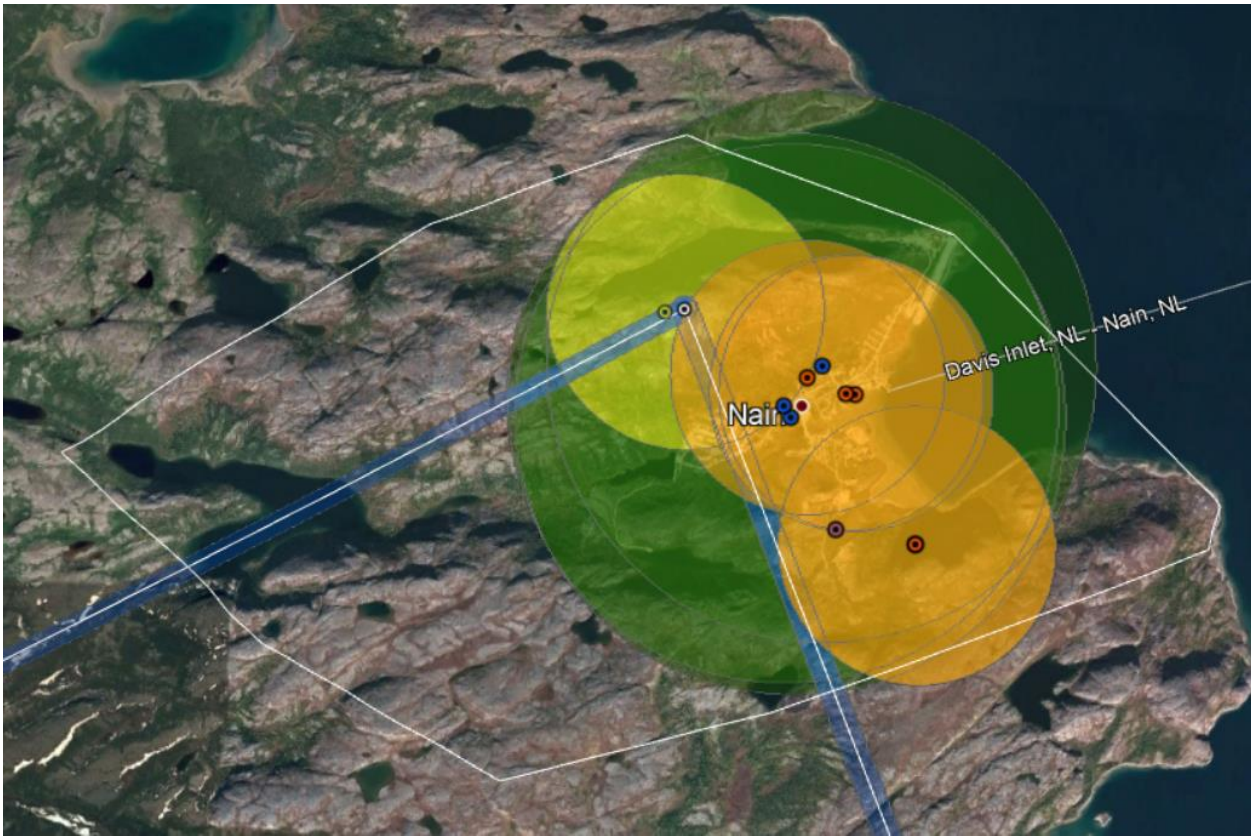

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The RABC/CanWEA consultation zones for this type of system are as follows:

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Figure 5: Broadcast towers and 2 km consultation zones (green) shown within the Nain boundary (white line).

Land Mobile Radio Towers

According to the ISED database, there are five land mobile towers in Nain. These towers and their locations are listed in Table 4. These towers require a 1 km consultation zone by the RABC/CanWEA guidelines. The tower locations and the associated consultation zones are shown in Figure 6.

Table 4: Relevant land mobile towers.

Tower ID	Licensee	Latitude (WGS84)	Longitude (WGS84)
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LM-NLSARA	NLSARA	56.54361111	-61.69638889

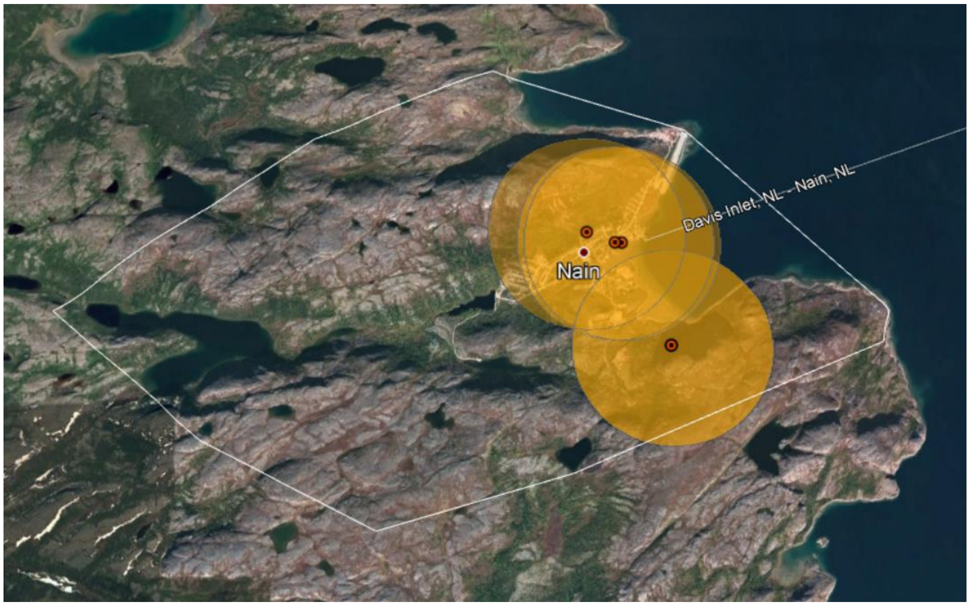

Figure 6: Land mobile towers and 1 km consultation zones (orange) shown within the Nain boundary (white line).

Navigation Canada and Canadian Coast Guard Towers

According to the ISED database, there is one Navigation Canada (NavCan) and one Canadian Coast Guard (CCG) tower in Nain. These towers will require consultation with NavCan and the CCG. The tower locations are listed in Table 5 and shown in Figure 7.

Table 5: NavCan and CCG towers located in Nain.

Tower ID	Licensee	Latitude (WGS84)	Longitude (WGS84)
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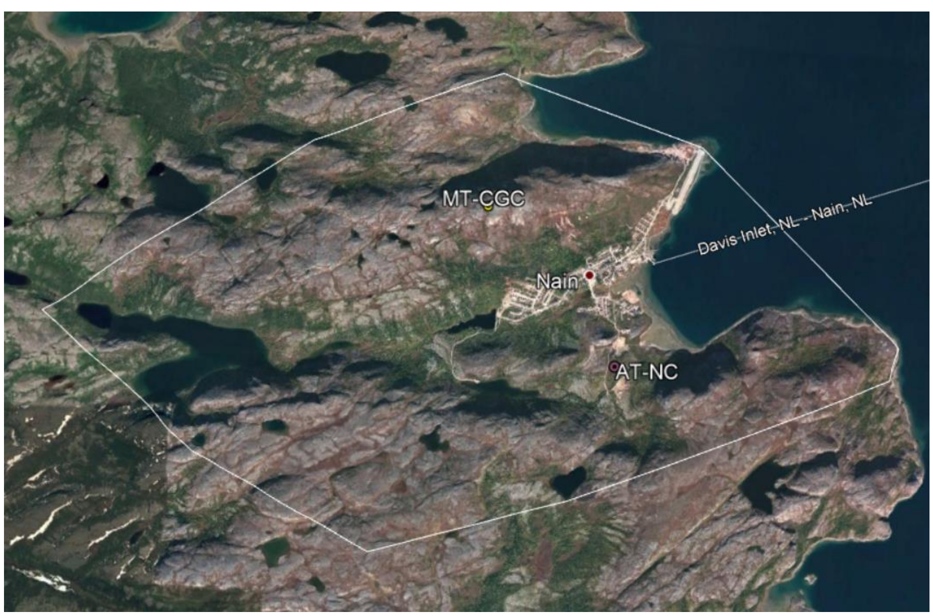

Figure 7: NavCan and CCG towers within the Nain boundary (white line).

Conclusions

Based on the preliminary project information, elevation data, and the constraint analyses completed for telecommunication infrastructure and municipal policy, two 3-turbine project layouts have been identified. These layouts are shown in Figure 8 and incorporate a 550+ m separation distance between the turbine locations. Layout 1 (T1, T2, T3) has an average turbine elevation of 229 m and Layout 2 (T4, T5, T6) has an average turbine elevation of 246 m. The proposed turbine locations are listed in Table 6.

Table 6: Proposed turbine locations.

Layout	Turbine #	Elevation (m)	Latitude (WGS84)	Longitude (WGS84)
Layout 1	T1	245	56.542465	-61.739154
	T2	223	56.546125	-61.732540
	T3	220	56.540700	-61.753511
Layout 2	T4	243	56.525794	-61.749145
	T5	246	56.527906	-61.739361
	T6	250	56.520957	-61.741990

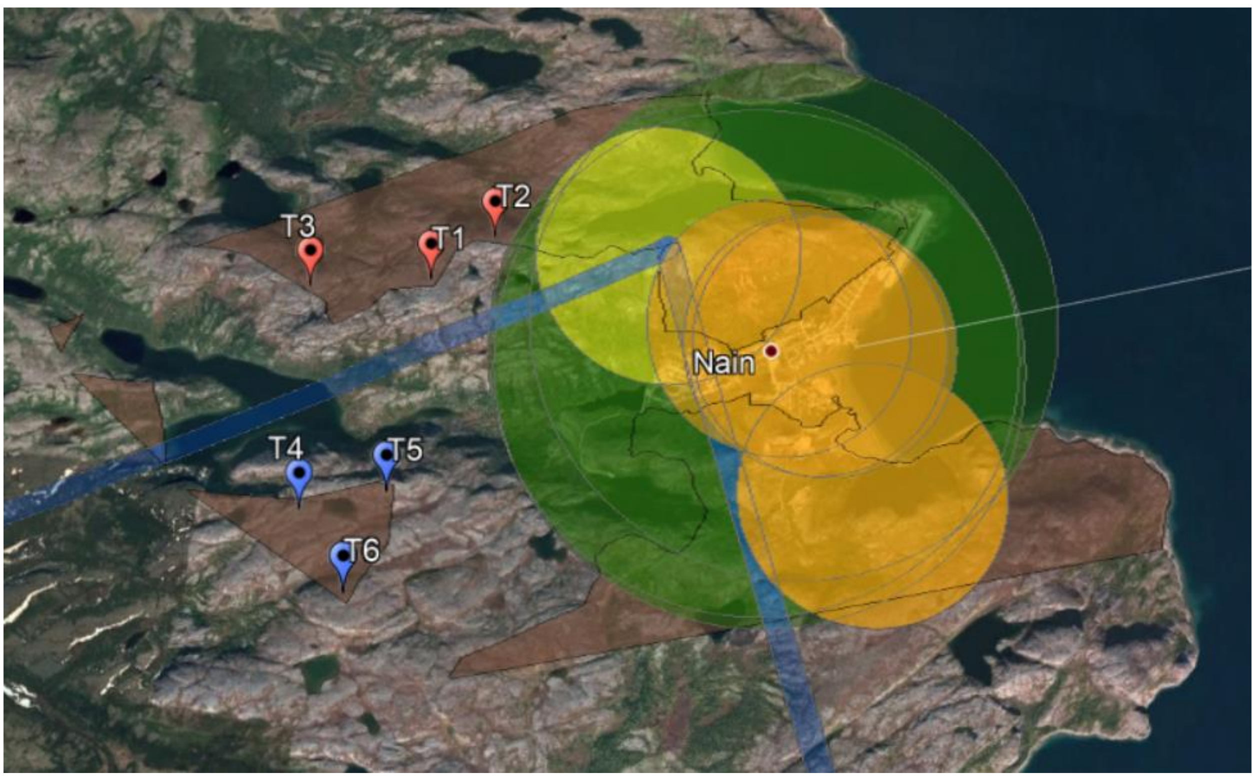

Figure 8: Proposed turbine locations (red and blue icons) shown with the EMI consultation zones and the lands zoned Rural.

Appendix A – Impact Analysis on Nain Airport and instrument approaches

OCTANT

EXPERTS IN AVIATION SOLUTIONS

NAIN WIND TURBINES LOCATION

Impact Analysis on Nain Airport and instrument approaches

Final Report

NO. 20.00

The Nunatsiavut Government

September 9, 2019

T +1 450 678-4884 OCTANTAVIATION.CA

4501 Bishop Street, Suite 202, Longueuil Québec J3Y 9E1

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4. CONCLUSION 4

Annex 1-Nain Wind Turbine Siting

Annex 2- Instrument approach impact study drawing

1. SITUATION

The Nunatsiavut government has requested an impact study on the wind turbine project considering the proximity of the Nain's actual airport (approximately 3.8 km) and on Nain's future airport.

2. DESCRIPTION

The summary description of the wind turbine project is reflected in document Nunatsiavut Nain wind turbine siting dated 20 June 2019 in reference.

3. IMPACT STUDY

An impact study on the height and proposed locations of the wind turbines was performed to find out if the proposed wind turbine location would affect the Nain airport OLS (obstacle limitation surface) under TP312 3th edition Aerodrome Standards And Recommended Practices standards and Nain Airport Instrument approaches under TP308 Criteria For Development Of Instrument Procedures.

It is important to note that the level of precision of this impact study could be negatively affected by the lack of precision of the exact turbine latitude and longitude. Consequently, for the study we have considered the average location. Furthermore, for the future airport, it is impossible to measure the exact impact for the reason mentioned above. However, an advisory note is included in the conclusions.

According to TP312 Outer Surface Standard, the wind turbines are located in the outer surface and are penetrating the horizontal disk of 4km to the South West of the airport. The wind turbines are not the only obstacle on the ridge since a communication tower is also penetrating the outer surface. Furthermore, there are restrictions on the published instrument approaches due to the topography around the airport.

These approaches were also verified considering the new obstacles and TP308 standards. The propose site and the height of the wind turbines would not affect the Nain airport published instrument approaches.

4. CONCLUSION

1. The two wind turbines are penetrating the OLS Outer surface at 3.8 km. (Location is as per document: Nunatsiavut Nain wind turbine siting dated 20 June 2019).

2. The two wind turbines are not affecting the published instrument approaches.

3. The two wind turbines are considered an obstacle and Transport Canada regulation would apply. (Reference TC Division III Marking and Lighting of Obstacles to Air Navigation CAR 601.23, 601.24, 601.25 and Standard 621 - Obstruction Marking and Lighting.)

4. The owner of the wind turbines will have to contact Transport Canada Aerodrome division Atlantic region and Nav Canada before starting the work. The owner will need to declare the exact localization and height.

5. Nain Airport's owner will need to advise Nav Canada and request an amendment to the official publications (CFS Canadian Flight Supplement, CAP Canada Air Pilot) to identify the obstacle on the airport chart and approach plates.

6. Considering that the new proposed airport site is not exactly defined, we recommend that this information and further work on the wind turbine project precised installation (position and height) are transmitted for the consultant working on the New Nain airport project.

ANNEX 1

NUNATSIAVUT kavamanga Government | Nunatsiavut Allatinga Nunatsiavut Secretariat

Nain Wind Turbine Siting:

20 Jane 2019

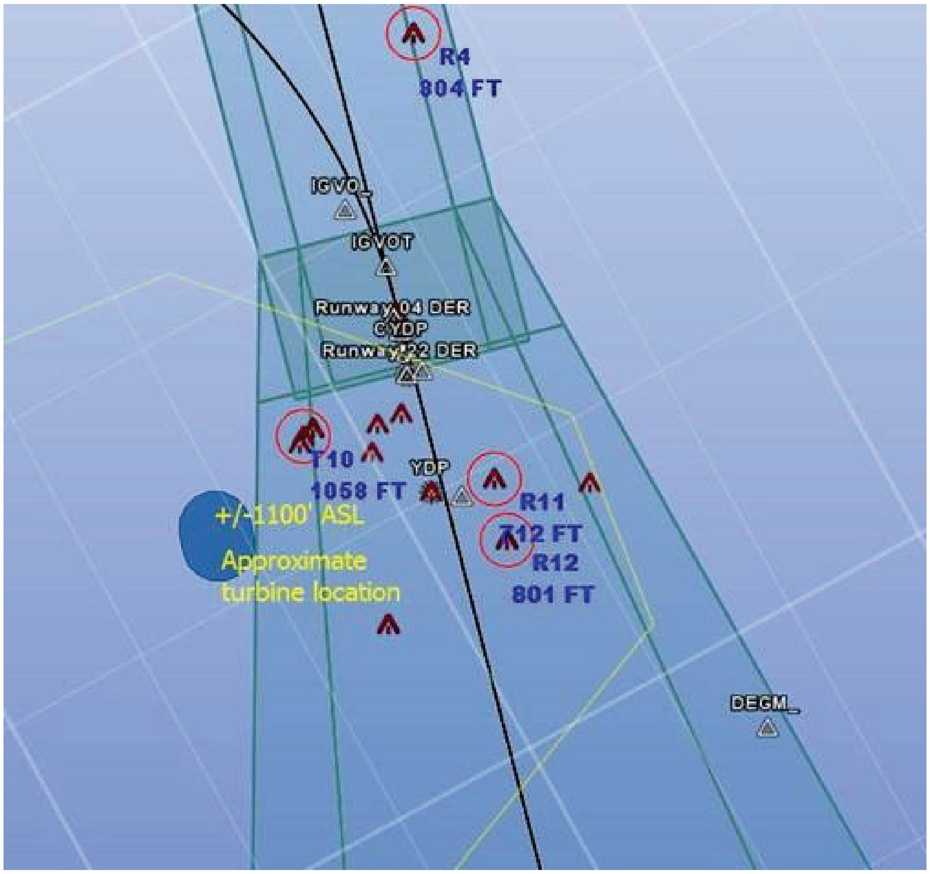
In 2015 Hatch Engineering conducted feasibility studies, recording wind data with met towers in five Labrador coastal communities. This report recommended Nain Labrador as the best candidate for a first wind project. The Hatch report proposes a few different turbine configurations and locations in Nain based on modelling, these potential wind turbine locations are shown in Figure 2. The options on Nain Hill were ruled out as they potentially conflict with existing radio tower infrastructure.

The proposed wind project consists of two 900 kW wind turbines for a total installed capacity of 1.8 MW. The proposed site for the Nain wind turbines is on the ridge north-west of the Nain water tower, as indicated by the orange shaded area in Figure 1. The approximate centre of the shaded area is (56.542, -61.738). There currently exists road access up to as far as the Nain water tower, additional road will likely need to be constructed between the water tower and the turbine site location. As the surveying and engineering for this road has not yet been completed the approximate location is indicated by the red shaded area in Figure 1.

INSTRUCTION APPROACH IMPACT STUDY DRAWING

ANNEX 2

CYDP wind turbine project impact on runway 04 and 22 approaches



CYDP wind turbine project impact on runway 04 and 22 departure