

**STATE OF NEW HAMPSHIRE  
SITE EVALUATION COMMITTEE**

**Docket No. 2015-02**

**Re: Application of Antrim Wind Energy, LLC  
for a Certificate of Site and Facility**

**March 17, 2017**

**ORDER AND  
CERTIFICATE OF SITE AND FACILITY WITH CONDITIONS**

WHEREAS, Antrim Wind Energy, LLC (Antrim Wind or the Applicant), filed an Application for a Certificate of Site and Facility (Application) with the Site Evaluation Committee (Committee) to site, construct, and operate 9 Siemens SWT-3.2-113 direct drive wind turbines capable of generating 3.2 MW each, for a total nameplate capacity of 28.8 MW and associated civil and electrical infrastructure (Project) to be located in the Town of Antrim on the Tuttle Hill ridgeline spanning southwestward to the northeastern slope of Willard Mountain (Site);

WHEREAS, the Project will consist of 9 Siemens SWT-3.2-113 direct drive turbines each with a nameplate generating capacity of 3.2 MW with a total nameplate capacity of 28.8 MW. Each turbine that the Applicant seeks to install will consist of: (i) a tower; (ii) a nacelle; and (iii) a rotor with three blades. The towers for turbines 1-8 will each be 92.5 meters tall and the tower for turbine 9 will be 79.5 meters tall. Each rotor will be 113 meters in diameter. The total turbine height from foundation to blade tip for turbines 1-8 will be 488.8 feet and for turbine 9 will be 446.2 feet;

WHEREAS, the Project will also include turbine foundations, staging areas, work pads, gravel roadways, electrical substations, a permanent meteorological tower, radar system, and an operations and management building. Turbine foundations will be approximately 24 feet in diameter and made of concrete and steel. The staging areas will be approximately one acre. One laydown yard will be located in an upland area between Route 9 and the Project substation covering approximately 2 acres. The second laydown yard will be approximately 2.9 acres located off of Route 9, west of the proposed Project entrance. The Project will require construction of a main access road and two spur roads that will be used for access to individual turbines. A joint collector system and interconnection substation will be constructed as part of the Project. A single 34.5 kV three-phase collector line will be constructed from the collector substation to the individual turbines. It will follow the access road, with turbines connecting underground. The collector and interconnection substation will be located immediately to the north of the PSNH L163 line. The substation yard will consist of: (i) a collection yard measuring 100 feet by 111 feet that will contain a transformer and control house (16x20); and (ii) an interconnection yard measuring 172 feet by 186 feet, that will contain a three-breaker ring bus and a 20-foot by 24-foot control house. The meteorological tower will be a 100-meter free-

standing lattice tower that will be located on the ridge between turbines 2 and 3. A radar activated system such as the Harrier Radar System manufactured by DeTect, Inc. will be installed: (i) on and at the base of the meteorological tower; and (ii) on a steel monopole tower that will be approximately 90-feet tall. The operations and maintenance building will be comprised of approximately 3,000 square feet and will include offices and associated facilities for technicians, a garage for spare parts and supplies, and a computer server room.

WHEREAS, the Subcommittee has held public meetings and hearings regarding the Application, including Public Information Sessions, pursuant to RSA 162-H:10, I-a on January 6, 2016 and Public Hearings pursuant to RSA 162-H:10, I-c on February 26, 2016; and adjudicatory proceedings on September 13, 15, 20, 22, 23, 28, 29, October 3, 18, 19, 20 and November 1 and 7, 2016, to hear evidence regarding the Application;

WHEREAS, the Subcommittee has received and considered both oral and written comments from the public concerning the Application;

WHEREAS, the Subcommittee finds that, subject to the conditions herein, the Applicant has adequate financial, technical, and managerial capability to assure construction and operation of the Project in continuing compliance with the terms and conditions of this Certificate;

WHEREAS, the Subcommittee finds that, subject to the conditions herein, that the Project will not unduly interfere with the orderly development of the region, with due consideration having been given to the views of municipal and regional planning commissions and municipal governing bodies;

WHEREAS, the Subcommittee finds that, subject to the conditions herein, the Project will not have an unreasonable adverse effect on aesthetics, historic sites, air and water quality, the natural environment, and public health and safety;

WHEREAS, the Subcommittee finds that, subject to the conditions herein, the Project will be in the public interest; and,

WHEREAS, the Subcommittee has issued a Decision Granting a Certificate of Site and Facility with Conditions (Decision) contemporaneously with this Order and Certificate.

NOW THEREFORE, it is hereby ORDERED that the Application of Antrim Wind Energy, LLC, as amended, is approved subject to the conditions set forth herein and this Order shall be deemed to be a Certificate of Site and Facility pursuant to R.S.A. 162-H:4; and it is,

Further Ordered that, the Site Evaluation Subcommittee's Decision and any conditions contained therein, are hereby made a part of this Order; and it is,

Further Ordered that, the Applicant may site, construct and operate the Project as outlined in the Application, as amended, and subject to the terms and conditions of the Decision and this Order and Certificate; and it is,

Further Ordered that, this Certificate is not transferable to any other person or entity without the prior written approval of the Committee; and it is,

Further Ordered that, the Applicant shall immediately notify the Site Evaluation Committee of any change in ownership or ownership structure of the Applicant or its affiliated entities and shall seek approval of the Subcommittee of such change; and it is,

Further Ordered that, all permits and/or certificates recommended by the New Hampshire Department of Environmental Services, including the Wetlands Permit, the Alteration of Terrain Permit, and the Individual Sewage Disposal System Permit, shall issue and this Certificate is conditioned upon compliance with all conditions of said permits and/or certificates which are appended hereto as Appendix I; and it is,

Further Ordered that, the New Hampshire Department of Environmental Services is authorized to monitor the construction and operation of the Project to ensure that terms and conditions of the Wetlands Permit, the Alteration of Terrain Permit, the Individual Sewage Disposal System Permit, and the Certificate are met, however, any actions to enforce the provisions of the Certificate must be brought before the Site Evaluation Committee; and it is,

Further Ordered that, the New Hampshire Department of Environmental Services is authorized to specify the use of any appropriate technique, methodology, practice or procedure approved by the Subcommittee within the Certificate, as may be necessary, to effectuate conditions of the Certificate, the Wetlands Permit, the Alteration of Terrain Permit, and the Individual Sewage Disposal System Permit; and it is,

Further Ordered that, this Certificate is conditioned upon compliance with conditions of the Memorandum of Understanding executed by the New Hampshire Department Cultural Resources, Division of Historic Resources and the Applicant, which is appended hereto as Appendix II (App. 26); and it is,

Further Ordered that, at its own expense, the Applicant shall maintain a kiosk, website, or other instrument that will result from the implementation of the Memorandum of Understanding executed by New Hampshire Department Cultural Resources, Division of Historic Resources and the Applicant; and it is,

Further Ordered that the Applicant shall consult with the White Birch Historic Association regarding implementation of the Memorandum of Understanding executed by the New Hampshire Department of Historic Resources and the Applicant; and it is,

Further Ordered that, in the event that new information or evidence of archeological resources, historic sites or other cultural resources is found in the Project area, the Applicant shall immediately report said findings to the New Hampshire Department Cultural Resources, Division of Historic Resources and the Committee; and it is,

Further Ordered that, the Applicant shall consult with the New Hampshire Department Cultural Resources, Division of Historic Resources to determine the need for appropriate evaluative

studies, determinations of National Register eligibility, and/or mitigation measures, if needed, to resolve adverse effects; and it is,

Further Ordered that, the Applicant shall notify the New Hampshire Department Cultural Resources, Division of Historic Resources of any material change in the construction plans of the Project and of any new community concerns for any archeological resources, historic sites or other cultural resources affected by the Project; and it is,

Further Ordered that, if material changes in the construction plans of the Project lead to newly-discovered effects on historic properties, the Applicant shall consult with the New Hampshire Department Cultural Resources, Division of Historic Resources to resolve any adverse effects to such properties; and it is,

Further Ordered that, the New Hampshire Department Cultural Resources, Division of Historic Resources is authorized to specify the use of any appropriate technique, methodology, practice or procedure associated with archaeological, historical and other cultural resources affected by the Project, however, any action to enforce the conditions must be brought before the Committee; and it is,

Further Ordered that, all permits and/or certificates recommended by the New Hampshire Department of Transportation, including the Driveway Permits for the main entrance to the Project and for temporary laydown areas, shall issue and this Certificate is conditioned upon compliance with all conditions of said permits and/or certificates which are appended hereto as Appendix III; and it is,

Further Ordered that, the New Hampshire Department of Transportation is authorized to monitor the construction and operation of the Project to ensure that terms and conditions of the Driveway Permits for the main entrance to the Project and for temporary laydown areas, and the Certificate are met, however, any actions to enforce the provisions of the Certificate must be brought before Site Evaluation Committee; and it is,

Further Ordered that, the New Hampshire Department of Transportation is authorized to specify the use of any appropriate technique, methodology, practice or procedure approved by the Subcommittee within the Certificate, as may be necessary, to effectuate conditions of the Certificate and Driveway Permits for the main entrance to the Project and for temporary laydown areas; and it is,

Further Ordered that, this Certificate is conditioned upon compliance with all conditions of the Determinations of No Hazard to Air Navigation issued by the Federal Aviation Administration which are appended hereto as Appendix IV; and it is,

Further Ordered that, prior to erection of the turbines, the Applicant shall submit the plans for the fire suppression system in the nacelles of the turbines to the State Fire Marshal and the Town of Antrim Fire Department for review and approval; and it is,

Further Ordered that, the Applicant shall submit one hard copy and an electronic version of the final approved plans for the fire suppression system in the nacelles of the turbines to the Administrator of the Committee; and it is,

Further Ordered that, the Applicant shall notify the Administrator of the Committee, in writing, of any modifications or replacement of the Operation and Maintenance Agreement within sixty (60) days of such modification or replacement; and it is,

Further Ordered that, within thirty (30) days of issuance of the Certificate, the Applicant shall provide an updated plan for the timing and sequence of construction of the Project to the Administrator of the Committee; and it is,

Further Ordered that, the Applicant shall provide the Town of Antrim and the Administrator of the Committee with copies of its proposed construction plans, schedule, blasting and other public information (Ref. RSA 91-A:5) to be made available to the public; and it is,

Further Ordered that, the construction plans, schedule and other information provided to the Town of Antrim and Administrator of the Committee shall be updated to reflect changes in the Project schedule or other changes during construction; and it is,

Further Ordered that, the Applicant shall immediately notify the Committee of any change in ownership or ownership structure of the Applicant or its affiliated entities and shall seek approval of the Committee for such a change; and it is,

Further Ordered that, prior to the construction of the Project, the Applicant shall provide documentation demonstrating that debt and/or equity financing required for the construction of the Project is in place to the Committee's Administrator; and it is,

Further Ordered that, the Certificate is conditioned upon final closing and recording of the conservation easements for 908 acres of conservation land addressed in the Application; and it is,

Further Ordered that, the Certificate is conditioned upon the Applicant's compliance with the terms and conditions contained within the conservation easements for 908 acres of conservation land addressed in the Application; and it is,

Further Ordered that, the Certificate is conditioned upon the Applicant's compliance with the terms and conditions contained in the Agreement entitled "Agreement Between Town of Antrim New Hampshire and Antrim Wind Energy LLC, Developer/Owner of the Antrim Wind Power Project" dated March 8, 2012 (effective date) (Agreement between the Applicant and the Town of Antrim dated March 8, 2012) which is appended hereto as Appendix V; and it is,

Further Ordered that, the Town and Antrim Wind may amend the Agreement between the Applicant and the Town of Antrim dated March 8, 2012, consistent with the terms and conditions of the Certificate; and it is,

Further Ordered that, in the event of a conflict between the requirements of the Agreement between the Applicant and the Town of Antrim dated March 8, 2012, as amended, and the requirements of the Certificate, the Certificate shall control; and it is,

Further Ordered that, prior to commencement of construction activities in the Town of Antrim, the Antrim Board of Selectmen shall retain an independent engineer to review the specifications and assumptions in the Decommissioning Plan approved by the Committee and used to determine the amount of the Decommissioning Cost Estimate; and it is,

Further Ordered that the specifications and assumptions in the Decommissioning Plan used to determine the Decommissioning Cost Estimate shall be reasonably acceptable to the Antrim Board of Selectmen, subject to review under the provisions of RSA 162-H; and it is,

Further Ordered that, any changes to the form or amount of the Decommissioning Funding Assurance shall be reasonably acceptable to the Antrim Board of Selectmen, subject to review under the provisions of RSA 162-H; and it is,

Further Ordered that, the Antrim Board of Selectmen's review of the specifications and assumption in the Decommissioning Plan approved by the Committee and used to determine the amount of the Decommissioning Cost Estimate shall be completed within sixty (60) days of submission to the Board of Selectmen or as otherwise agreed to in writing; and it is,

Further Ordered that, failure to come to a decision within sixty (60) days or as otherwise agreed to in writing shall be deemed approval by the Antrim Board of Selectmen; and it is,

Further Ordered that, the Decommissioning Plan, Decommissioning Cost Estimate and the Decommissioning Funding Assurance shall comply with the terms and conditions of the Certificate; and it is,

Further Ordered that, prior to the commencement of construction of the Project, the Applicant shall provide Decommissioning Funding Assurance in an amount equal to two million seven hundred seventy five thousand dollars (\$2,775,000) unless otherwise determined by the Committee; and it is,

Further Ordered that, the Applicant shall not cause the Decommissioning Funding Assurance amount to become less than two million seven hundred seventy five thousand dollars (\$2,775,000) at any time throughout the term of the Agreement with the Town of Antrim dated March 8, 2012; and it is,

Further Ordered that, the Applicant shall increase the amount of the Decommissioning Funding Assurance, as appropriate, to reflect the updated decommissioning estimate, in accordance with Section 14.1.1 of the Agreement with the Town of Antrim dated March 8, 2012; and it is,

Further Ordered that, the Decommissioning Funding Assurance shall be in the form of an Irrevocable Letter of Credit ("ILOC") issued by a major financial institution with a credit rating

of “BBB” from Standard and Poor’s, or a “Baa2” rating from Moody’s, each as defined on the Effective Date (*See Appendix V*); and it is,

Further Ordered that, the ILOC shall be in a form acceptable to the Antrim Select Board as provided by Section 14.2 of the Agreement with the Town of Antrim dated March 8, 2012; and it is,

Further Ordered that, the ILOC shall be extended without amendment for successive periods of one (1) year; and it is,

Further Ordered that, forty-five (45) days prior to the extension of the ILOC, the Applicant shall provide documentation to the Town of Antrim and the Administrator of the Committee demonstrating that the extension of the ILOC complies with the decommissioning requirements of the Agreement with the Town of Antrim dated March 8, 2012, and the requirements of the Committee for the following annual period; and it is,

Further Ordered that, the Applicant shall provide documentation demonstrating that the extension of the ILOC complies with the decommissioning requirements of the Agreement with the Town of Antrim dated March 8, 2012, and the requirements of the Committee to the Town of Antrim and the Administrator annually, until the Applicant has completed its decommissioning obligations in accordance with Agreement between the Applicant and the Town of Antrim dated March 8, 2012, as amended by the Committee, the Decommissioning Plan as approved by the Subcommittee and any other requirements specified by the Certificate; and it is,

Further Ordered that, the ILOC shall remain in place until decommissioning is fully implemented and certified as complete; and it is,

Further Ordered that, the Applicant shall participate in meetings to be scheduled jointly by the Antrim Board of Selectmen and the Applicant to review and provide information to the public concerning construction activities, construction schedule, use of public highways, blasting and other construction activities; and it is,

Further Ordered that, the meetings between the Applicant and the Antrim Board of Selectmen shall be attended by persons knowledgeable with the Applicant’s construction plans and responsible for managing construction activities; and it is,

Further Ordered that, the meetings between the Applicant and the Antrim Board of Selectmen shall be public meetings under RSA 91-A, moderated by the Antrim Board of Selectmen, except as provided by RSA 91-A:3; and it is,

Further Ordered that, the Applicant shall provide information concerning complaints during construction, if any, and their resolution, except that confidential, personal or financial information (Ref. RSA 91-A:5) regarding the complaint may be redacted; and it is,

Further Ordered that, in the event of significant unanticipated changes or events during construction that may impact the public, the environment, compliance with the terms and

conditions of the Certificate, public transportation or public safety, the Applicant shall notify the Town of Antrim Board of Selectmen or its designee and Administrator of the Committee in writing as soon as possible but no later than seven (7) days after the occurrence; and it is,

Further Ordered that, in the event of emergency conditions which may impact public safety, the Applicant shall notify the Town of Antrim, appropriate officials and the Administrator of the Committee immediately; and it is,

Further Ordered that, during construction, the Applicant shall copy the Town of Antrim on any notices provided to the Committee, the New Hampshire Department of Environmental Services, or other applicable regulatory agency pursuant to the Certificate or any other permit for the Project; and it is,

Further Ordered that, prior to any blasting, the Applicant shall identify drinking water wells located within 2,000 feet of the proposed blasting activities and develop a groundwater quality sampling program to monitor for nitrates and nitrites, either in the drinking water supply wells or in other wells that are representative of the drinking water supply wells in the area; and it is,

Further Ordered that, the groundwater quality sampling program shall include pre-blasting and post-blasting water quality monitoring to be approved by the Department of Environmental Services prior to commencing blasting; and it is,

Further Ordered that, the groundwater sampling program shall be implemented by the Applicant once approved by the Department of Environmental Services; and it is,

Further Ordered that, the Department of Environmental Services is authorized to monitor the implementation and enforcement of the groundwater quality sampling program to ensure that terms and conditions of the program and the Certificate are met, and any actions to enforce the provisions of the Certificate must be brought before the Committee; and it is,

Further Ordered that, the Department of Environmental Services is authorized to specify the use of any appropriate technique, methodology, practice or procedure, as may be necessary, to effectuate conditions addressing the groundwater sampling program or to carry out the requirements of the groundwater quality sampling program; and it is,

Further Ordered that, the Certificate is conditioned upon the Applicant's compliance with the terms and conditions contained in the Bird and Bat Conservation Strategy (App. 33, Appx. 12F) which is appended hereto as Appendix VI; and it is,

Further Ordered that, the Certificate is conditioned upon the Applicant's compliance with the terms and conditions contained in the Invasive Species Management Plan which is appended hereto as Appendix VII; and it is,

Further Ordered that, the Certificate is conditioned upon the Applicant's compliance with the terms and conditions contained in the Memorandum of Understanding between the Applicant,



New Hampshire Fish and Game and the New Hampshire Audubon Society which is appended hereto as Appendix VIII; and it is,

Further Ordered that, any and all reports that will be provided to New Hampshire Fish and Game, the United States Fish and Wildlife Service and/or the New Hampshire Department of Environmental Services pursuant to the terms and conditions of the Bird and Bat Conservation Strategy, the Invasive Species Management Plan and the Memorandum of Understanding between the Applicant, New Hampshire Fish and Game, and the New Hampshire Audubon Society shall be provided to the Administrator of the Committee; and it is,

Further Ordered that, the New Hampshire Fish and Game is authorized to monitor the Applicant's actions as they relate to protection of wood turtles during construction of the Project in the laydown and staging areas identified in the July 1, 2016, letter from New Hampshire Fish and Game to the Applicant, which is appended hereto as Appendix IX, and any actions to enforce this provision of the Certificate must be brought before Site Evaluation Committee; and it is,

Further Ordered that, New Hampshire Fish and Game is authorized to specify the use of any appropriate technique, methodology, practice or procedure approved by the Subcommittee within the Certificate, as may be necessary, to effectuate conditions of the Certificate addressing the protection of wood turtles; and it is,

Further Ordered that, the Applicant shall consult with, and receive approval from, New Hampshire Fish and Game regarding methods for providing protection of wood turtles during Project construction activities in the laydown and staging areas identified in the July 1, 2016 letter; and it is,

Further Ordered that, the Applicant shall submit to the Administrator of the Committee the final plan addressing protection of wood turtles during Project construction activities, as approved by New Hampshire Fish and Game; and it is,

Further Ordered that, the Applicant shall, to the extent practicable, use all reasonable efforts to avoid, rather than demolish, any boulders identified during adjudicative hearings in this docket that are located on Tuttle Hill within the limits of the disturbance area in the construction zone; and it is,

Further Ordered that, all reasonable efforts to avoid the boulders shall be within the scope of state and federal permits pertaining to the Project; and it is,

Further Ordered that the Applicant shall retain a third-party noise expert, as approved by the Administrator of the Committee, to assist the Town of Antrim and the Administrator in taking field measurements in order to evaluate and validate noise complaints; and it is,

Further Ordered that, the Applicant shall file, with the Administrator of the Committee, the Federal Aviation Administration's determination of no hazard pertaining to the Aircraft Detection Lighting System that will be installed on the Project upon its receipt; and it is,

Further Ordered that, on a semi-annual basis, the Applicant shall submit to the Administrator of the Committee and to the Town of Antrim, an electronic copy and one hard copy of the report generated from the SCADA System that shows the amount of shadow flicker for each residence, learning space, workplace, health care setting, outdoor or indoor public gathering area, other occupied building, and roadway, identified by property address and/or tax identification number, within a minimum of one mile of any turbine; and it is,

Further Ordered that, the Applicant or its successors shall provide the Town of Antrim and the Administrator of the Committee with paper and electronic copies of its Post-Construction Sound Monitoring Reports required by the Site Evaluation Committee (Ref. Site 301.18 e & f) which shall include a map or diagram showing: (1) the layout of the project area, including topography, project boundary lines, and property lines; (2) the locations of the sound measurement points; and (3) the distance between any sound measurement point and the nearest wind turbine; and it is,

Further Ordered that, the Applicant shall request the Town of Antrim to maintain a paper and electronic copy of the Applicant's Post-Construction Sound Monitoring Reports available at the Town Hall for all potential owners and/or developers (Potential Owners and/or Developers) applying for either a: (i) building permit to construct a new residential structure or (ii) planning board approval for the subdivision of land for residential use, within one mile of any wind turbine associated with the Project (New Development); and it is,

Further Ordered that, the Town of Antrim shall make available the Applicant's Post-Construction Sound Monitoring Reports to all Potential Owners and/or Developers on its web site, in person, or by regular mail, provided that such in-person or mailed reports shall require a nominal fee for postage or photocopying; and it is,

Further Ordered that, in addition to a copy of the Post-Construction Sound Monitoring Report, the Town of Antrim shall inform any Potential Owner and/or Developer of any New Development that it has the right to obtain from the Applicant or its successors, upon request via email to \_\_\_\_\_,<sup>1</sup> additional information regarding expected maximum sound power levels and shadow flicker associated with the Project within the above referenced one mile radius; and it is,

Further Ordered that, a request for additional information regarding expected maximum sound power levels and shadow flicker associated with the Project within the above referenced one mile radius shall include the proposed location of the New Development, and the name and address of the property owner and the Potential Owner and/or Developer (if different than the property owner) pertaining to the New Development (collectively, as applicable, the Property Owner); and it is,

Further Ordered that, within fourteen (14) days after receiving a request for additional information regarding expected maximum sound power levels and shadow flicker associated with the Project within the above referenced one mile radius from a Potential Owner and/or Developer, the Applicant shall provide to the Potential Owner and/or Developer and the Town of

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<sup>1</sup> To be provided by the Applicant.

Antrim the following information: (i) the expected maximum sound power level at the location of the New Development; and (ii) the expected amount of shadow flicker at the location of the New Development; and it is,

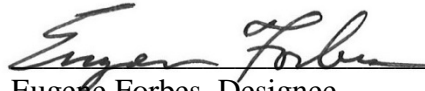
Further Ordered that, following the receipt of the above-referenced forecasts for expected maximum sound power level and expected amount of shadow flicker by the Potential Owner and/or Developer, the Applicant shall cooperate with and take such mitigation measures, if requested by the Potential Owner and/or Developer, to comply with applicable rules; and it is,

Further Ordered that, all Conditions contained in this Certificate and in the Decision shall remain in full force and effect unless otherwise ordered by the Committee.

SO ORDERED this seventeenth day of March, 2017.



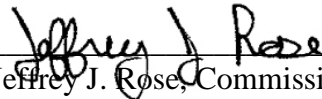
Robert R. Scott, Presiding Officer  
Site Evaluation Committee  
Commissioner  
Public Utilities Commission



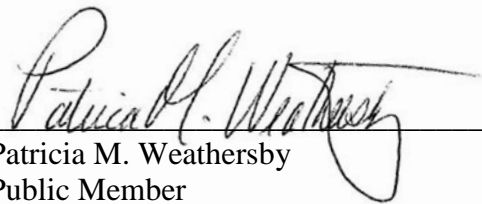
Eugene Forbes, Designee  
Director, Dept. of Environmental Services  
Water Division



John Clifford, Designee  
Hearings Examiner  
Public Utilities Commission



Jeffrey J. Rose, Commissioner  
Dept. of Resources & Economic Dev.



Patricia M. Weathersby  
Public Member

**APPENDIX I – PERMITS AND CERTIFICATES**

**APPENDIX II – MEMORANDUM OF UNDERSTANDING  
(N.H. Department of Cultural Resources, Division of Historic Resources - Applicant)**

**APPENDIX III – DEPARTMENT OF TRANSPORTATION PERMITS**

**APPENDIX IV – DETERMINATIONS OF NO HAZARD TO AIR NAVIGATION  
(Federal Aviation Administration)**

**APPENDIX V – AGREEMENT BETWEEN  
TOWN OF ANTRIM NEW HAMPSHIRE AND ANTRIM WIND ENERGY LLC,  
DEVELOPR/OWNER OF THE ANTRIM WIND POWER PROJECT  
(March 8, 2012)**

**APPENDIX VI – BIRD AND BAT CONSERVATION STRATEGY**

**APPENDIX VII – INVASIVE SPECIES MANAGEMENT PLAN**

**APPENDIX VIII – MEMORANDUM OF UNDERSTANDING  
(Applicant – N.H. Fish and Game – Audubon Society of N.H.)**

**APPENDIX IX – CORRESPONDENCE FROM N.H. FISH AND GAME  
(July 1, 2016)**

## **Appeals Process**

Any person or party aggrieved by this decision or order may appeal this decision or order to the New Hampshire Supreme Court by complying with the following provisions of RSA 541

**R.S.A. 162-H:11 Judicial Review.** – Decisions made pursuant to this chapter shall be reviewable in accordance with RSA 541.

**R.S.A. 541:3 Motion for Rehearing.** - Within 30 days after any order or decision has been made by the commission, any party to the action or proceeding before the commission, or any person directly affected thereby, may apply for a rehearing in respect to any matter determined in action or proceeding, or covered or included in the order, specifying in the motion all grounds for rehearing, and the commission may grant such rehearing if in its opinion good reason for the rehearing is stated in the motion.

**R.S.A. 541:4 Specifications.** - Such motion shall set forth fully every ground upon which it is claimed that the decision or order complained of is unlawful or unreasonable. No appeal from any order or decision of the commission shall be taken unless the appellant shall have made application for rehearing as herein provided, and when such application shall have been made, no ground not set forth therein shall be urged, relied on, or given any consideration by the court, unless the court for good cause shown shall allow the appellant to specify additional grounds.

**R.S.A. 541:5 Action on Motion.** – Upon the filing of such motion for rehearing, the commission shall within ten days either grant or deny the same, or suspend the order or decision complained of pending further consideration, and any order of suspension may be upon such terms and conditions as the commission may prescribe.

**R.S.A. 541:6 Appeal.** Within thirty days after the application for a rehearing is denied, or, if the application is granted, then within thirty days after the decision on such rehearing, the applicant may appeal by petition to the supreme court.

## Appendix I



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**

App. 32



**Thomas S. Burack, Commissioner**

FINAL DECISION AND REVISED CONDITIONS

August 30, 2016

Pamela G. Monroe, Administrator  
New Hampshire Site Evaluation Committee  
21 South Fruit Street, Suite 10  
Concord, NH 03301


Re: Application of Antrim Wind Energy, LLC  
Site Evaluation Committee Docket No. 2015-02

Dear Ms. Monroe:

This letter is to notify you that the NH Department of Environmental Services (DES) Water Division staff has completed their technical review of a request for revisions to the application conditions issued on July 26, 2016. A final decision on revising parts of the application that relate to DES permitting or regulatory authority relative to the Alteration of Terrain permit and Wetland permit has been made. DES recommends revising Alteration of Terrain conditions #20 and #22, and Wetland conditions #19, 20 and 21 and issues the revised decision enclosed with this letter.

This concludes DES review of the project which we hope will assist the SEC to complete its project evaluation process and render a final decision. If you have any questions, please contact me at 271-2951 or email at: [Rene.Pelletier@des.nh.gov](mailto:Rene.Pelletier@des.nh.gov)

Sincerely,

  
Rene Pelletier, PG  
Assistant Director  
Water Division

cc: Michael J. Iacopino, Counsel NHSEC  
ec: John B. Kenworth, Applicant  
Dana Valteau, TRC  
Thomas Burack, Commissioner, NHDES  
Clark Freise, Asst. Commissioner, NHDES  
Eugene Forbes, Water Division Director, NHDES  
David Keddell, ACOE  
Mark Kern, EPA

**ANTRIM WIND PARK, NHSEC DOCKET #2015-02**  
**ALTERATION OF TERRAIN BUREAU**  
**JULY 26, 2016 FINAL DECISION**

**RECOMMEND APPROVAL WITH THE FOLLOWING PERMIT CONDITIONS:**

As part of the processing of this application, DES granted approval to waiving specific requirements of Rule Env-Wq 1504.09(b)(2)b. regarding site specific soil mapping, with the finding that granting the waiver would not have an adverse impact on the environment, public health, public safety, or abutting properties, and that granting the request is consistent with the intent and purpose of the rule waived.

*(Approval includes permit conditions from the Watershed Management Bureau (WMB) to satisfy 401 Water Quality Certification concerns, and from the Drinking Water and Groundwater Bureau (DWGB) to satisfy concerns regarding ledge blasting and monitoring Best Management Practices. These conditions are based on the understanding that the NH Programmatic General Permit (PGP) issued by the U.S. Army Corps of Engineers applies to this project.)*

**PROJECT DESCRIPTION:**

Construct an energy generation wind park that will include the construction of 9 wind turbines, a substation, 3.6 miles of gravel access roads with associated stormwater management facilities, an operations/maintenance building, and various crane pads. The total contiguous area of disturbance has been calculated to be 57.1 acres. In addition, approximately 45.8 acres of the disturbed areas will be restored and re-vegetated, including roadway shoulders, side slopes, and portions of the construction pads.

**PROJECT SPECIFIC CONDITIONS:**

1. Activities shall not cause or contribute to any violations of the surface water quality standards established in Administrative Rule Env-Wq 1700.
2. Revised plans shall be submitted for an amendment approval prior to any changes in construction details or sequences. The Department must be notified in writing within ten days of a change in ownership.
3. The Department must be notified in writing prior to the start of construction and upon completion of construction. Forms are available at:  
<http://des.nh.gov/organization/divisions/water/aot/categories/forms.htm>.
4. The revised plans dated June 17, 2016 and supporting documentation in the file are a part of this approval.
5. No construction activities shall occur on the project after expiration of the approval unless the approval has been extended by the New Hampshire Site Evaluation Committee (SEC).
6. This permit does not relieve the Applicant from the obligation to obtain other local, state or federal permits that may be required (e.g., from US EPA, US Army Corps of Engineers, etc.). Projects disturbing over 1 acre may require a federal stormwater permit from EPA. Information regarding this permitting process can be obtained at:  
<http://des.nh.gov/organization/divisions/water/stormwater/construction.htm>.
7. All stormwater practices shall be inspected and maintained in accordance with Env-Wq 1507.08 and the project's approved Inspection and Maintenance (I&M) Manual. All record



08/30/16 DES FINAL DECISION CONTINUED:  
NHSEC DOCKET #2015-02

- keeping required by the I&M Manual shall be maintained by the identified responsible party, and be made available to the department upon request.
8. The smallest practical area shall be disturbed during construction activities.
  9. The permittee shall employ the services of an environmental monitor ("Monitor"). The Monitor shall be a Certified Professional in Erosion and Sediment Control or a Professional Engineer licensed in the State of New Hampshire and shall be employed to inspect the site from the start of alteration of terrain activities until the alteration of terrain activities are completed and the site is considered stable.
  10. During this period, the Monitor shall inspect the subject site at least once a week, and if possible, during any ½ inch or greater rain event (i.e. ½ inch of precipitation or more within a 24 hour period). If unable to be present during such a storm, the Monitor shall inspect the site within 24 hours of this event.
  11. The inspections shall be for the purposes of determining compliance with the permit. The Monitor shall submit a written report with photographs to the Department within 24 hours of the inspections. The reports shall describe, at a minimum, whether the project is being constructed in accordance with the approved sequence, shall identify any deviation from the conditions of this permit and the approved plans, and identify any other noted deficiencies.
  12. The Monitor shall provide technical assistance and recommendations to the Contractor on the appropriate Best Management Practices for Erosion and Sediment Controls required to meet the requirements of RSA 485-A:17 and all applicable DES permit conditions.
  13. Within 24 hours of each inspection, the Monitor shall submit a report with photographs to DES via email (to Craig Rennie at: [craig.rennie@des.nh.gov](mailto:craig.rennie@des.nh.gov) and to Jennifer Drociak at: [jennifer.drociak@des.nh.gov](mailto:jennifer.drociak@des.nh.gov)).
  14. Unless otherwise authorized by DES, the contractor shall keep a sufficient quantity of erosion control supplies on the site at all times during construction to facilitate an expeditious (i.e., within 24 hour) response to any construction related erosion issues on the site.
  15. For any blasting activities, the contractor shall follow the best management practices contained in Attachment A of the DES document *Rock Blasting and Water Quality Measures That Can Be Taken To Protect Water Quality and Mitigate Impacts*, which is available on the web at: <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf>
  16. Unless otherwise authorized by NHDES the Applicant shall prepare a turbidity sampling plan to confirm that measures to control erosion during construction are not causing or contributing to surface water quality violations. The turbidity sampling plan shall include the turbidity monitoring elements specified in the August, 14, 2013 NHDES Inter-Department Communication entitled "Guidance for SWPPPs, BMP Inspection and Maintenance, Turbidity and Sediment Monitoring for NHDOT Projects with 401 Water Quality Certifications" which includes guidance regarding sampling station number and locations, sampling frequency, sampling duration, size of storms that need to be sampled, how soon after the start of precipitation sampling should begin, quality assurance quality control provisions, and turbidity meter specifications. The plan shall be submitted to NHDES for approval at least 90 days prior to construction. The Applicant shall then implement the approved plan. Unless otherwise authorized by DES, the turbidity sampling results along with station ID, date, time, other field notes, and a description of corrective actions taken when violations of state surface water quality criteria for turbidity are found, shall be submitted to NHDES via electronic mail within 48 hours of collection.

08/30/16 DES FINAL DECISION CONTINUED:  
NHSEC DOCKET #2015-02

17. Unless otherwise authorized by NHDES, the Applicant shall develop and submit a monitoring plan to NHDES Watershed Management Bureau for approval at least 90 days prior to construction. The purpose of the plan is to confirm that operation of the Activity is not causing or contributing to violations of state surface water quality standards and may include pre and post construction monitoring. The plan shall include the parameters to be sampled, the location, timing and frequency of sampling, sampling and laboratory protocols, quality assurance / quality control provisions as well as when data will be submitted to NHDES. The applicant shall consult with NHDES and submit the monitoring data in a format that can be automatically uploaded into the NHDES Environmental Database. Once approved by NHDES, the Applicant shall implement the sampling plan.
18. The Applicant shall prepare and submit a Spill Prevention, Control, and Countermeasures plan (SPCC) for the Activity in accordance with federal regulations (40 CFR part 112). The plan shall include a certification by a Professional Engineer licensed in the State of New Hampshire. The Applicant shall submit the plan to NHDES Watershed Management Bureau for review and approval at least 90 days prior to the installation of the first turbine. The SPCC Plan shall include, but not be limited to, operating procedures to prevent oil spills, control measures installed to prevent oil from entering surface waters, countermeasures to contain, clean up and mitigate the effects of an oil spill, and facility inspections. The Applicant shall then implement the approved plan and maintain records demonstrating compliance with the plan. Such records shall be made available to NHDES within 30 days of receiving a written request by NHDES.
19. The Applicant shall submit a plan to prevent water quality violations due to discharges of concrete wash water during construction. The Applicant shall submit the plan to the NHDES Watershed Management Bureau for review and approval at least 90 days prior to placement of any concrete within the Activity area. The Applicant shall then implement the approved plan.
20. Herbicide use associated with the Activity shall be minimized to the maximum extent possible and shall only be allowed on a limited, as-needed basis in the switchyard and substation areas to control vegetation that could otherwise disrupt operation of the Activity, or for other reasons approved by NHDES, including but not limited to, control of invasive species where other forms of control are ineffective. Herbicides shall only be applied in strict accordance with the manufacturer's recommendations. Unless otherwise authorized by NHDES, the Applicant shall maintain records of herbicide use, including the name and brand of herbicide used, the date herbicides were applied, where they were applied, and the amount used. Such records shall be provided to NHDES within 30 days of receiving a request from NHDES.
21. Unless otherwise authorized by NHDES, fertilizers shall only be applied once on soils disturbed during construction to support the initial establishment of vegetation. Prior to fertilizer application, soils shall be tested to determine the minimum amounts of lime, nitrogen (N), phosphorus (P) and potassium (K) needed to support vegetation. Lime application rates, fertilizer selection (in terms of N, P and K content) and fertilizer application rates shall be consistent with the soil test results. Fertilizers shall not contain any pesticides. Where possible, fertilizer with slow release nitrogen shall be used.
22. Application of de-icing materials containing chloride shall be minimized to the maximum extent possible, and shall only be allowed when necessary to ensure safe access to the site for operations or emergency response personnel. Unless otherwise authorized by NHDES, the

08/30/16 DES FINAL DECISION CONTINUED:  
NHSEC DOCKET #2015-02

Applicant shall maintain records of the dates when chloride was applied, the reason it was applied, and the estimated amount of chloride applied on each date. The Applicant shall submit such records to NHDES by May 1 of the first two years of operation and within 30 days of receiving a request from NHDES thereafter. All applicators of road salt containing chloride that are retained to de-ice surfaces associated with the Activity shall be certified per the Green SnowPro program ( see <http://t2.unh.edu/green-snowpro-training-and-certification>) within two years of the issuance date of this Certification and shall maintain records of road salt use on the web-based tracking system available at <http://www.roadsalt.unh.edu/Salt/>.

08/30/16 DES FINAL DECISION CONTINUED:  
NHSEC DOCKET #2015-02

**ANTRIM WIND PARK, NHSEC DOCKET #2015-02**  
**SUBSURFACE SYSTEMS BUREAU**  
**JULY 26, 2016 FINAL DECISION**

**RECOMMEND APPROVAL WITH THE FOLLOWING PERMIT CONDITION:**

**PROJECT DESCRIPTION:**

The applicant proposes to install an Individual Sewage Disposal System (Enviro-Septic) that will accommodate 300 gallons per day.

**PROJECT SPECIFIC CONDITION:**

1. All work shall be in accordance with the revised plan dated October 30, 2015, as received by DES on November 1, 2015.

08/30/16 DES FINAL DECISION CONTINUED:  
NHSEC DOCKET #2015-02

**ANTRIM WIND PARK, NHSEC DOCKET #2015-02**  
**WETLANDS BUREAU**  
**JULY 26, 2016 FINAL DECISION**

**RECOMMEND APPROVAL WITH THE FOLLOWING PERMIT CONDITIONS:**

**PROJECT DESCRIPTION:**

Dredge and fill 9,121 square feet of palustrine wetlands, dredge and fill 156 square feet within an intermittent stream (impacting 156 linear feet), and temporarily impact 60 square feet within a perennial stream (impacting 15 linear feet) to construct an energy generation wind park that will include the construction of 9 wind turbines, a substation, 3.6 miles of gravel access roads, an operations/maintenance building, and various crane pads. In addition, the project includes a proposal to protect 908 acres of undeveloped forestland through the execution of 6 distinct conservation easements, which includes the summit of Willard Mountain.

**PROJECT SPECIFIC CONDITIONS:**

1. All work shall be in accordance with revised plans by TRC dated June 17, 2016, as received by the NH Department of Environmental Services (DES) on June 29, 2016.
2. Prior to construction, any plan revisions or changes in construction details or sequences shall be submitted to DES for review and approval.
3. Any further alteration of areas on this property that are within the jurisdiction of the DES Wetlands Bureau will require a new application and further permitting by the Bureau.
4. This permit is not valid unless an Alteration of Terrain permit or other method of compliance with RSA 485-A:17 and Env-Wq 1500 is achieved.
5. This permit is not valid unless a septic system construction approval or other method of compliance with RSA 485-A:29-44 and Env-Wq 1000 is achieved.
6. No construction activities shall occur on the project after expiration of the approval unless the approval has been extended by the New Hampshire Energy Facility Site Evaluation Committee (SEC).
7. Appropriate siltation/erosion/turbidity controls shall be in place prior to construction, shall be maintained during construction, and remain in place until the area is stabilized. Silt fence(s) must be removed once the area is stabilized.
8. Work shall be conducted in a manner so as to minimize turbidity and sedimentation to surface waters and wetlands.
9. Discharge from dewatering of work areas shall be to sediment basins that are: a) located in uplands; b) lined with hay bales or other acceptable sediment trapping liners; c) set back as far as possible from wetlands and surface waters, in all cases with a minimum of 20 feet of undisturbed vegetated buffer.
10. Dredged material shall be placed outside of the jurisdiction of the DES Wetlands Bureau.
11. Stream work shall be done during low flow conditions.
12. Culvert outlets shall be protected in accordance with the DES Best Management Practices for Urban Stormwater Runoff Manual (January 1996) and the Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire (August 1992).
13. Proper headwalls shall be constructed within seven days of culvert installation.

14. Within three days of final grading or temporary suspension of work in an area that is in or adjacent to wetlands or surface waters, all exposed soil areas shall be stabilized by seeding and mulching during the growing season, or if not within the growing season, by mulching with tackifiers on slopes less than 3:1 or netting and pinning on slopes steeper than 3:1.
15. Where construction activities occur between November 30 and May 1, all exposed soil areas shall be stabilized within 1 day of establishing the grade that is final or that otherwise will exist for more than 5 days. Stabilization shall include placing 3 inches of base course gravels, or loaming and mulching with tack or netting and pinning on slopes steeper than 3:1.
16. The contractor responsible for completion of the work shall utilize techniques described in the New Hampshire Stormwater Manual, Volume 3, Erosion and Sediment Controls During Construction (December 2008).
17. This project includes the conservation of six parcels for preservation which shall have deeds written for the conservation to run with the land, and both existing and future property owners shall be subject to the conservation restrictions.
18. The plans noting the six conservation parcels with a copy of the final deed language shall be recorded with the Registry of Deeds Office for each appropriate lot. A copy of the recording from the County Registry of Deeds Office shall be submitted to the DES Wetlands Bureau.

**ANTRIM WIND PARK, NHSEC DOCKET #2015-02**  
**WATERSHED MANAGEMENT BUREAU - 401 WATER QUALITY CERTIFICATION**  
**JULY 26, 2016 FINAL DECISION**

**401 WATER QUALITY CERTIFICATION CONDITIONS:**

The proposed Activity involves the discharge of dredge or fill material into surface waters of the U.S. and, therefore, requires a federal Clean Water Act (CWA) Section 404 (33 U.S.C. 1344) permit from the U.S. Army Corps of Engineers (Corps). In accordance with Section 401 of the CWA (33 U.S.C. 1341) and New Hampshire (NH) statute RSA 485-A: 12, III, the Activity therefore requires a Section 401 Water Quality Certification from the NH Department of Environmental Services (NHDES).

On February 24, 2016, the Corps indicated that the Section 404 general permit (i.e., the New Hampshire Programmatic General Permit or PGP) applies to the proposed Activity. The Corps issues PGPs every five years; the last PGP was issued in 2012. A 401 Water Quality Certification (WQC # 2012-404P-002) for the current PGP was issued by NHDES on August 2, 2012. WQC # 2012-404P-002 is applicable to all activities covered by the PGP. Since the proposed Activity is covered by the PGP, the Applicant for the proposed Activity must comply with the conditions of WQC #2012-404P-002, which are provided below:

“E-1. Construction or operation of all projects included under the PGP shall meet NH surface water quality standards.

E-2. Applications for projects included under the PGP shall be subject to DES review to determine whether additional conditions or an individual 401 Certification application is necessary to ensure compliance with surface water quality standards.

E-3. If DES determines that surface water quality standards are being violated by the specific project or there is reasonable potential to expect that water quality standards will be violated if more project specific conditions are not included in the 401 Certification, DES may modify this 401 Certification for the specific project to include additional conditions to ensure compliance with surface water quality standards.

E-4. Construction on any specific project permitted under the PGP shall not commence until all other applicable permits and approvals have been granted, including those permits issued through DES Wetlands Bureau and, if necessary, DES Alteration of Terrain Program.

E-5. All applicable conditions in the NH PGP shall be followed.

E-6. DES reserves the right to inspect any project permitted under the PGP and the effects of the project on affected surface waters at any time to monitor compliance with the NH surface water quality standards.”

08/30/16 DES FINAL DECISION CONTINUED:  
NHSEC DOCKET #2015-02

NHDES has reviewed the information provided by the Applicant and has determined that compliance with WQC #2012-404P-002 issued in 2012, and the conditions for the Alteration of Terrain and Wetlands permits, provides reasonable assurance that construction and operation of the Activity will not violate surface water quality standards<sup>1</sup>.

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<sup>1</sup> New Hampshire surface water quality standards are included in statute (RSA 485-A:8) and regulation (Env-Wq 1700).



## Appendix II

App. 26

STATE OF NEW HAMPSHIRE  
DIVISION OF HISTORICAL RESOURCES, NEW HAMPSHIRE STATE HISTORIC  
PRESERVATION OFFICE  
AND ANTRIM WIND ENERGY, LLC  
REGARDING THE  
ANTRIM WIND ENERGY PROJECT IN ANTRIM, HILLSBOROUGH COUNTY, NH

MEMORANDUM OF UNDERSTANDING

In accordance with RSA 227-C:9 Directive for Cooperation in the Protection of Historic Resources, this Memorandum of Understanding (MOU) is entered into by and between the New Hampshire Division of Historical Resources (NHSHPO) and Antrim Wind Energy, LLC (Antrim Wind), and

Whereas, all state agencies, departments, commissions and institutions are directed to cooperate with the Division of Historical Resources for the preservation of historic resources during all state licensed, assisted or contracted projects, activities or programs pursuant to RSA 227-C:9 Directive for Cooperation in the Protection of Historic Resources, and

Whereas, Antrim Wind has applied for a certificate from the New Hampshire Site Evaluation Committee and proposes to construct a series of wind tower structures along the Willard Mountain and Tuttle Hill ridgelines and extending down to NH Route 9 in Antrim, NH (the Project); and

Whereas, a comprehensive survey of properties in the project area and consultation with the NHSHPO as part of its Determination of Eligibility Committee process has determined that the White Birch Point Historic District is eligible for listing in the National Register of Historic Places for its historic significance and architecture; and

Whereas, the NHSHPO has determined that the introduction of turbines within the viewshed of the eligible historic district will diminish the historic setting, feeling and association of the eligible White Birch Point Historic District, and

Whereas, execution of this MOU resolves the Project's effects through the implementation of the following stipulations:

Stipulations

Antrim Wind shall insure that the following measure is carried out in consultation with the NHSHPO:

1. Antrim Wind will hire an Architectural Historian qualified under 36 CFR 61 to oversee the development and installation of an interpretive sign within the eligible White Birch Point Historic District. The sign will focus on the history and significance of the eligible White Birch Point Historic District as a grouping of camp buildings united by their pattern of development and setting that represent summer and vacation home tourism in New Hampshire in the early to mid-20th century. The sign will incorporate historic and present-day images and text. Antrim Wind will coordinate with the White

Birch Point Association and the NHSHPO to determine an appropriate location for the interpretive sign. The Architectural Historian will work with White Birch Point Association in developing and installing the sign. NHSHPO will have 30 days to review and comment on the draft design prior to installation. The deadline for installation will be one year from the start of Project construction.

2. Should the White Birch Point Association have no interest in the installation of the historic signage, the following measure will be completed.

Antrim Wind will hire an Architectural Historian qualified under 36 CFR 61 and a web designer to develop the historical content and design of a website page devoted to the history and significance of the eligible White Birch Point Historic District as a grouping of camp buildings united by their pattern of development and setting that represent summer and vacation home tourism in New Hampshire in the early 20th century. The page will feature historic and present-day photographs of the district as well as other similar camp communities in Antrim in order to place the eligible White Birch Point Historic District into a larger historic context. Antrim Wind will work with the Antrim Historical Society to determine its interest in content development as well as its ability to host the page on their website. NHSHPO will have 30 days to review and comment on a draft of the webpage content and design. The deadline for completion will be one year from the start of Project construction.

3. Should neither option be feasible, Antrim Wind will continue to consult with the NHSHPO to determine a mutually agreeable project of similar scope and cost to document the history of the eligible White Birch Point Historic District.

#### Administrative Conditions

1. Dispute Resolution
  - a. Should Antrim Wind object within thirty (30) days to any actions proposed or carried out pursuant to this Agreement, they shall consult with NHSHPO to resolve the objection.
  - b. If at any time during the implementation of the measures stipulated in this MOU, an objection should be raised by an interested member of the public, the parties will consult to determine the appropriate response.
2. Post Review Discoveries
  - a. If Antrim Wind materially changes plans for the proposed Project and such changes lead to newly discovered effects on historic properties, AWE shall consult with NHSHPO to resolve any adverse effects to such properties.
  - b. If any unanticipated archaeological resources are discovered as a result of project planning or construction, Antrim Wind will consult with NHSHPO to determine the need for appropriate evaluative studies, determinations of

National Register eligibility, and/or mitigation measures, if needed, to resolve adverse effects.

3. Monitoring and Reporting

- a. Each year following the execution of this MOU until it expires or is terminated, Antrim Wind shall provide NESHPO a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed and any problems encountered in Antrim Wind's efforts to carry out the terms of this MOU.

4. Amendments

- a. This MOU may be amended when such an amendment is agreed to in writing by all signatories.

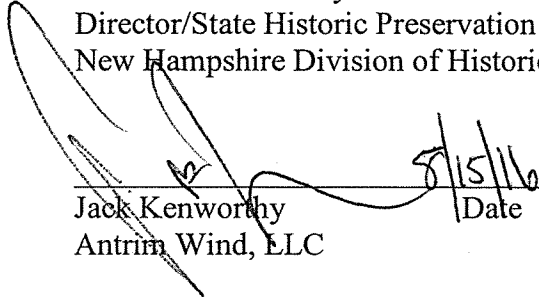
5. Termination

- a. If any signatory to this MOU determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Condition 3 above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOU upon written notification to the other signatories. Signatories must continue to work to resolve the adverse effects of this undertaking.
- b. Upon completion of the measures outlined in the Stipulations section of this agreement, Antrim Wind's obligations under this agreement shall be considered complete and this agreement shall terminate.

Execution of this Memorandum of Understanding by Antrim Wind and NESHPO, and implementation of its terms evidences that the effects of the Project on historic properties have been taken into account.

 8/10/16  
Elizabeth H. Muzzey Date

Director/State Historic Preservation Officer  
New Hampshire Division of Historical Resources

 8/15/16  
Jack Kenworthy Date  
Antrim Wind, LLC

## Appendix III



Victoria F. Sheehan  
Commissioner

**THE STATE OF NEW HAMPSHIRE**  
**DEPARTMENT OF TRANSPORTATION**

District 4 Office, 19 Base Hill Road, Swanzey, NH 03446



William Cass, P.E.  
Assistant Commissioner

**DRIVEWAY PERMIT**

<b>To: John B Kenworthy, Executive Office</b> <b>Antrim Wind Energy, LLC</b> <b>155 Fleet Street</b> <b>Portsmouth, NH 03801</b>	<b>City/Town: Antrim</b> <b>Route/Road: NH 9 (S0000009)</b> <b>Patrol Section: 404</b> <b>Tax Map: 212</b> <b>Lot: 27</b> <b>Development: Wind Power Facility</b>	<b>Permit #: 04-017-0022</b> <b>District: 04</b> <b>Permit Date 2/4/2016</b>
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Permission is hereby granted to construct (alter) a driveway, entrance, exit or approach adjoining NH 9 (S0000009), pursuant to the location and specifications as described below. Failure to adhere to the standards and engineering drawings previously approved shall render this instrument null and void. Failure to start or complete construction of said facility within one calendar year of the date of this permit shall require application for permit extension or renewal in accordance with the Driveway Access Rules. Facilities constructed in violation of the permit specifications or the rules, shall be corrected immediately upon notification by a Department representative. Any cost by the State to correct deficiencies shall be fully borne by the landowner. The landowner shall defend, indemnify and hold harmless the Department and its duly appointed agents and employees against any action for personal injury and/or property damage sustained by reason of the exercise of this permit.

**Drive 1**

**Location:** Approximately 0.63 miles east of Loveren Mill Road on the south side of NH 9 (S0000009).  
SLD Station: 12121 (right)      GPS: 43.07633 N 72.006245 W.

**Specifications:** This permit authorizes a paved access to be used as a Wind Power Facility drive. Any change in use, increase in use or reconstruction of the driveway requires reapplication.

The right-of-way line is located 50' from centerline.  
The entrance shall be graded so that the surface of the drive drops 3 inches at a point 5 feet from NH 9 (S0000009) edge of pavement to create a drainage swale.

The driveway shall not exceed 16 feet in width. The entrance of the drive may be flared; typically the flare radius is one half the driveway width.  
A new 18 inch diameter plastic culvert is required for drainage.

**Other Conditions:**

No structures, including buildings, permanent or portable signs, lights, displays, fences, walls, etc. shall be permitted on, over or under the Highway Right of Way.

No parking, catering or servicing shall be conducted within the Highway Right of Way.

The applicant shall comply with all applicable ordinances and regulations of the municipality or other State Agencies.

The Department has relied on the title and subdivision information provided by the landowner. The Department has not performed additional title research and makes no warranty or representation concerning landowner's legal right to access. In the event of a dispute about the landowner's legal right to the access provided herein, the landowner will defend and indemnify the Department.

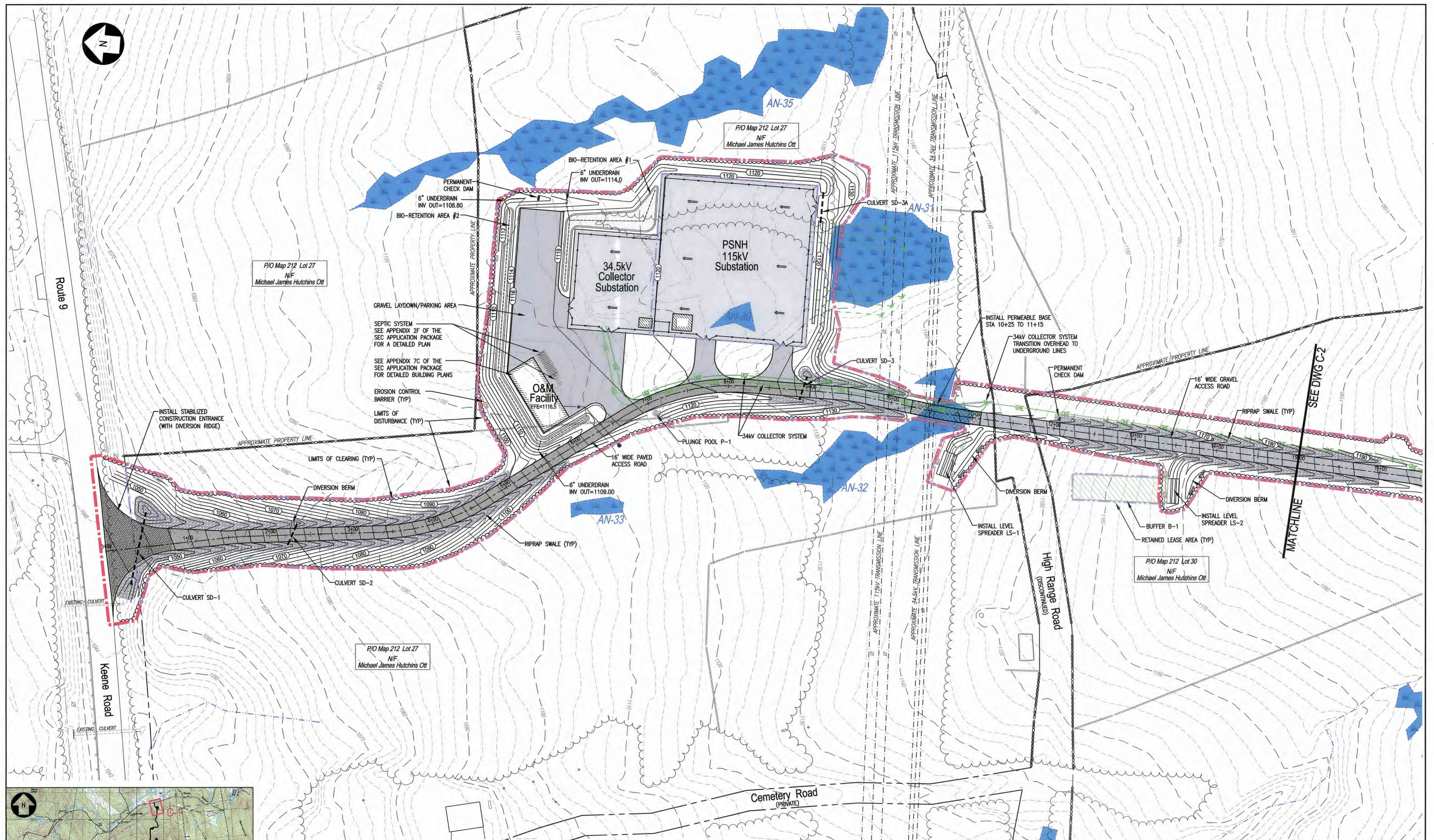
1. Driveway and related roadway modifications are to be constructed as shown on plans prepared by Daniel T. Butler with TRC dated 11-8-11 for Antrim Wind Energy, LLC provided that they do not conflict with other provisions of this permit and are approved by the Town.
2. Driveway to be 90° to the State highway, from the edge of roadway pavement to the right of way line.
3. The roadside embankment and vegetation must be appropriately modified and maintained to insure a minimum, all season safe sight distance of 400' by the applicant, the owner, and the owner's successor and assignees during construction and as long as this entrance is in use.
4. All slopes to be 4:1 - 6:1 preferred or match existing. Loam, seed, fertilize, and mulch any disturbed areas within the State right of way.
5. All drive(s) shall be paved full width with hot Bituminous Pavement machine method. The drive(s) shall be paved a minimum of 20 feet in length.
6. Traffic must be maintained during the performance of the work as described in the USDOT Manual on Uniform Traffic Control Devices Latest Edition. Traffic shall be protected by suitable barricades, standard warning and advance warning signs, and proper lighting at night. Properly trained flag persons with vests and using stop/slow paddles shall be provided whenever two-way traffic cannot be maintained.
7. Applicant to contact the District 4 Office at 352-2302 for a final inspection upon completion of driveway. This permit shall be construed to permit temporary access only until final acceptance of the modifications, and may be revoked in the event such modifications do not comply with the terms of this permit.

Approved \_\_\_\_\_

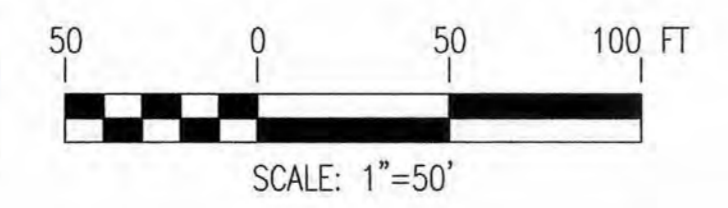
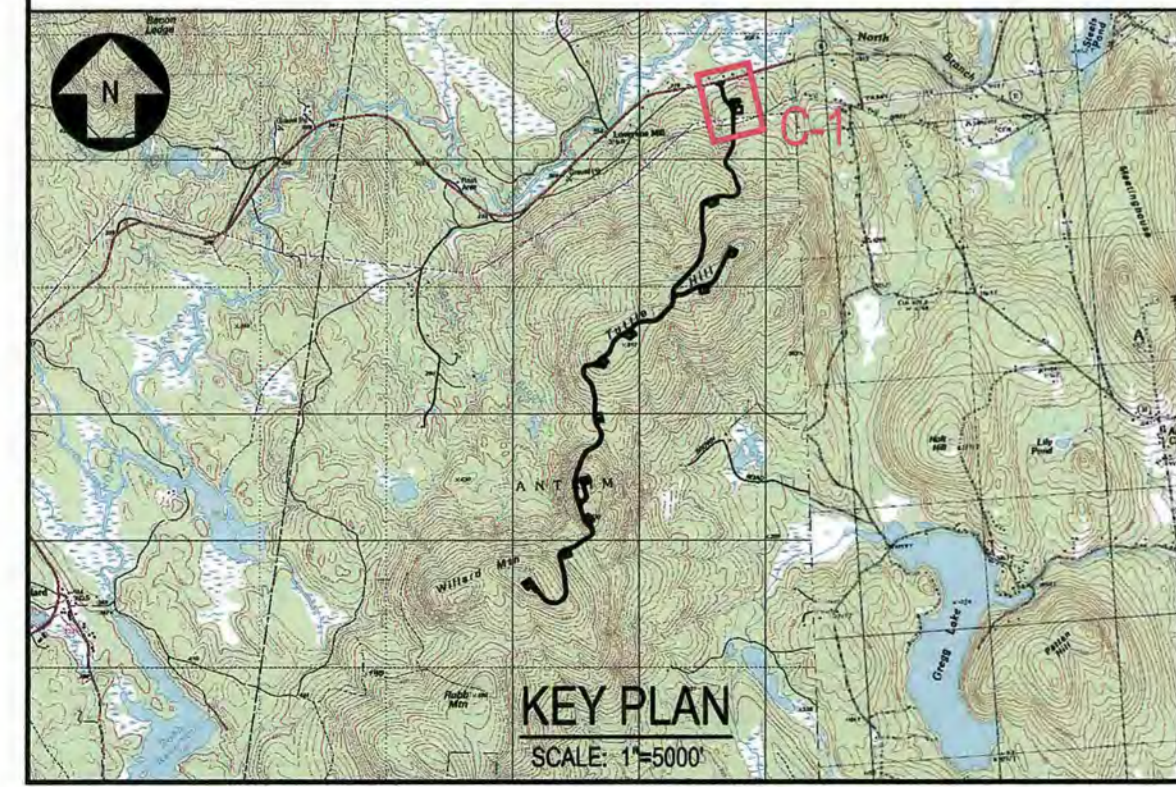


Assistant District Engineer  
For Director of Administration

Copies: District, Town, Patrolman



**PLAN VIEW**  
SCALE: 1"=50'



- NOTES:**
- SEE DRAWING G-2 FOR PROJECT NOTES, LEGEND, AND ABBREVIATIONS.
  - SEE DRAWING G-3 FOR OVERALL PROJECT MAP AND OVERALL PROJECT DRAWING INDEX.
  - SEE DRAWING C-24 FOR CULVERT, BUFFER, TREATMENT SWALE, LEVEL SPREADER AND PLUNGE POOL SCHEDULES.

**NOT FOR CONSTRUCTION**

NO.	REVISION	DATE	BY	CK	P.E. STAMPED BY	P.E. No.
B	ISSUED FOR PERMITTING	1/20/12	PMM	PGT	DTB	8105
A	ISSUED FOR CLIENT REVIEW	12/19/11	PMM	PGT		



CLIENT APPROVAL	
APPROVED BY	TRC/PMI DESIGNED
COMPANY	TRC/KAV DRAWN
DATE	TRC/DTB CHECKED
	APPROVED
	REVIEWED

PLAN: MAIN ACCESS ROAD STA 0+00 TO 15+00 ANTRIM WIND ENERGY, LLC ANTRIM WINDPARK NEW HAMPSHIRE	
	249 WESTERN AVENUE AUGUSTA, ME 04330 PROJECT NO: 186317 DATE: 11-8-11
ANTRIM	NEW HAMPSHIRE
C-1	REV. B





Victoria F. Sheehan  
Commissioner

**THE STATE OF NEW HAMPSHIRE**  
**DEPARTMENT OF TRANSPORTATION**

District 4 Office, 19 Base Hill Road, Swanzey, NH 03446



William Cass, P.E.  
Assistant Commissioner

**DRIVEWAY PERMIT**

<b>To: John B Kenworthy, Executive Office</b>	<b>City/Town: Antrim</b>	<b>Permit #: 04-017-0023</b>
<b>Antrim Wind Energy, LLC</b>	<b>Route/Road: NH 9 (S0000009)</b>	<b>District: 04</b>
<b>155 Fleet Street</b>	<b>Patrol Section: 404</b>	<b>Permit Date 2/4/2016</b>
<b>Portsmouth, NH 038010-4050</b>	<b>Tax Map: 222</b>	
	<b>Lot: 004</b>	
	<b>Development: Temporary Laydown Yard</b>	

Permission is hereby granted to construct (alter) a driveway, entrance, exit or approach adjoining NH 9 (S0000009), pursuant to the location and specifications as described below. Failure to adhere to the standards and engineering drawings previously approved shall render this instrument null and void. Failure to start or complete construction of said facility within one calendar year of the date of this permit shall require application for permit extension or renewal in accordance with the Driveway Access Rules. Facilities constructed in violation of the permit specifications or the rules, shall be corrected immediately upon notification by a Department representative. Any cost by the State to correct deficiencies shall be fully borne by the landowner. The landowner shall defend, indemnify and hold harmless the Department and its duly appointed agents and employees against any action for personal injury and/or property damage sustained by reason of the exercise of this permit.

**Drive 1**      **Temporary Laydown Yard expires: 2/4/2017**  
**Location:**      Approximately 0.31 miles west of Loveren Mill Road on the south side of NH 9 (S0000009).  
                         SLD Station: 7158 (right)                      GPS: 43.069932 N 72.02288 W.

**Specifications:** This permit authorizes a paved access to be used as a Temporary Laydown Yard drive. Any change in use, increase in use or reconstruction of the driveway requires reapplication.

The right-of-way line is located 50 feet from and parallel to the centerline of the highway.  
The entrance shall be graded so that the surface of the drive drops 6 inches at a point 10 feet from NH 9 (S0000009) edge of pavement to create a drainage swale.

The driveway shall not exceed 16 feet in width. The entrance of the drive may be flared; typically the flare radius is one half the driveway width.

**Other Conditions:**

No structures, including buildings, permanent or portable signs, lights, displays, fences, walls, etc. shall be permitted on, over or under the Highway Right of Way.

No parking, catering or servicing shall be conducted within the Highway Right of Way.

The applicant shall comply with all applicable ordinances and regulations of the municipality or other State Agencies.

The Department has relied on the title and subdivision information provided by the landowner. The Department has not performed additional title research and makes no warranty or representation concerning landowner's legal right to access. In the event of a dispute about the landowner's legal right to the access provided herein, the landowner will defend and indemnify the Department.

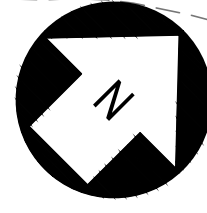
1. Driveway and related roadway modifications are to be constructed as shown on plans prepared by TRC dated 11-8-11 for Antrim Wind Energy, LLC provided that they do not conflict with other provisions of this permit and are approved by the Town.
2. Driveway to be 90° to the State highway, from the edge of roadway pavement to the right of way line.
3. The roadside embankment and vegetation must be appropriately modified and maintained to insure a minimum, all season safe sight distance of 400' by the applicant, the owner, and the owner's successor and assignees during construction and as long as this entrance is in use.
4. All slopes to be 4:1 - 6:1 preferred or match existing. Loam, seed, fertilize, and mulch any disturbed areas within the State right of way.
5. All drive(s) shall be paved full width with hot Bituminous Pavement machine method. The drive(s) shall be paved a minimum of 20 feet in length.
6. Traffic must be maintained during the performance of the work as described in the USDOT Manual on Uniform Traffic Control Devices Latest Edition. Traffic shall be protected by suitable barricades, standard warning and advance warning signs, and proper lighting at night. Properly trained flag persons with vests and using stop/slow paddles shall be provided whenever two-way traffic cannot be maintained.
7. This permit is intended as temporary staging for construction purposes only and any further development which results in a change or increase in usage will require additional site reviews and/or modifications to the driveway and/or state highway. In addition, should this project change or significantly increase the current flowage pattern to a point where the integrity of the highway drainage system is threatened, this permit shall be declared null and void until such time as solutions are proposed and constructed to the satisfaction of the District Engineer or his authorized agent.

Approved



Assistant District Engineer  
For Director of Administration

Copies: District, Town, Patrolman



North Branch River

Keene Road

TO PROJECT ENTRANCE  
(5,000'±)

Route 9

AN-LD-3

AN-LD-INT-1

Temporary  
Staging / Laydown Area  
(2.91 Acres)

AN-LD-4

AN-LD-2

AN-LD-1

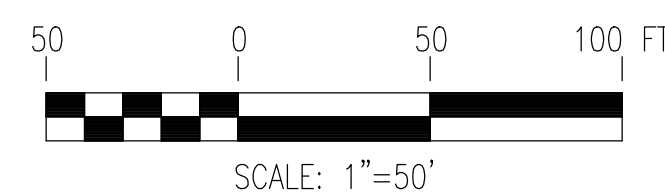
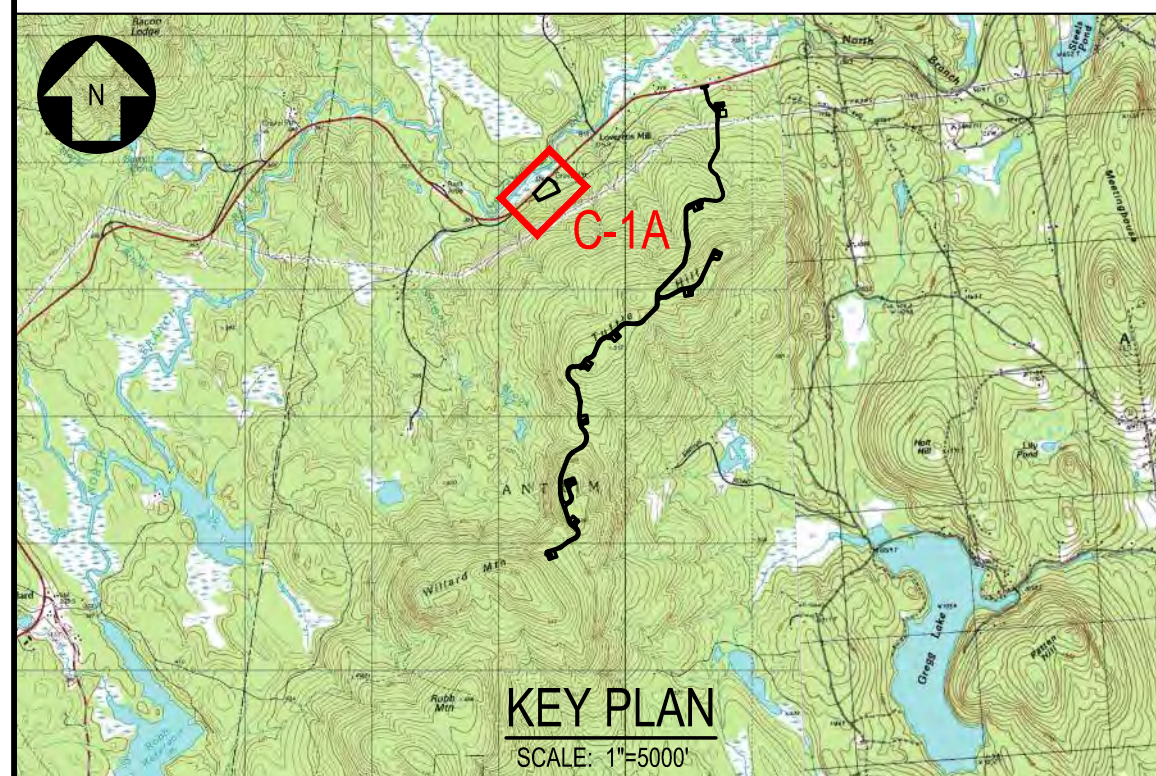
EROSION CONTROL  
BARRIER (TYP)

TEMPORARY LIMITS OF  
DISTURBANCE (TYP)

AN-LD-1

APPROX PROPERTY  
LINE (TYP)

25' WETLAND  
SETBACK (TYP)



PLAN VIEW  
SCALE: 1"=50'

**NOTES:**

1. SEE DRAWING C-2 FOR PROJECT NOTES, LEGEND, AND ABBREVIATIONS.
2. SEE DRAWING C-3 FOR OVERALL PROJECT MAP AND OVERALL PROJECT DRAWING INDEX.
3. SEE DRAWING C-23 FOR CULVERT, BUFFER, TREATMENT SWALE, LEVEL SPREADER AND PLUNGE POOL SCHEDULES.

**NOT FOR CONSTRUCTION**

NO.	REVISION	DATE	BY	CK	P.E. STAMPED BY	P.E. No.
A	ISSUED FOR CLIENT REVIEW	12/19/14	PMM	DTB		

CLIENT APPROVAL	
DESIGNED	TRC/PM
DRAWN	TRC/KAV
CHECKED	TRC/DTB
APPROVED	
REVIEWED	
DATE	

PLAN: TEMPORARY STAGING/LAYDOWN AREA

ANTRIM WIND ENERGY, LLC  
ANTRIM WINDPARK  
NEW HAMPSHIRE

ANTRIM

**CTRC** 249 WESTERN AVENUE  
AUGUSTA, ME 04330  
PROJECT NO: 186317  
SCALE: AS NOTED DATE: 11-8-11

C-1A

REV. A

## **Appendix IV**



Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5439-OE

Issued Date: 03/31/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 1  
 Location: Hillsborough, NH  
 Latitude: 43-04-03.41N NAD 83  
 Longitude: 72-00-28.14W  
 Heights: 1431 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 1920 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (1920 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 10/01/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before April 30, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on May 10, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5439-OE.

**Signature Control No: 231063057-247681023**

( DNH -WT )

Sheri Edgett-Baron  
Manager, Obstruction Evaluation Group

Attachment(s)  
Additional Information  
Map(s)

## Additional information for ASN 2014-WTE-5439-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 4.5 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 137 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes or minimum vectoring altitudes.

The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.







Mail Processing Center  
Federal Aviation Administration  
Southwest Regional Office  
Obstruction Evaluation Group  
2601 Meacham Boulevard  
Fort Worth, TX 76193

Aeronautical Study No.  
2014-WTE-5440-OE

Issued Date: 06/11/2015

Drew Kenworthy  
Antrim Wind Energy, LLC  
155 Fleet Street  
Portsmouth, NH 03801

**\*\* MARKING & LIGHTING CHANGE \*\***

The Federal Aviation Administration (FAA) has completed an evaluation of the obstruction marking and lighting for the following structure:

Structure:	Wind Turbine AWE 2
Location:	Hillsborough, NH
Latitude:	43-03-51.34N NAD 83
Longitude:	72-00-22.29W
Heights:	1743 feet site elevation (SE) 489 feet above ground level (AGL) 2232 feet above mean sea level (AMSL)

Based on this evaluation, the FAA has determined that a change to the obstruction marking/lighting for this structure is necessary for aviation safety. The structure would not be a hazard to air navigation provided it is obstruction marked/lighted in accordance with FAA Advisory Circular 70/7460-1, K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines). This condition supersedes the obstruction marking/lighting condition in the Determination of No Hazard to Air Navigation issued on 05/04/2015.

So that aeronautical charts and records can be updated, it is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed when the new system is installed and operational.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-

contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This evaluation concerns the effect of the marking/lighting changes on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5440-OE.

**Signature Control No: 231063058-254923363**

( MLCHG -WT )

Cindy Whitten  
Specialist

Attachment(s)  
Map(s)

TOPO Map for ASN 2014-WTE-5440-OE





Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5440-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 2  
 Location: Hillsborough, NH  
 Latitude: 43-03-51.34N NAD 83  
 Longitude: 72-00-22.29W  
 Heights: 1743 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 2232 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (2232 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5440-OE.

**Signature Control No: 231063058-251023069**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

## Additional information for ASN 2014-WTE-5440-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 4.4 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 146 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

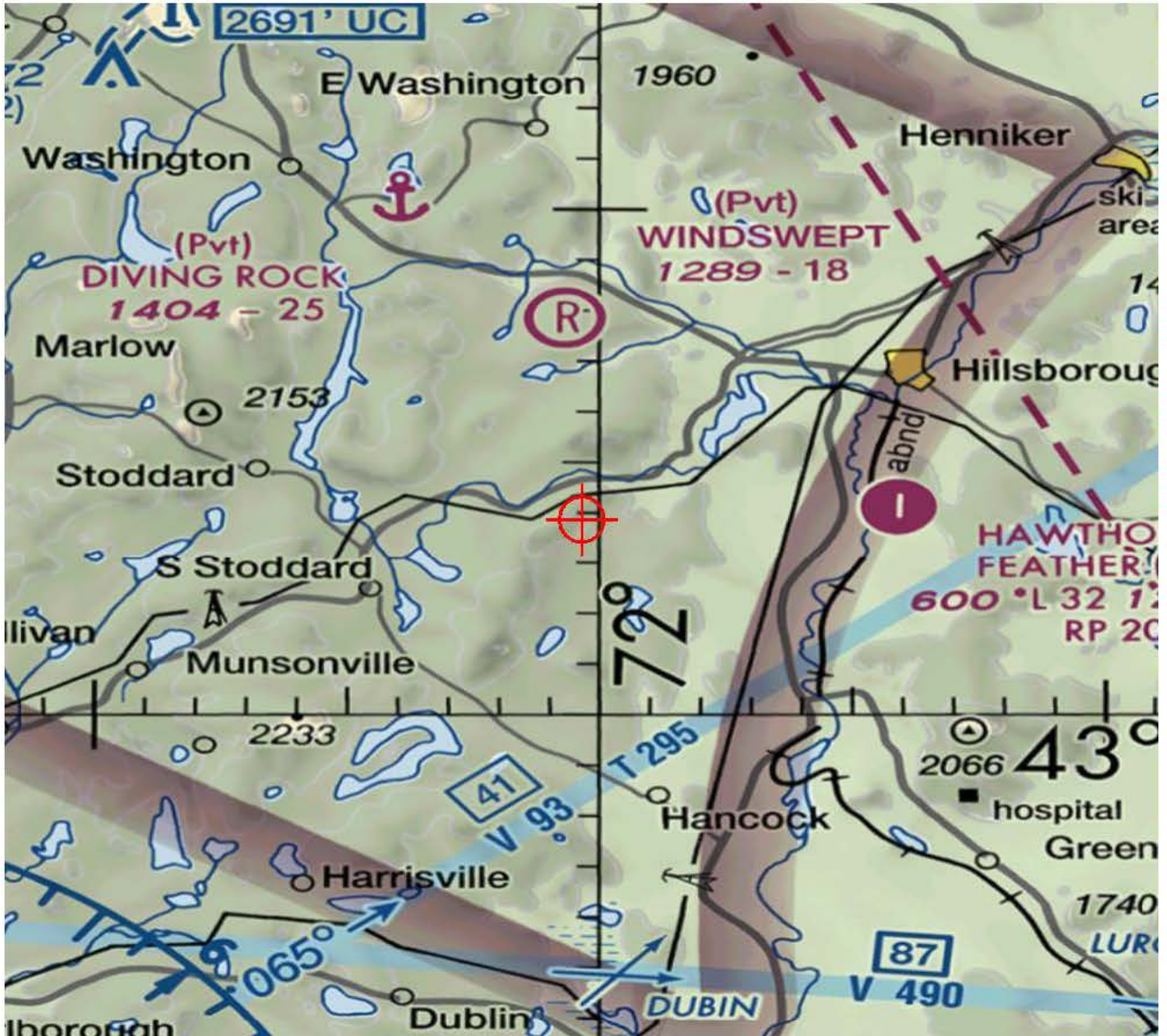
The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.









Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5441-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 3  
 Location: Hillsborough, NH  
 Latitude: 43-03-41.26N NAD 83  
 Longitude: 72-00-32.62W  
 Heights: 1758 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 2247 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (2247 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5441-OE.

**Signature Control No: 231063059-251023360**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

## Additional information for ASN 2014-WTE-5441-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 4.5 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 133 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.





Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5442-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 4  
 Location: Hillsborough, NH  
 Latitude: 43-03-31.43N NAD 83  
 Longitude: 72-00-59.25W  
 Heights: 1682 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 2171 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (2171 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:



- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5442-OE.

**Signature Control No: 231063060-251023653**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

## Additional information for ASN 2014-WTE-5442-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 4.8 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 101 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

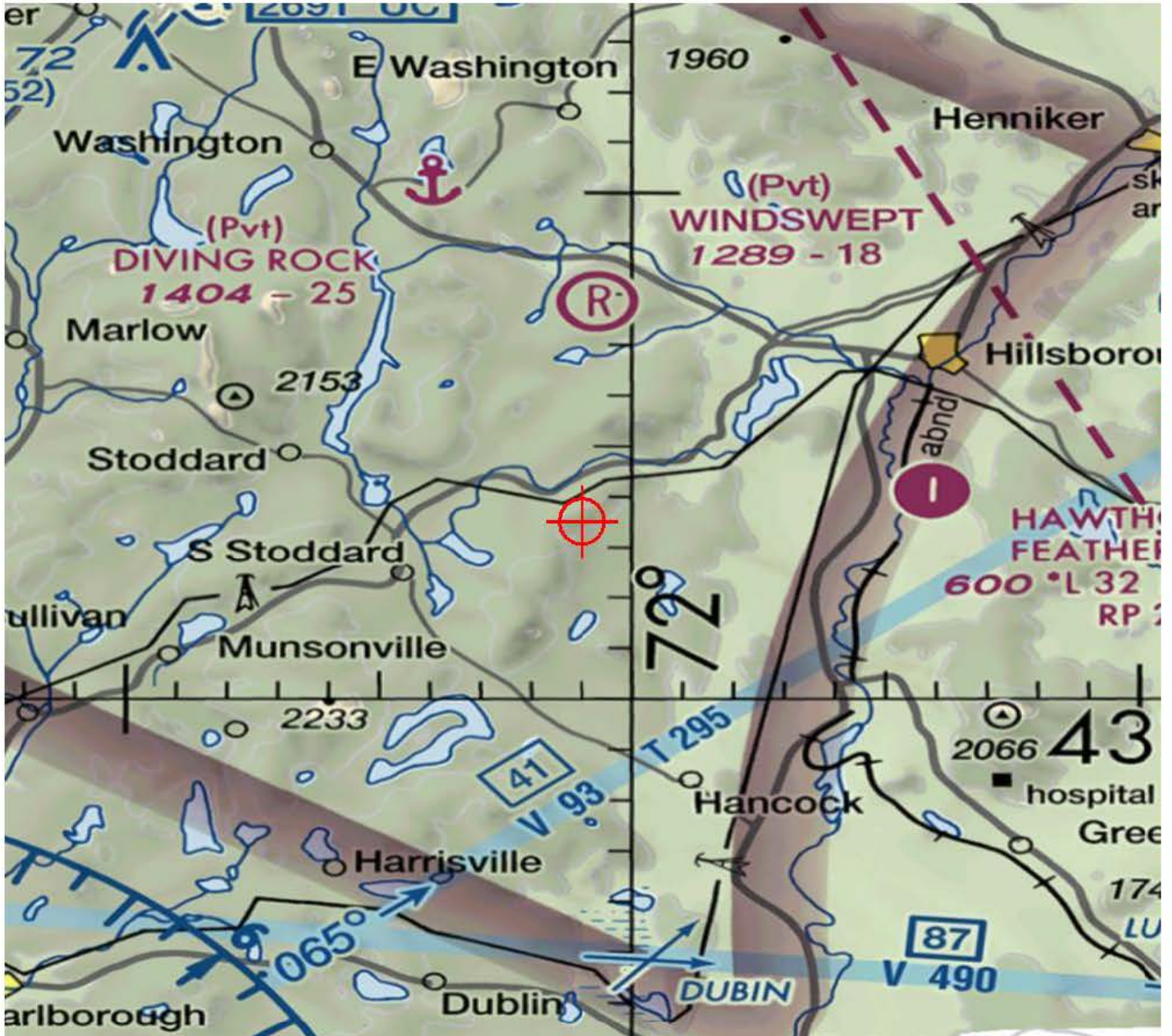
The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.

TOPO Map for ASN 2014-WTE-5442-OE







Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5443-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 5  
 Location: Hillsborough, NH  
 Latitude: 43-03-23.84N NAD 83  
 Longitude: 72-01-10.20W  
 Heights: 1726 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 2215 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (2215 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5443-OE.

**Signature Control No: 231063061-251023963**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)



## Additional information for ASN 2014-WTE-5443-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 5.0 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 87 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.

TOPO Map for ASN 2014-WTE-5443-OE





Mail Processing Center  
Federal Aviation Administration  
Southwest Regional Office  
Obstruction Evaluation Group  
2601 Meacham Boulevard  
Fort Worth, TX 76193

Aeronautical Study No.  
2014-WTE-5443-OE

Issued Date: 06/11/2015

Drew Kenworthy  
Antrim Wind Energy, LLC  
155 Fleet Street  
Portsmouth, NH 03801

**\*\* MARKING & LIGHTING CHANGE \*\***

The Federal Aviation Administration (FAA) has completed an evaluation of the obstruction marking and lighting for the following structure:

Structure:	Wind Turbine AWE 5
Location:	Hillsborough, NH
Latitude:	43-03-23.84N NAD 83
Longitude:	72-01-10.20W
Heights:	1726 feet site elevation (SE) 489 feet above ground level (AGL) 2215 feet above mean sea level (AMSL)

Based on this evaluation, the FAA has determined that a change to the obstruction marking/lighting for this structure is necessary for aviation safety. The structure would not be a hazard to air navigation provided it is obstruction marked/lighted in accordance with FAA Advisory Circular 70/7460-1, K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines). This condition supersedes the obstruction marking/lighting condition in the Determination of No Hazard to Air Navigation issued on 05/04/2015.

So that aeronautical charts and records can be updated, it is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed when the new system is installed and operational.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-

contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This evaluation concerns the effect of the marking/lighting changes on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5443-OE.

**Signature Control No: 231063061-254923362**

( MLCHG -WT )

Cindy Whitten  
Specialist

Attachment(s)  
Map(s)

TOPO Map for ASN 2014-WTE-5443-OE





Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5444-OE

Issued Date: 03/31/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 6  
 Location: Hillsborough, NH  
 Latitude: 43-03-09.66N NAD 83  
 Longitude: 72-01-11.94W  
 Heights: 1504 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 1993 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 10 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (1993 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 10/01/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before April 30, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on May 10, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5444-OE.

**Signature Control No: 231063062-247682326**

( DNH -WT )

Sheri Edgett-Baron  
Manager, Obstruction Evaluation Group

Attachment(s)  
Additional Information  
Map(s)



## Additional information for ASN 2014-WTE-5444-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 5.0 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 83 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

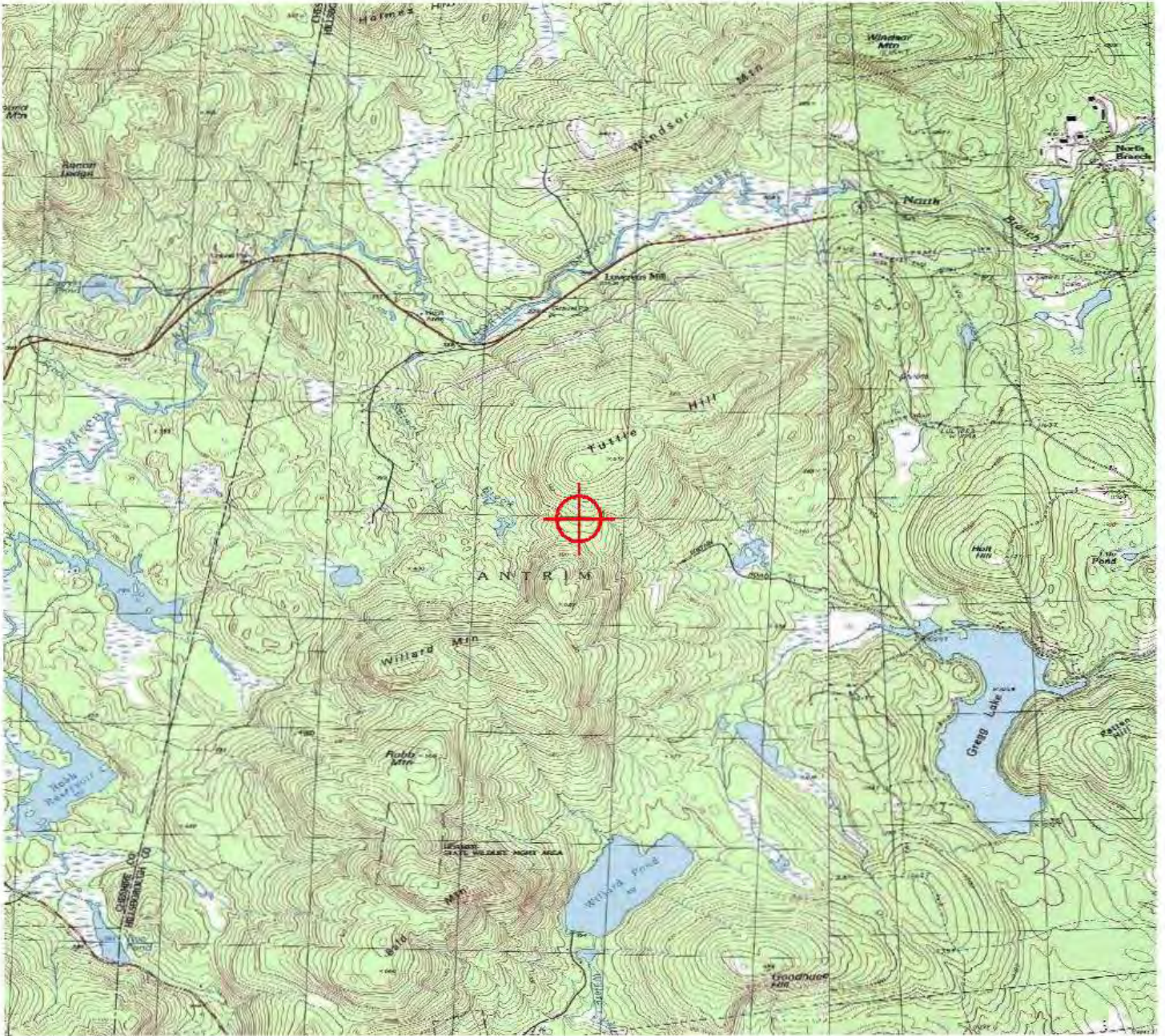
The structure would have no effect on any existing or proposed IFR minimum flight altitudes or minimum vectoring altitudes.

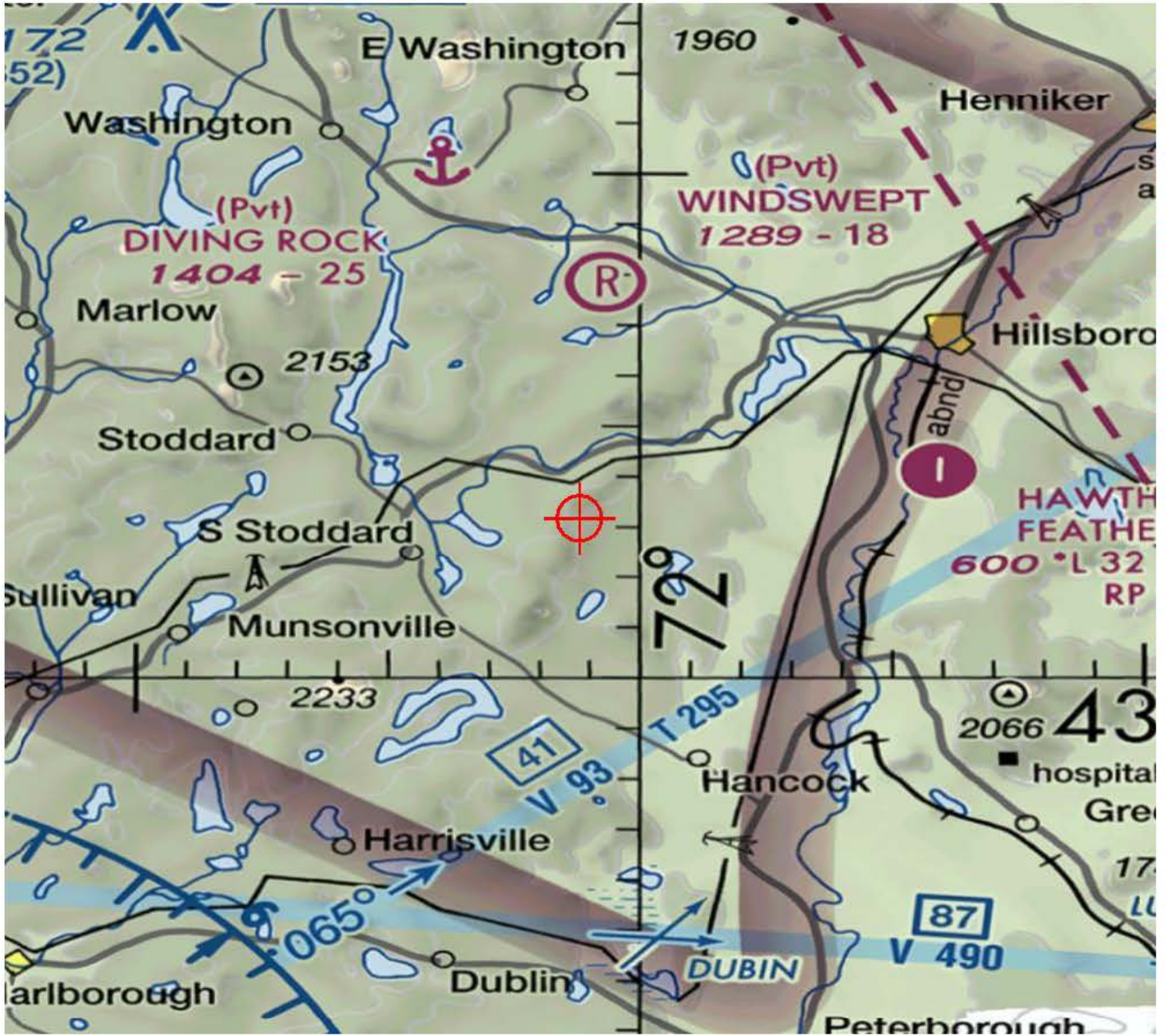
The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.







Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5445-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 7  
 Location: Hillsborough, NH  
 Latitude: 43-02-54.23N NAD 83  
 Longitude: 72-01-17.79W  
 Heights: 1676 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 2165 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (2165 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5445-OE.

**Signature Control No: 231063063-251024142**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

## Additional information for ASN 2014-WTE-5445-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 5.1 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 72 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

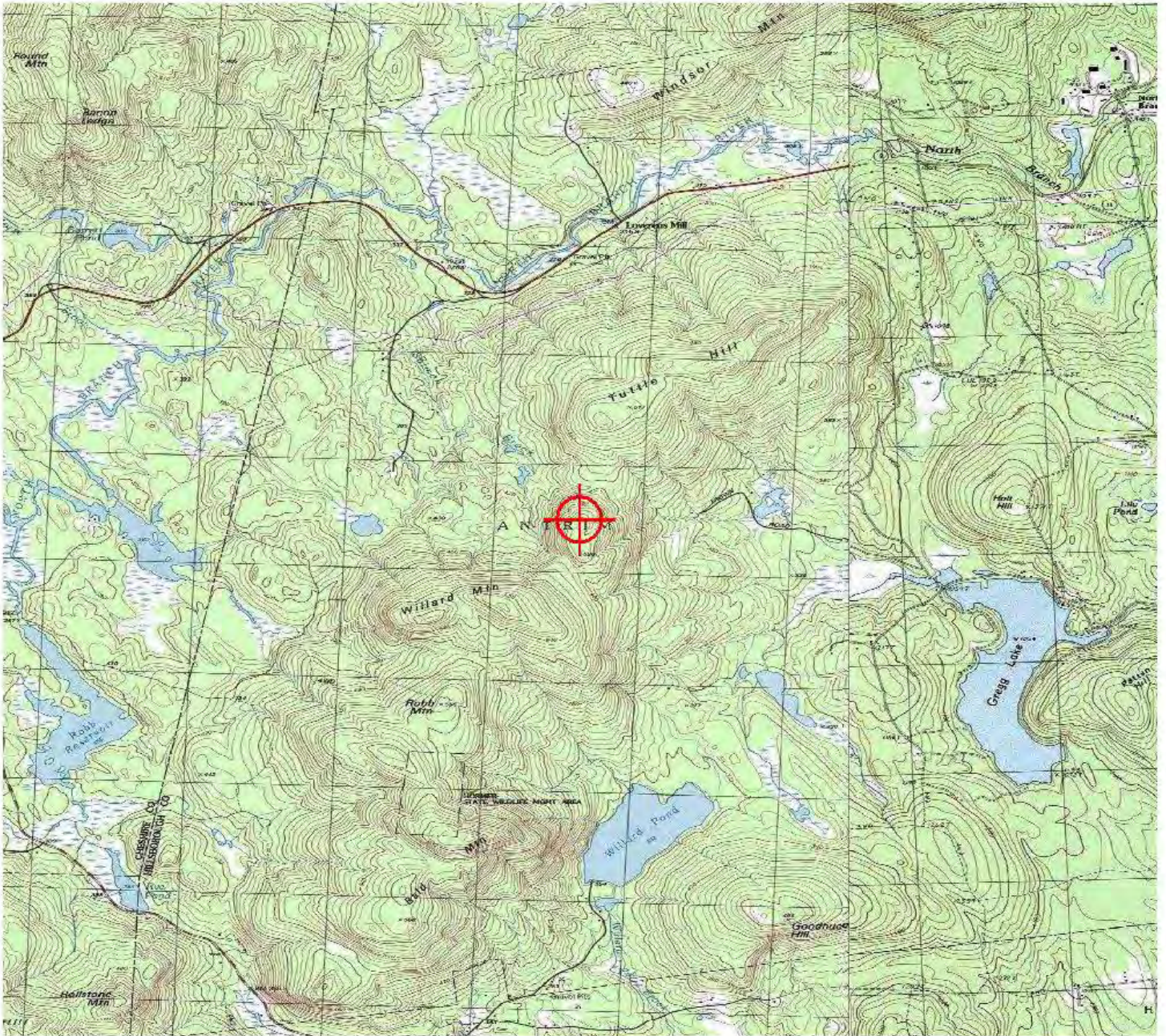
The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

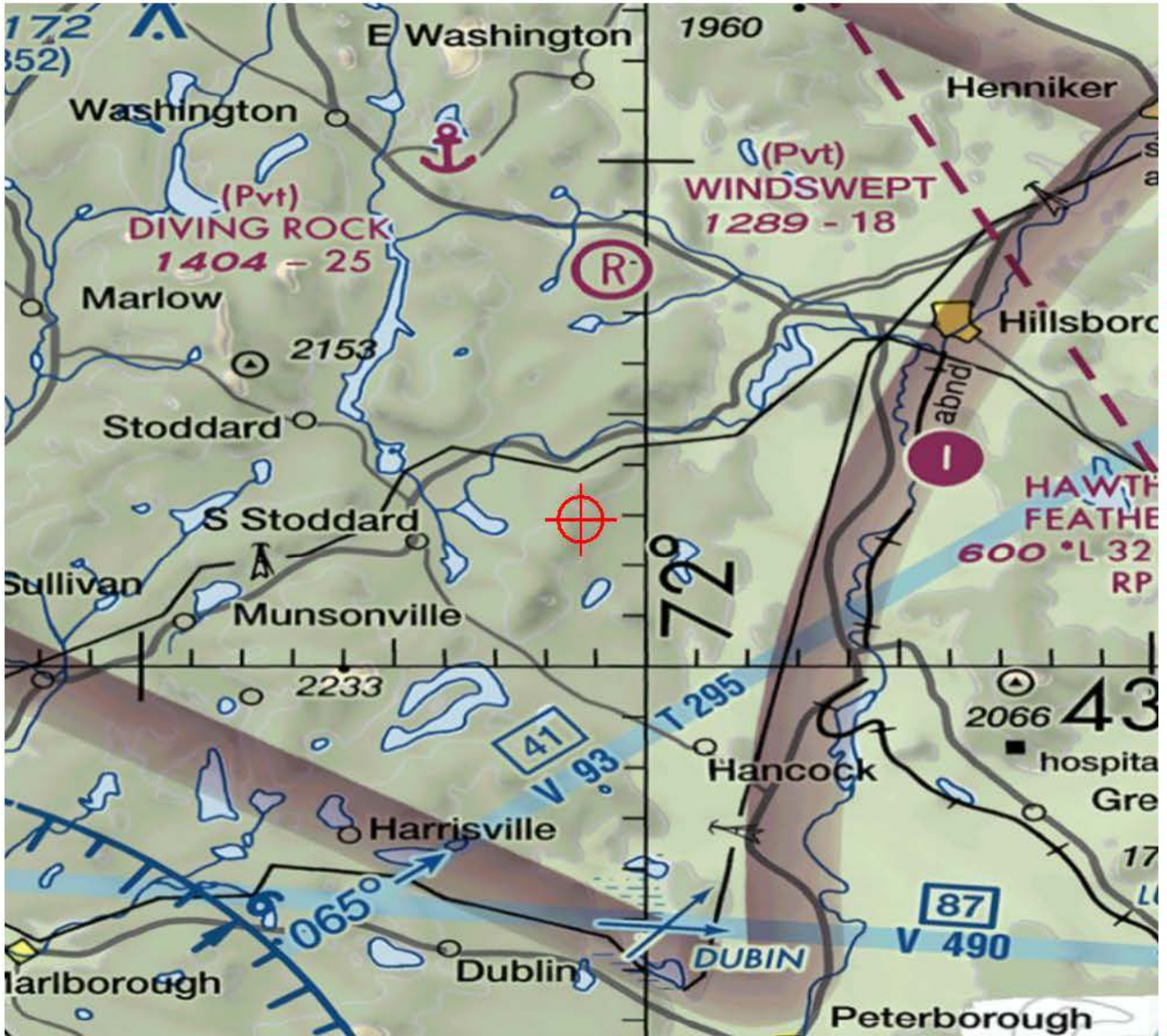
The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.

TOPO Map for ASN 2014-WTE-5445-OE









Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5446-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 8  
 Location: Hillsborough, NH  
 Latitude: 43-02-43.77N NAD 83  
 Longitude: 72-01-16.79W  
 Heights: 1700 feet site elevation (SE)  
 489 feet above ground level (AGL)  
 2189 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 489 feet above ground level (2189 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5446-OE.

**Signature Control No: 231063064-251024501**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

## Additional information for ASN 2014-WTE-5446-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 5.1 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 71 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

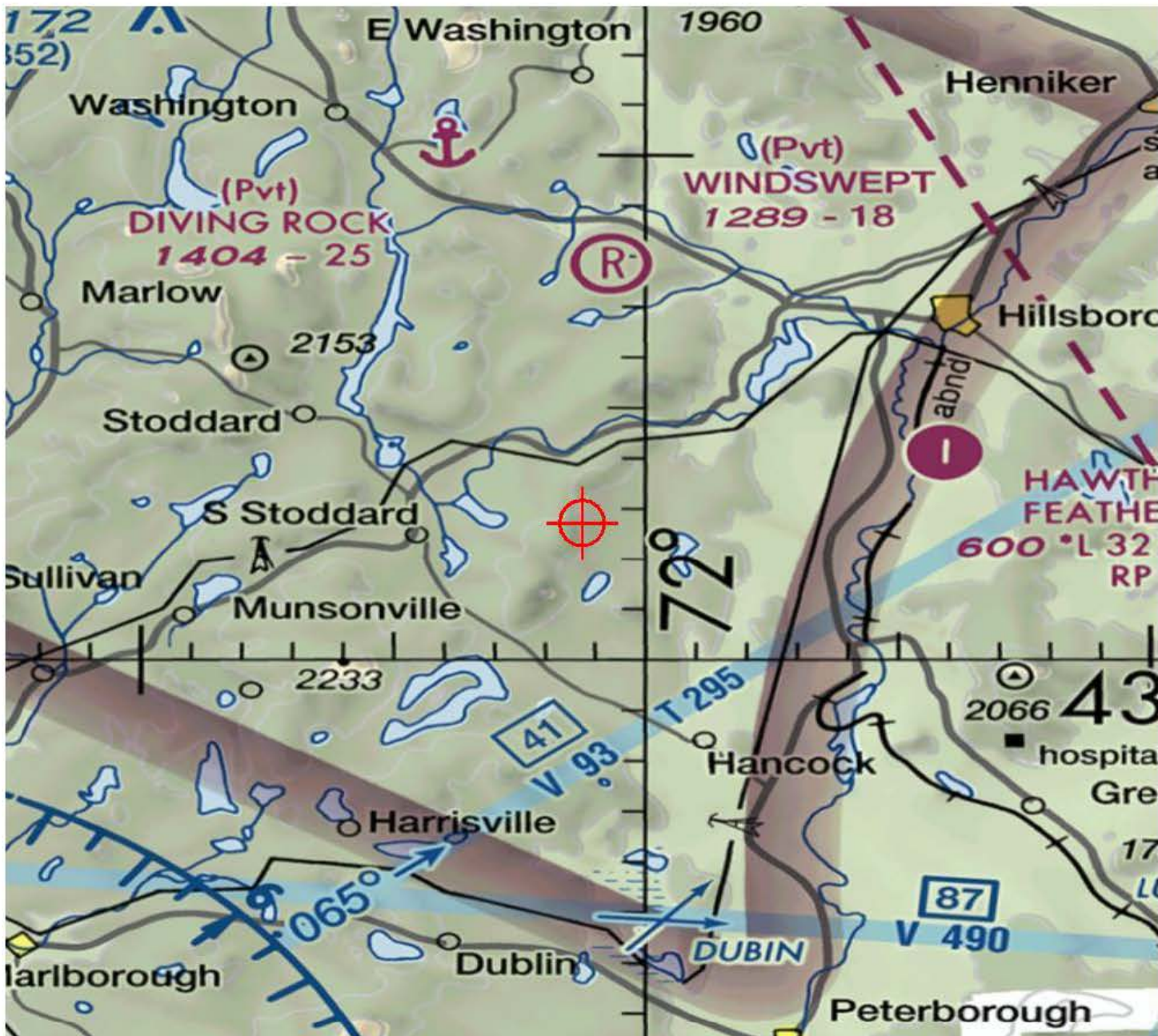
The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.

TOPO Map for ASN 2014-WTE-5446-OE







Mail Processing Center  
Federal Aviation Administration  
Southwest Regional Office  
Obstruction Evaluation Group  
2601 Meacham Boulevard  
Fort Worth, TX 76193

Aeronautical Study No.  
2014-WTE-5446-OE

Issued Date: 06/11/2015

Drew Kenworthy  
Antrim Wind Energy, LLC  
155 Fleet Street  
Portsmouth, NH 03801

**\*\* MARKING & LIGHTING CHANGE \*\***

The Federal Aviation Administration (FAA) has completed an evaluation of the obstruction marking and lighting for the following structure:

Structure:	Wind Turbine AWE 8
Location:	Hillsborough, NH
Latitude:	43-02-43.77N NAD 83
Longitude:	72-01-16.79W
Heights:	1700 feet site elevation (SE) 489 feet above ground level (AGL) 2189 feet above mean sea level (AMSL)

Based on this evaluation, the FAA has determined that a change to the obstruction marking/lighting for this structure is necessary for aviation safety. The structure would not be a hazard to air navigation provided it is obstruction marked/lighted in accordance with FAA Advisory Circular 70/7460-1, K Change 2, Obstruction Marking and Lighting, white paint only - Chapters 12&13(Turbines). This condition supersedes the obstruction marking/lighting condition in the Determination of No Hazard to Air Navigation issued on 05/04/2015.

So that aeronautical charts and records can be updated, it is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed when the new system is installed and operational.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-



contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This evaluation concerns the effect of the marking/lighting changes on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

If we can be of further assistance, please contact our office at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5446-OE.

**Signature Control No: 231063064-254923364**

( MLCHG -WT )

Cindy Whitten  
Specialist

Attachment(s)  
Map(s)

TOPO Map for ASN 2014-WTE-5446-OE





Mail Processing Center  
 Federal Aviation Administration  
 Southwest Regional Office  
 Obstruction Evaluation Group  
 2601 Meacham Boulevard  
 Fort Worth, TX 76193

Aeronautical Study No.  
 2014-WTE-5447-OE

Issued Date: 05/04/2015

Drew Kenworthy  
 Antrim Wind Energy, LLC  
 155 Fleet Street  
 Portsmouth, NH 03801

**\*\* DETERMINATION OF NO HAZARD TO AIR NAVIGATION \*\***

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Wind Turbine AWE 9  
 Location: Hillsborough, NH  
 Latitude: 43-02-35.31N NAD 83  
 Longitude: 72-01-26.37W  
 Heights: 1667 feet site elevation (SE)  
 447 feet above ground level (AGL)  
 2114 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked/lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

- At least 60 days prior to start of construction (7460-2, Part 1)
- Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

See attachment for additional condition(s) or information.

Any height exceeding 447 feet above ground level (2114 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 11/04/2016 unless:

- (a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
- (b) extended, revised, or terminated by the issuing office.

**NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.**

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 03, 2015. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted to the Manager, Airspace Regulations & ATC Procedures Group, Federal Aviation Administration, 800 Independence Ave, SW, Room 423, Washington, DC 20591.

This determination becomes final on June 13, 2015 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Airspace Regulations & ATC Procedures Group via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

Obstruction marking and lighting recommendations for wind turbine farms are based on the scheme for the entire project. ANY change to the height, location or number of turbines within this project will require a reanalysis of the marking and lighting recommendation for the entire project. In particular, the removal of previously planned or built turbines/turbine locations from the project will often result in a change in the marking/lighting recommendation for other turbines within the project. It is the proponent's responsibility to contact the FAA to discuss the process for developing a revised obstruction marking and lighting plan should this occur.

In order to ensure proper conspicuity of turbines at night during construction, all turbines should be lit with temporary lighting once they reach a height of 200 feet or greater until such time the permanent lighting configuration is turned on. As the height of the structure continues to increase, the temporary lighting should be relocated to the uppermost part of the structure. The temporary lighting may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. An FAA Type L-810 steady red light fixture shall be used to light the structure during the construction phase. If power is not available, turbines shall be lit with self-contained, solar powered LED steady red light fixture that meets the photometric requirements of an FAA Type L-810 lighting system. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level. The use of a NOTAM (D) to not light turbines within a project until the entire project has been completed is prohibited.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

This determination cancels and supersedes prior determinations issued for this structure.

If we can be of further assistance, please contact Cindy Whitten, at (816) 329-2528. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2014-WTE-5447-OE.

**Signature Control No: 231063065-251024717**

( DNH -WT )

Mike Helvey

Manager, Obstruction Evaluation Group

Attachment(s)

Additional Information

Map(s)

## Additional information for ASN 2014-WTE-5447-OE

The proposed new structure is a Wind Turbine at 489 feet Above Ground Height (AGL). The proposed structure will be located approximately 5.3 nautical miles west of the airport reference point for the Hawthorne-Feather Airpark (8B1), Hillsboro, NH. The proposed structure is identified as exceeding 14 CFR, part 77, obstruction standards as follows as applied to the 8B1 Airport:

Section 77.17(a)(2): A height AGL or airport elevation, whichever is higher, exceeding 400 feet within 5 miles; as applied to the 8B1 Airport would exceed by 14 feet.

The proposal was not circularized for public comment because current FAA obstruction evaluation policy exempts from circularization those proposals which exceed the above cited obstruction standard. This is provided the proposal does not lie within an airport traffic pattern. In this case the structure would not be located within the lateral limits of the VFR traffic pattern airspace for this airport. Therefore, the structure would not conflict with airspace required to conduct normal VFR traffic pattern operations and/or visual approach operations at 8B1 or any other known public use or military airports.

**THIS POLICY DOES NOT AFFECT THE PUBLIC'S RIGHT TO PETITION FOR REVIEW DETERMINATIONS REGARDING STRUCTURES, WHICH EXCEED THE SUBJECT OBSTRUCTION STANDARDS.**

The structure would have no effect on any existing or proposed IFR enroute routes, or arrival/departure routes, operations, or procedures.

The structure would have no effect on any existing or proposed IFR minimum flight altitudes. Minimum Vectoring Altitudes will be affected, but coordination and approval with Boston TRACON has been accomplished.

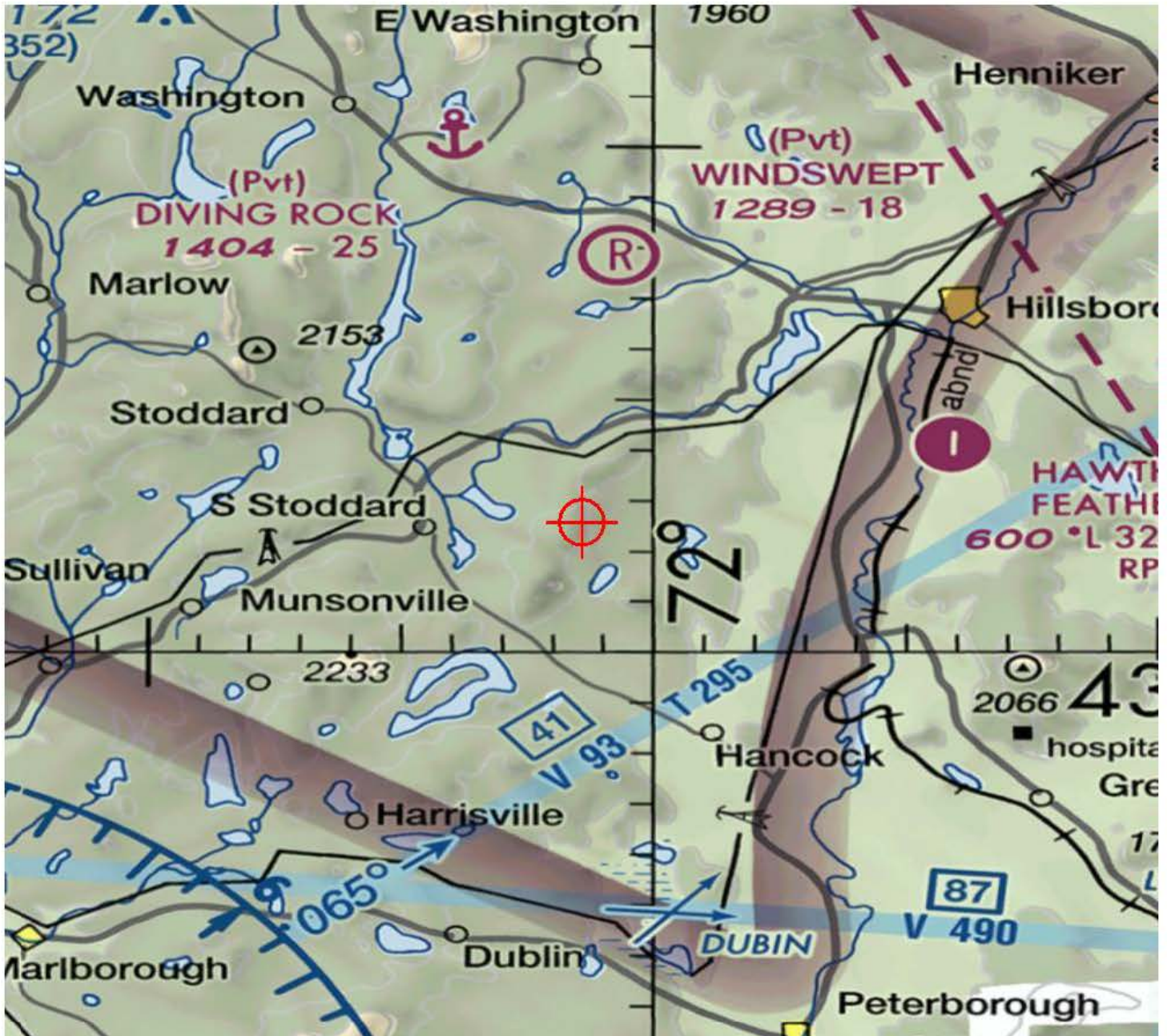
The structure would not penetrate those altitudes normally considered available to airmen for VFR en route flight.

The structure will be appropriately obstruction marked and/or lighted to make it more conspicuous to airmen flying in VFR weather conditions at night.

The cumulative impact of the structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the structure would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.







## **Appendix V**

AGREEMENT BETWEEN TOWN OF ANTRIM NEW HAMPSHIRE AND ANTRIM WIND ENERGY  
LLC, DEVELOPER/OWNER OF THE ANTRIM WIND POWER PROJECT DATED AS OF MARCH  
8<sup>th</sup>, 2012 ("Effective Date")

**1 Definitions**

- 1.1 "Agreement" – This agreement between the Town of Antrim, New Hampshire and Antrim Wind Energy LLC, and its successors and assigns, which shall apply from the Effective Date until the End of Useful Life of the Wind Farm
- 1.2 "Ambient Sound Pressure" – The sound pressure level excluded from that contributed by the operation of the Wind Farm.
- 1.3 "Decommissioning Funding Assurance" – An assurance provided by the Owner as more fully described in Section 14.2 in a form reasonably acceptable to the Town that guarantees completion of decommissioning activities, as provided in this Agreement.
- 1.4 "Effective Date" – The date of this Agreement as set forth above.
- 1.5 "End of Useful Life" – The point in time at which the Wind Farm, or an individual Wind Turbine as the case may be, has not generated electricity for a continuous period of twenty-four months for reasons other than the wind regime, maintenance or repair, facility upgrade or repowering.
- 1.6 "Non-Participating Landowner" – Any landowner in the Town of Antrim, other than a Participating Landowner.
- 1.7 "Owner" – Antrim Wind Energy LLC, its successors and assigns.
- 1.8 "Occupied Building" – A permanent structure used as a year-round residence, school, hospital, church, public library or other building used for public gathering that is occupied or in use as of the Effective Date.
- 1.9 "Participating Landowner" – Any landowner having entered into an agreement with the Owner for lease of real property or the granting of easements for access, entry or conveyance of the other real property rights related to the Wind Farm.
- 1.10 "Project Site" – Property with rights as conveyed to Owner by lease, easement or other agreement with a Participating Landowner that includes all access roads, and other ancillary facilities required for construction and operation of the Wind Farm.
- 1.11 "Town" – Town of Antrim, New Hampshire

- 1.12 "Turbine Height" – The distance from the surface of the tower foundation to the tip of the uppermost blade when in a vertical position.
- 1.13 "Wind Turbine" – A wind energy conversion system that converts kinetic wind energy into electricity, comprised primarily of a tower, a nacelle housing the generator, and a 3-blade rotor.
- 1.14 "Wind Farm" – The wind powered project being developed in the Town of Antrim by Owner, including but not limited to up to 10 Wind Turbines, cable, accessory buildings and structures including substations, permanent and temporary meteorological towers, electric infrastructure, access roads, and cables and other appurtenant structures and facilities that comprise such wind power project.

## **2 General Provisions**

- 2.1 Enforceability. This Agreement shall apply to and be binding and enforceable on all successors and assigns of the Owner.
- 2.2 Applicability to Owner. This Agreement shall apply to the Owner only to the extent of Owner's rights and responsibilities related to the Wind Farm and Project Site as conferred to Owner by Participating Landowner agreements.
- 2.3 Recording.
  - 2.3.1 At the Town's request, the Owner shall submit to the Town evidence of all agreements between the Owner and Participating Landowner, which may take the form of memoranda recorded with the Hillsborough County Registry of Deeds.
  - 2.3.2 This Agreement shall be recorded at the Hillsborough County Registry of Deeds.
- 2.4 Invalidity. The invalidity of any section, portion, or paragraph of this Agreement will not affect any other section, portion, or paragraph in this Agreement.
- 2.5 Limitation on Turbines. This Agreement relates to the installation and operation of the Wind Farm. The Wind Turbines used in the Wind Farm shall be consistent with the size and configuration as approved by the New Hampshire Site Evaluation Committee (NHSEC); provided, however, that in no event shall the overall Turbine Height of any Wind Turbine used in the Wind Farm exceed 500 feet. Communications or other equipment attached to the Wind Turbines shall be limited to that which is incidental or necessary for the

safe and efficient construction, operation, maintenance, and interconnection of the Wind Farm.

2.6 On-Site Burning. The Owner will obtain a permit from the Town of Antrim, and comply with all state requirements before Owner or its agents perform any on-site burning.

2.7 Warnings.

2.7.1 A clearly visible warning sign concerning voltage must be placed on all of the Wind Farm's aboveground electrical collection facilities, switching or interconnection facilities, and substations.

2.7.2 Visible, reflective, colored objects, such as flags, reflectors, or tape shall be placed on the anchor points of the Wind Farm's guy wires, if any, and along the guy wires up to a height of ten feet from the ground.

2.7.3 Clearly visible warning signs concerning safety risks related to winter or storm conditions shall be placed on access roads to the Wind Farm no less than 750 feet from each Wind Turbine tower base and on informal roads and trails in the vicinity of the Project at no less than 500 feet from each Wind Turbine tower base.

2.8 Access. The Town shall have access to all gated entrances to the Project Site for the purpose of emergency response. The Owner shall provide to the Town any keys, combination codes, and/or remote control devices necessary to open such gates. Such keys or access devices may not be provided by the Town to anyone other than members of the Board of Selectman, Police Department, Fire Chief, EMS or Highway Department while engaged in official duties. The Owner shall provide access to the Project Site, Wind Turbines or other facilities upon reasonable request by the Town for the purpose of building or safety inspections under the Town ordinances. The Owner shall provide access for emergency response purposes pursuant to the protocols provided under Section 7 of this Agreement. The Owner shall coordinate agreements with responding town emergency services and ensure access for those responder departments. Building, occupancy or other permits or approvals required by Town regulations and ordinances are not required for any of the site plans, subdivisions, facilities, buildings, roads or other structures certificated by the New Hampshire Site Evaluation Committee.

2.9 Liability Insurance. Upon the closing of the construction financing for the Wind Farm, the Owner shall maintain a current general liability policy covering body injury and property damage with limits of at least \$10 million in the aggregate which may be covered as a part of an umbrella or blanket policy. Certificates verifying such insurance coverage shall be made available to the Town upon request.

- 2.10 Indemnification. The Owner specifically and expressly agrees to indemnify, defend, and hold harmless the Town and its officers, elected officials, employees and agents (hereinafter collectively "Indemnitees") against and from any and all claims, demands, suits, losses, costs and damages of every kind and description, including reasonable attorneys' fees and/or litigation expenses, brought or made against or incurred by any of the Indemnitees resulting from or arising out of any negligence or wrongful acts of the Owner, its employees, agents, representatives or subcontractors of any tier, their employees, agents or representatives in connection with the Wind Farm. The indemnity obligations under this Article shall include without limitation:
- 2.10.1 Loss of or damage to any property of the Indemnitees or, to the extent that loss of or damage to property of Owner, results in a third party claim against the Town, loss of or damage to any property of Owner;
  - 2.10.2 Bodily or personal injury to, or death of any person(s), including without limitation employees of the Town, or of the Owner or its subcontractors of any tier.
  - 2.10.3 The Owner's indemnity obligation under this Article shall not extend to any liability caused by the negligence or willful misconduct of any of the Indemnitees, or third parties outside the Owner's control.
- 2.11 Reopener Clause. Upon agreement of both parties to this agreement, this agreement or portions thereof may be revised or amended.

### **3 Wind Turbine Equipment and Facilities**

- 3.1 Visual Appearance.
- 3.1.1 Wind Turbines shall be painted and lighted in accordance with Federal Aviation Administration (FAA) regulations. Wind Turbines shall not be artificially lighted, except to the extent required by the Federal Aviation Administration or any other applicable authority that regulates air safety. Lights shall be shielded to the greatest extent possible from viewers on the ground.
  - 3.1.2 Wind Turbines shall not display advertising, except for reasonable identification of the turbine manufacturer and/or Owner.
- 3.2 Controls and Brakes. All Wind Turbines shall be equipped with a redundant braking system. This includes both aerodynamic over-speed controls (including variable pitch, tip, and other similar systems) and mechanical brakes. Mechanical brakes shall be operated in a fail-safe mode. Stall

regulation shall not be considered a sufficient braking system for over-speed protection.

3.3 Electrical Components. All electrical components of the Wind Farm shall conform to relevant and applicable local, state, and national codes, and relevant and applicable international standards.

3.4 Power Lines. On-site distribution power lines between Wind Turbines shall, to the maximum extent practicable, be placed underground.

#### **4 Project Site Security**

4.1 Wind Turbines exteriors shall not be climbable up to fifteen (15) feet above ground surfaces.

4.2 All access doors to Wind Turbines and electrical equipment shall be locked, fenced, or both, as appropriate, to prevent entry by non-authorized persons.

4.3 Entrances to Project Site shall be gated, and locked during non-working hours. If the Owner identifies problems with unauthorized access, the Owner shall work to implement additional security measures.

#### **5 Public Information, Communications and Complaints**

5.1 Public Inquiries and Complaints. During construction and operation of the Wind Farm, and continuing through completion of decommissioning of the Wind Farm, the Owner shall identify an individual(s), including phone number, email address, and mailing address, posted at the Town Hall, who will be available for the public to contact with inquiries and complaints. The Owner shall make reasonable efforts to respond to and address the public's inquiries and complaints. This process shall not preclude the Town from acting on a complaint.

5.2 Signs. Signs shall be reasonably sized and limited to those necessary to identify the Wind Farm and provide warnings or liability information, construction information, or identification of private property. There will be no signs placed in the public right of way without the prior approval of the Town. After the completion of construction, signs visible from public roads shall be unlit and be no larger than twelve square feet, unless otherwise required by applicable permits or as otherwise approved by the Town.

#### **6 Reports to the Town of Antrim**

6.1 Incident Reports. The Owner shall provide the following to the Chairman of the Board of Selectmen or the Chairman's designee as soon as practicable, but not later than thirty days after an incident:

- 6.1.1 Copies of all reports of environmental incidents or industrial accidents that require a report to U.S. EPA, New Hampshire Department of Environmental Services, OSHA or another federal or state government agency.
- 6.2 Periodic Reports. The Owner shall submit, on an annual basis starting one year after the commencement of commercial operation of the Wind Farm, a report to the Board of Selectmen of the Town of Antrim, providing, at a minimum, the following information:
  - 6.2.1 If applicable, status of any additional construction activities, including schedule for completion;
  - 6.2.2 Details on any calls for emergency, police or fire assistance during the prior year;
  - 6.2.3 Location of all on-site fire suppression equipment; and
  - 6.2.4 Identity of hazardous materials, including volumes and locations, as reported to state or federal agencies.
  - 6.2.5 Summary of any complaints received from Town of Antrim residents, and the current status or resolution of such complaints or issues.

## **7 Emergency Response**

- 7.1 Upon request, the Owner shall cooperate with the Town's emergency services and any emergency services that may be called upon to deal with a fire or other emergency at the Wind Farm through a mutual aid agreement, to develop and coordinate implementation of an emergency response plan for the Wind Farm. The Owner shall provide and maintain protocols for direct notification of emergency response personnel designated by the Town, including provisions for access to the Project Site, Wind Turbines or other facilities within 30 minutes of an alarm or other request for emergency response, and provisions notifying the Town of contact information for personnel available at every hour of the day. The Owner shall coordinate with other jurisdictions as necessary on emergency response provisions.
- 7.2 The Owner shall cooperate with the Town's emergency services to determine the need for the purchase of any equipment required to provide an adequate response to an emergency at the Wind Farm that would not otherwise need to be purchased by the Town. If agreed between the Town and Owner, Owner shall purchase any specialized equipment for storage at the Project Site. The Town and Owner shall review together on an annual basis the equipment requirements for emergency response at the Wind Farm.

- 7.3 The Owner shall maintain fire alarm systems, sensor systems and fire suppression equipment customarily installed in all Wind Turbines and related facilities.
- 7.4 If an emergency response event related to the Wind Farm creates an extraordinary expense (i.e. expenses beyond what the Town would normally incur in responding to an emergency event for a business located in the Town) for the Town, Owner shall reimburse the Town for actual expenses incurred by the Town.

## **8 Roads**

- 8.1 Public Roads. In the event that the Owner wishes to utilize Town of Antrim roads for construction or operation of the Wind Farm for oversize or overweight vehicles, and/or use during posted weight limit time periods, then the Owner shall:
  - 8.1.1 Identify and notify the Town of Antrim of all local public roads to be used within the Town to transport equipment and parts for construction, operation or maintenance of the Wind Farm.
  - 8.1.2 Hire a qualified professional engineer, as mutually agreed to with the Town, to document local road conditions prior to construction and as soon as possible after construction is completed (but no later than 30 days after such date) or as weather permits.
  - 8.1.3 Promptly repair, at the Owner's expense, any local road damage caused directly by the Owner or its contractors at any time.
  - 8.1.4 Reimburse the Town for reasonable costs associated with special police details, if required to direct or monitor traffic within the Town limits during construction of the Wind Farm.
- 8.2 Wind Farm Access Roads
  - 8.2.1 The Owner shall construct and maintain roads at the Wind Farm that allows for year-round access to each Wind Turbine at a level that permits passage and turnaround of emergency response vehicles.
  - 8.2.2 Any use of Town of Antrim public ways that is beyond what is necessary to service the Wind Farm or that is beyond the scope of Participating Landowner agreement(s) shall be subject to approvals under relevant Town ordinances or regulation, or state or federal laws.



## 9 Construction Period Requirements

- 9.1 Site Plan. Prior to the commencement of construction, the Owner shall provide the Town with a copy of the final Soil Erosion and Sediment Control site plans or New Hampshire Stormwater Pollution Prevention Plan, as approved by the New Hampshire Department of Environmental Services showing the construction layout of the Wind Farm.
- 9.2 Construction Schedule. Upon request of the Town, prior to the commencement of construction activities at the Wind Farm, the Owner shall provide the Town with a schedule for construction activities.
- 9.3 Disposal of Construction Debris. Tree stumps, slash, and brush will be disposed of onsite or removed consistent with state law. Construction debris and stumps shall not be disposed of at Town facilities.
- 9.4 Blasting. The handling, storage, sale, transportation, and use of explosive materials shall conform to all state and federal rules and regulations. In addition:
  - 9.4.1 At least ten days before blasting commences, the Owner shall brief Town officials on the blasting plan. The briefing shall include the necessity for blasting and the safeguards that will be in place to ensure that building foundations, wells or other structures will not be damaged by the blasting.
  - 9.4.2 In accordance with the rules of the State of New Hampshire, the Owner shall notify the Town police and fire chiefs before blasting commences. Any changes to the schedule for blasting will be reported immediately to the Town police and fire chiefs.
  - 9.4.3 A copy of the appropriate Insurance Policy and Blasting License will be provided to the Town.
- 9.5 Storm Water Pollution Control. The Owner shall obtain a New Hampshire Site-Specific Permit and conform to all of its requirements including the Storm Water Pollution Prevention Plan and requirements for inspections as included or referenced therein. The Owner shall provide the Town with a copy of all state and federal stormwater, wetlands, and water quality permits.
- 9.6 Design Safety Certification. The design of the Wind Farm shall conform to applicable industry standards, including those of the American National Standards Institute. If requested by the Town, the Owner shall submit certificates of design compliance obtained by the equipment manufacturers from Underwriters Laboratories, Det Norske Veritas, Germanshcer Lloyd Wind Energies or other similar certifying organizations.

## 9.7 Construction Vehicles

- 9.7.1 Vehicles used for construction of the Wind Farm shall only use Town roads mutually agreed upon by the Owner and the Town. Staging or idling vehicles shall not be permitted on public roads. The Owner shall notify the Town at least 24 hours before any construction vehicle with a gross vehicle weight greater than 88,000 pounds is scheduled to use a Town road. Acceptance by the Town of vehicles exceeding this weight is not a waiver of the Owner's obligation under Section 8.1.3 of this Agreement to repair all damage to Town roadways caused by the Owner or its contractors.
- 9.7.2 Construction vehicles will not travel on Town roads before 6:00 am or after 7:00 pm, Monday through Saturday, unless prior approval is obtained from the Town. Construction vehicles will not travel on Town roads on Sunday, unless prior approval is obtained from the Town.
- 9.7.3 Construction will only be conducted between 6:00 am and 7:00 pm, Monday through Friday, and between 7:00 am and 7:00 pm on Saturdays unless prior approval is obtained from the Town. Construction will not be conducted on Sundays, unless prior approval is obtained from the Town.
- 9.7.4 The start-up and idling of trucks and equipment will conform to all applicable Department of Transportation regulations. In addition, the start-up and idling of trucks and equipment will only be conducted between 5:30 am and 7:00 pm, Monday through Friday and between 6:30 am and 7:00 pm on Saturday.
- 9.7.5 Notwithstanding anything in this Agreement to the contrary, upon mutual agreement between the Town and Owner, over-sized vehicles delivering equipment and supplies may travel on Town roads between the hours of 7:00pm and 6:00am and on Sundays so that the timing of such over-sized deliveries will minimize potential disruptions to area roads.

## 10 Operating Period Requirements

- 10.1 Spill Protection. The Owner shall take reasonable and prudent steps to prevent spills of hazardous substances used during the construction and operation of the Wind Farm. This includes, without limitation, oil and oil-based products, gasoline, and other hazardous substances from construction related vehicles and machinery, permanently stored oil, and oil used for operation of permanent equipment. Owner shall provide the Town with a copy of the Spill

Prevention, Control and Countermeasure (SPCC) for the Wind Farm as required by state or federal agencies.

- 10.2 Pesticides and Herbicides. The Owner shall not use herbicides or pesticides for maintaining clearances around the Wind Turbines or for any other maintenance at the Wind Farm.

## **11 Noise Restrictions**

- 11.1 Residential Noise Restrictions. Sound from the Wind Farm during Operations at the exterior facades of homes shall not exceed 50 dBA or 5 dBA above ambient, whichever is greater during daytime and 45 dBA or 5 dBA above ambient, whichever is greater, at night.
- 11.2 Pre-Construction Sound Modeling. Upon request of the Town, the Owner shall provide a full noise study prepared by a qualified professional, which demonstrates that the Wind Farm will meet the requirements of this Agreement and any conditions imposed by the Site Evaluation Committee in a Certificate of Site and Facility.
- 11.3 Post-Construction Noise Measurements. Within one year of the commencement of commercial operations of the Wind Farm, the Owner shall retain an independent qualified acoustics engineer to take sound pressure level measurements in accordance with the most current version of ANSI S12.18. The measurements shall be taken at sensitive receptor locations as mutually identified by the Owner and Town. The periods of the noise measurements shall include, as a minimum, daytime, winter and summer seasons and nighttime. All sound pressure levels shall be measured with a sound meter that meets or exceeds the most current version of ANSI S1.4 specifications for a Type II sound meter. The Owner shall provide the final report of the acoustics engineer to the Town within thirty (30) days of its receipt by the Owner.

## **12 Setbacks**

- 12.1 Setback From Occupied Buildings. The setback distance between a Wind Turbine and a Non-Participating Landowner's existing Occupied Building shall be not less than 2,200 feet. The setback distance shall be measured in a straight line from the center of the Wind Turbine base to the nearest point on the foundation of the Occupied Building.
- 12.2 Setback From Property Lines. The setback distance between a Wind Turbine and Non-Participating Landowner's property line shall be not less than 1.1 times the Turbine Height. The setback distance shall be measured in a straight line from the nearest point on the property line to the center of the Wind Turbine base.

- 12.3 Setback From Public Roads. All Wind Turbines shall be setback from the nearest public road a distance of not less than 1.5 times the Turbine Height as measured from the right-of-way line of the nearest public road to the center of the Wind Turbine base.

### **13 Waiver of Restrictions**

- 13.1 Waiver of Noise Restrictions. A Participating Landowner or Non-Participating Landowner may waive the noise provisions of Section 11 of this Agreement by signing a waiver of their rights, or by signing an agreement that contains provisions providing for a waiver of their rights. The written waiver shall state that the consent is granted for the Wind Farm to not comply with the sound limits set forth in this Agreement.
- 13.2 Waiver of Setback Requirements. A Participating Landowner or Non-Participating Landowner may waive the setback provisions of Section 12 of this Agreement by signing a waiver of their rights, or by signing an agreement that contains provisions providing for a waiver of their rights. Such a waiver shall include a statement that consent is granted for the Owner to not be in compliance with the requirements set forth in this Agreement. Upon application, the Town may waive the setback requirement for public roads for good cause.
- 13.3 Recording. A memorandum summarizing a waiver or agreement containing a waiver pursuant to Section 13.1 or 13.2 of this Agreement shall be recorded in the Registry of Deeds for Hillsborough County, New Hampshire. The memorandum shall describe the properties benefited and burdened and advise all subsequent purchasers of the burdened property of the basic terms of the waiver or agreement, including time duration. A copy of any such recorded agreement shall be provided to the Town.

### **14 Decommissioning**

- 14.1 Scope of Decommissioning Activities.
- 14.1.1 The Owner shall submit a detailed estimate of both the costs associated with site-specific decommissioning activities and the salvage value of the decommissioned materials from the site to the Town before construction of the Wind Farm commences. The estimates shall be prepared by a qualified third party consultant, reasonably satisfactory to the Town, with experience in wind farm decommissioning and salvage value estimates. These estimates shall be updated and submitted to the Town every three years thereafter and in each instance shall be performed by a qualified third party consultant reasonably acceptable to the Town. The consultant shall produce, as part of the scope of services, a "Site Specific Decommissioning Estimate" that shall

be the cost of decommissioning activities, minus the recoverable salvage value of the decommissioned materials. The plan and estimate shall include the cost of removing the foundations down to eighteen (18) inches below grade.

14.1.2 The Owner shall, at its expense, complete decommissioning of the Wind Farm or individual Wind Turbines, pursuant to Section 14.1.3 of this Agreement, within twenty-four (24) months after the End of Useful Life of the Wind Farm or individual Wind Turbines, as the case may be, as defined in Section 1.5. For the avoidance of doubt, in no instance shall End of Useful Life for an individual Wind Turbine trigger decommissioning requirements for the entire Wind Farm.

14.1.3 The Owner shall provide a decommissioning plan to the Town no less than three months before decommissioning is to begin. The decommissioning plan shall provide a detailed description of all Wind Farm equipment, facilities or appurtenances proposed to be removed, the process for removal, and the post-removal site conditions. The Town will consider the remaining useful life of any improvement before requiring its removal as part of decommissioning. Approval of the Town, not to be unreasonably withheld, conditioned or delayed, must be received before decommissioning can begin.

#### 14.2 Decommissioning Funding Assurance:

14.2.1 The Owner shall provide a Decommissioning Funding Assurance for the complete decommissioning of the Wind Farm in a form reasonably acceptable to the Town. The Wind Farm will be presumed to be at the End of Useful Life if no electricity is generated from the Wind Farm for a continuous period of twenty-four (24) months, and as defined in Section 1.5.

14.2.2 Before commencement of construction of the Wind Farm, the Owner shall provide Decommissioning Funding Assurance in an amount equal to the greater of the Site-specific Decommissioning Estimate plus twenty-five percent (25%) or \$200,000. The Owner shall adjust the amount of Decommissioning Funding Assurance to reflect the updated decommissioning costs and salvage value after each update of the decommissioning estimate, in accordance with Section 14.1.1.

14.2.3 Decommissioning Funding Assurance in the amount described in Section 14.2.2 shall be provided by posting a decommissioning bond, letter of credit, or other financial mechanism that provides for an irrevocable guarantee to cover the reasonably anticipated costs of complying with Owner's decommissioning obligations. Any decommissioning bond, letter of credit or other financial mechanism

must be issued or made by an entity having and maintaining a minimum credit rating of "BBB" from Standard and Poor's, or "Baa2" from Moody's, each as defined on the Effective Date, or their commercial equivalent.

14.2.4 Funds expended from the Decommissioning Funding Assurance shall only be used for expenses associated with the cost of decommissioning the Wind Farm.

14.2.5 If the Owner fails to complete decommissioning within the period prescribed by this Agreement, the Town may, at its sole discretion, require the expenditure of decommissioning funds from the Decommissioning Funding Assurance on such measures as reasonably necessary to complete decommissioning. In such an event, where the Owner has failed to complete the required decommissioning obligations under this Agreement and the Town expends the funds from the Decommissioning Funding Assurance to effect the decommissioning requirements, the Town shall also have the right to receive the salvage value available from the decommissioned materials in an amount sufficient to reimburse the Town for any out of pocket expenses incurred for performing decommissioning that were in excess of the otherwise available decommissioning funds (e.g. to be "made whole"). Any remaining salvage value for the decommissioned materials shall be paid to the Owner.

#### 14.3 Transfer of Decommissioning Responsibility

14.3.1 Consistent with Section 2.1 of this Agreement, the provisions of Section 14 of this Agreement shall apply to and be binding and enforceable on all successors and assigns of the Owner.

14.3.2 The Owner shall ensure that any successors or assigns of the Wind Farm shall agree to be bound by this Agreement and shall provide the Town with written confirmation from any successors or assigns stating that they agree to be bound to this Agreement.

### 15 **Environmental Standards**

15.1 **Wildlife Protection.** Prior to commencing construction, Owner shall provide the Town with copies of all protocols and plans for post-construction monitoring and impact mitigation related to wildlife that are contained in any permit condition or as a condition of the Certificate of Site and Facility issued by the New Hampshire Site Evaluation Committee.

15.2 **Environmentally Sensitive Areas.** The Wind Farm shall be constructed and operated in such a manner as to comply with all applicable environmental

permits and conditions associated with a Certificate of Site and Facility issued by the New Hampshire Site Evaluation Committee.

- 15.3 Erosion Control. The Wind Farm shall be designed constructed and maintained in accordance with accepted erosion and sediment control methods as required by the New Hampshire Department of Environmental Services (NHDES).
- 15.4 Hazardous Wastes. The Owner agrees to comply with all state and federal regulations applicable to the use and disposal of hazardous wastes involved in or generated by the Wind Farm during construction, operation, maintenance or decommissioning.

16 **Support for the Project**

- 16.1 The Town and Owner agree that they will propose to the New Hampshire Site Evaluation Committee that the terms and conditions of this Agreement be incorporated as conditions to any Certificate of Site and Facility issued by the SEC for the Project. The Town further agrees that it shall support the Project during the SEC process.

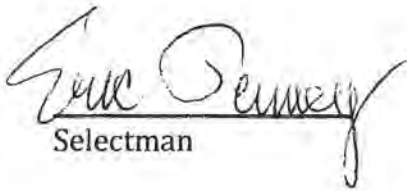
*[signatures appear on the following page]*

The parties agree the terms of this Agreement are effective as of the date first above written, regardless of the date of execution by either party.

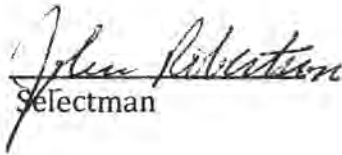
**TOWN OF ANTRIM**



Chairman, Board of Selectmen

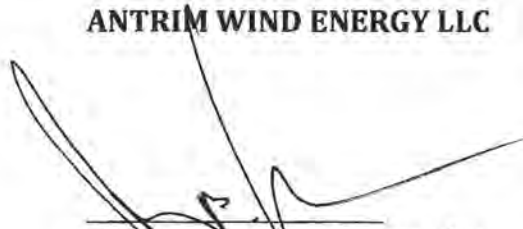


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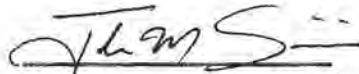
Selectman

**ANTRIM WIND ENERGY LLC**



Print Name: Jack Kenworthy

Title: Executive Officer



Print Name: John Soininen

Title: Executive Officer



## Appendix VI

# BIRD AND BAT CONSERVATION STRATEGY for the ANTRIM WIND ENERGY PROJECT

Prepared for:

**Antrim Wind Energy, LLC**

155 Fleet Street

Portsmouth, NH 03801-4050

Prepared by:

**TRC Engineers**

14 Gabriel Drive

Augusta, ME 04330

*and*

**Stantec Consulting Services Inc.**

30 Park Drive

Topsham, ME 04086

July 9, 2015

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# 1 INTRODUCTION

Antrim Wind Energy, LLC (AWE) is dedicated to producing clean, reliable, renewable power while demonstrating respect and stewardship for the natural environment. As the sponsor of the Antrim Wind Energy Project (Project), AWE submits the following Bird and Bat Conservation Strategy (BBCS) as evidence of its approach to responsible wind energy development. AWE believes that the Project will be a net-benefit to the health and prosperity of the host community and the wider New England region.

## 1.1 Project Description

The Antrim Wind Energy Project (the Project) is proposed to be located in the northwest portion of the Town of Antrim, in Hillsborough County, New Hampshire. The Project site is located on a ridgeline that starts approximately 0.75 miles south of NH Route 9 and runs south-southwest, for approximately 2.5 miles.

The Project will produce electricity using wind turbine electrical generators installed on tubular steel towers. The turbines will be horizontal axis, upwind rotor turbines typical of those currently in use in utility-scale wind projects in New England and throughout the United States. The Project will consist of nine (9) turbines in the 3.2 MW size class with an expected plant generating capacity of 28.8 MW (rated). Proposed access to the Project site is from Route 9 up the north slope of Tuttle Hill ridge.

The entirety of the Project is located in the sparsely settled rural conservation zoning district in Antrim on approximately 1,870 acres of private lands leased by AWE from six landowners. Post-construction, the total direct impact area (including access and spur roads, work pads, staging areas, turbine pads, substation and operations & maintenance building) will be approximately 11.3 acres.

The Project's proposed Point of Interconnection (POI) is Public Service of New Hampshire's (PSNH) 115kV Line L163, which sits in a PSNH transmission corridor contained within the Project's leased boundary. The POI is located approximately halfway

between Route 9 and the northern most turbine location. The interconnection facility will consist of a new three breaker ring bus substation to be built adjacent to the existing 115kV line and along the Project's main access road. See Attachment A for a detailed site map. Importantly, no new high voltage transmission lines will be constructed as a result of the Project.

## **1.2 Corporate Policy on Bird and Bat Conservation**

AWE recognizes that wind power generation has the potential to impact bird and bat species, and is committed to minimizing these impacts for the sake of the ecosystems, species and the communities they benefit. AWE also understands that renewable power generation, as an alternative to fossil fuel energy sources, benefits the environment and its inhabitants as a whole. By instituting a comprehensive Bird and Bat Conservation Strategy (BBCS), AWE believes that the benefits of the Antrim Wind Energy Project will far outweigh its impacts and will provide significant positive contributions to both the human and natural environments.

In that spirit, AWE is committed to working cooperatively with state and federal agencies and non-governmental organizations to promote the reasonable protection of bird and bat species during all phases of the Project's development, construction and operation. AWE is dedicated to incorporating the latest, state of the art knowledge and best management practices in the field of bird and bat protection at wind farms and this is reflected in its pre-construction assessments, project design, construction, post-construction monitoring, and long-term adaptive management.

Over the course of the Project's operating life, AWE pledges to design and operate the Antrim Wind Energy Project in a manner which provides decades of clean, renewable energy to the public while effectively reducing project impacts to bird and bat species, thereby balancing the health of the environment with society's growing need for electricity.

### 1.3 Purpose of the BBCS

In fulfillment of AWE's commitment to environmental stewardship, AWE has developed this site-specific Bird and Bat Conservation Strategy (BBCS) to reduce potential impacts to birds and bats as a result of construction and operation of the Antrim Wind Energy Project. In formulating the BBCS, AWE incorporated recommendations and guidance from the following sources: the U.S. Fish and Wildlife Service (USFWS) Draft Land-Based Wind Energy Guidelines (USFWS 2011b); USFWS's Final Land-Based Wind Energy Guidelines (USFWS 2012); USFWS's Eagle Conservation Plan Guidance – Module 1 – Land-based Wind Energy, Version 2 (USFWS 2013); USFWS's Bird Protection Plan Guidelines (APLIC and USFWS, 2005); and the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC). This BBCS also draws upon: the results of pre-construction bird and bat studies conducted at the project site; results from relevant post-construction surveys conducted to date at similar facilities; the latest science regarding options for effectively avoiding and minimizing potential impacts to birds and bats; and direct correspondence with the USFWS and the New Hampshire Fish and Game Department (NHFGD). This BBCS also incorporates conditions recommended by the NH Site Evaluation Committee (NHSEC). AWE met with USFWS on May 27, 2015, to review this plan and the status of existing survey data for northern long-eared bat surveys. A subsequent email from USFWS on June 1, 2015 stated that bat survey data performed at the AWE Project is valid for at least ten years unless changes in northern long-eared bat populations warrant adjustments of that timeframe.

Potential impacts to birds and bats that are typically associated with wind power facilities include: direct, turbine-associated mortality through either collision or barotrauma; and indirect impacts such as habitat loss, displacement and increased energy demands due to turbine avoidance.

The BBCS is structured around an adaptive management framework and includes detailed provisions for avoiding, reducing, and, if warranted, mitigating for these potential impacts to birds and bats. The BBCS will be a living document throughout an initial Evaluation Phase (described in Section 7). During the Evaluation Phase, AWE will



work with USFWS and NHFGD to evaluate the findings of post-construction studies, formulate recommendations and definitions, and incorporate them into the BBCS on a prospective basis. The monitoring, reporting and adaptive management programs described in this BBCS will allow this plan to respond and adapt to both actual results and unforeseen or changing (biological or technological) circumstances over the life of the Project.

#### **1.4 Goals and Objectives**

This BBCS has been developed to be consistent with the most recent USFWS Land-Based Wind Energy Guidelines, dated March 23, 2012. The goal of this BBCS is to minimize Project's impacts to birds and bats in a scientifically sound, and commercially reasonable manner. AWE intends to achieve this goal by incorporating into the BBCS the following actions:

- Study baseline mortality and injury rates during the first three years of project operation, and work with USFWS and NHFGD to establish management strategies and, if applicable, acceptable mortality thresholds;
- Implement a permanent (for the life of the Project) informal wildlife mortality monitoring and reporting program and an immediate alert procedure for biologically significant events;
- Implement a tiered consultation strategy to guide decision-making and allow for modifications to the BBCS, based on actual results and unexpected events over the life of the Project; and
- Study the effectiveness of a curtailment strategy on minimizing bat mortality and work with USFWS and NHFGD to determine if and how curtailment might be applied as a long-term management strategy for the Project.
- Permanently conserve approximately 908 acres of valuable forestland in the immediate vicinity of the Project to preserve important and diverse habitat types for birds, bats and other species.
- Making a \$100,000 commitment to the New England Forestry Foundation ("NEFF") to fund the acquisition of additional permanent conservation lands in southern New Hampshire.

## 2 PROTECTION OF BIRD AND BAT SPECIES IN NEW HAMPSHIRE

There are several laws which protect avian and bat species in the United States and in New Hampshire. These include:

- The federal Endangered Species Act;
- The New Hampshire Endangered Species Conservation Act;
- The federal Migratory Bird Treaty Act and;
- The Bald and Golden Eagle Protection Act.

The legal protection status of bird and bat species in New Hampshire, pursuant to these laws, is described in the following subsections.

### 2.1 Federal and State Endangered Species Acts

The federal Endangered Species Act (ESA) protects threatened and endangered plants and animals and the habitats in which they are found. Protection of birds and mammals under the ESA is administered by the USFWS. The law requires federal agencies, in consultation with the USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife.

The State of New Hampshire has its own Endangered Species Conservation Act (NH RSA 212-A<sup>1</sup>) that protects all non-domesticated species of wildlife indigenous to the state. The list of New Hampshire's endangered and threatened wildlife is maintained by the NHFGD.

According to the New Hampshire Endangered Species Conservation Act (NH ESCA) "Endangered" species are those in danger of being extirpated from the state, while

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<sup>1</sup> Note that under RSA 212-A:13, III, the provisions of RSA 212-A or any rule promulgated under that statute shall not interfere in any way with the siting or construction of any energy facility as defined in RSA 162-H:2.

"Threatened" species face the possibility of becoming "endangered." Some of New Hampshire's listed species are also listed under the federal ESA.

In addition to those species listed as threatened or endangered, New Hampshire also maintains a list of species of "special concern". Species listed as "special concern" include: (a) those that could become "threatened" in the foreseeable future if conservation actions are not taken or that were recently recovered enough to be removed from the endangered and threatened category, and; (b) those for which a large portion of their global or regional range (or population) occurs in New Hampshire and where actions to protect these species' habitat will benefit the species' global population. Species that do not meet the criteria for "endangered", "threatened", or "special concern", but that are still biologically rare, as indicated by the State and Global Ranks, are also listed as rare in New Hampshire.

Table 1 lists New Hampshire's rare bird and bat species and identifies each species' rank and listing.

**Table 1: Rare Bird and Bat Species of New Hampshire**

Name	Rank		Listing	
	Global	State	Federal	State
<p><b>Rank Prefix:</b> G = Global Rank; S = State Rank; T = Global or State Rank for a subspecies or variety  <b>Rank Suffix:</b> 1 = Critically imperiled; 2 = Imperiled; 3 = Vulnerable; 4 = Apparently secure; 5 = Secure;  <b>B</b> = Breeding population; <b>N</b> = Non-breeding population; <b>H</b> = Occurred historically, not seen recently;  <b>X</b> = Extirpated; <b>NR/U</b> = Not ranked / Unknown; <b>Q</b> = Questionable taxonomy; <b>?</b> = Uncertain  <b>Listing Codes:</b> E = Endangered; T = Threatened; SC = Special Concern</p>				
<b>Birds</b>				
American Bittern ( <i>Botaurus lentiginosus</i> )	G4	S3B	--	--
American Kestrel ( <i>Falco sparverius</i> )	G5	S3B	--	SC
American Pipit ( <i>Anthus rubescens</i> )	G5	S2B	--	SC
American Three-toed Woodpecker ( <i>Picoides dorsalis</i> )	G5	S2	--	T
Arctic Tern ( <i>Sterna paradisaea</i> )	G5	S1B	--	SC
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	G5	S2	--	T
Bank Swallow ( <i>Riparia riparia</i> )	G5	S3B	--	SC
Bicknell's Thrush ( <i>Catharus bicknelli</i> )	G4	S2S3B	--	SC
Cerulean Warbler ( <i>Dendroica cerulea</i> )	G4	S3B	--	SC
Cliff Swallow ( <i>Petrochelidon pyrrhonota</i> )	G5	S3B	--	SC
Common Loon ( <i>Gavia immer</i> )	G5	S2B	--	T
Common Moorhen ( <i>Gallinula chloropus</i> )	G5	S2B	--	SC
Common Nighthawk ( <i>Chordeiles minor</i> )	G5	S1B	--	E
Common Tern ( <i>Sterna hirundo</i> )	G5	S2B	--	T
Eastern Meadowlark ( <i>Sturnella magna</i> )	G5	S3B	--	SC
Golden Eagle ( <i>Aquila chrysaetos</i> )	G5	SHB	--	E
Golden-winged Warbler ( <i>Vermivora chrysoptera</i> )	G4	S2B	--	SC
Goshawk ( <i>Accipiter gentilis</i> )	G5	S3	--	--
Grasshopper Sparrow ( <i>Ammodramus savannarum</i> )	G5	S2B	--	T
Great Blue Heron (Rookery) ( <i>Ardea herodias</i> )	G5	S4B	--	--
Henslow's Sparrow ( <i>Ammodramus henslowii</i> )	G4	SHB	--	--
Horned Lark ( <i>Eremophila alpestris</i> )	G5	S3B	--	SC
King Rail ( <i>Rallus elegans</i> )	G4	SHB	--	--
Least Bittern ( <i>Ixobrychus exilis</i> )	G5	S1B	--	SC
Least Tern ( <i>Sterna antillarum</i> )	G4	SHB	--	E
Loggerhead Shrike ( <i>Lanius ludovicianus</i> )	G4	SHB	--	--
Marsh Wren ( <i>Cistothorus palustris</i> )	G5	S3B	--	--
Nelson's Sharp-tailed Sparrow ( <i>Ammodramus nelsoni</i> )	G5	S3B	--	SC
Northern Harrier ( <i>Circus cyaneus</i> )	G5	S1B	--	E
Olive-sided Flycatcher ( <i>Contopus cooperi</i> )	G4	S3B	--	SC

Antrim Wind Energy Project  
 Bird and Bat Conservation Strategy

Name	Rank		Listing	
	Global	State	Federal	State
Osprey ( <i>Pandion haliaetus</i> )	G5	S3B	--	SC
Peregrine Falcon ( <i>Falco peregrinus anatum</i> )	G4T4	S2	--	T
Pied-billed Grebe ( <i>Podilymbus podiceps</i> )	G5	S2B	--	T
Piping Plover ( <i>Charadrius melodus</i> )	G3	S1B	T	E
Purple Martin ( <i>Progne subis</i> )	G5	S1B	--	SC
Roseate Tern ( <i>Sterna dougallii dougallii</i> )	G4T3	S1B	E	E
Rusty Blackbird ( <i>Euphagus carolinus</i> )	G4	S3B	--	SC
Saltmarsh Sharp-tailed Sparrow ( <i>Ammodramus caudacutus</i> )	G4	S3B	--	SC
Seaside Sparrow ( <i>Ammodramus maritimus</i> )	G4	S1B	--	SC
Sedge Wren ( <i>Cistothorus platensis</i> )	G5	S1B	--	E
Sora ( <i>Porzana carolina</i> )	G5	S3B	--	SC
Spruce Grouse ( <i>Falcipennis canadensis</i> )	G5	S3	--	SC
Upland Sandpiper ( <i>Bartramia longicauda</i> )	G5	S1B	--	E
Vesper Sparrow ( <i>Pooecetes gramineus</i> )	G5	S2S3B	--	SC
Whip-poor-will ( <i>Caprimulgus vociferus</i> )	G5	S3B	--	SC
Willet ( <i>Catoptrophorus semipalmatus</i> )	G5	S3B	--	SC
<b>Bats</b>				
Eastern Red Bat ( <i>Lasiurus borealis</i> )	G5	S3?B	--	SC
Hoary Bat ( <i>Lasiurus cinereus</i> )	G5	S3B	--	SC
Indiana Bat ( <i>Myotis sodalis</i> )	G2	SNA	E	--
Northern Long-eared Bat ( <i>Myotis septentrionalis</i> )	G4	S3	--	SC
Silver-haired Bat ( <i>Lasionycteris noctivagans</i> )	G5	S3B	--	SC
Small Footed Bat ( <i>Myotis leibii</i> )	G3	S1	--	E
Tricolored Bat ( <i>Pipistrellus subflavus</i> )	G5	S1N,SUB	--	SC
<b>Bat Hibernacula</b>				
Bat hibernaculum	GNR	S1	--	--

Source: New Hampshire Natural Heritage Bureau, 2011

## 2.2 Bird Protection

### 2.2.1 The Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA, as amended (16 U.S.C. 703–712; 40 Stat. 755) prohibits the "take" of migratory birds, their eggs, feathers or nests. The MBTA defines "take" to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, selling, purchasing, possessing or transporting any migratory bird, nest, egg, or part thereof. As of 2012, a total of 1,007 bird species are protected by the MBTA; 58 of these are currently legally hunted as game birds (USFWS 2011c). A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle.

The United States Fish and Wildlife Service (USFWS) is primary entity responsible for ensuring the implementation and enforcement of the MTBA.

### 2.2.2 Bald and Golden Eagle Protection Act

Bald eagles and golden eagles are protected under the MBTA, described above. In addition, these species are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250). The Bald and Golden Eagle Protection Act (Eagle Act) is the primary law protecting bald and golden eagles in the U.S. and in New Hampshire. The Eagle Act prohibits take of bald and golden eagles, including their parts, nests, or eggs. The statutory definition of "take" includes to take, possess, purchase, sell, transport, pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb eagles.

The USFWS is primarily responsible for ensuring the implementation and enforcement of the Eagle Act. On September 11, 2009, the USFWS issued its final rule regarding take permits for bald and golden eagles (50 CFR Parts 13 and 22). According to this rule, wind power projects which are deemed likely to incur take of eagles or their nests would need to obtain a programmatic take permit.

## 2.3 Bat Protection

Eight species of bats occur in New Hampshire, based upon their normal geographical range (NHFGD 2010). These are:

- little brown bat (*Myotis lucifugus*)
- northern long-eared bat, (*Myotis septentrionalis*)
- eastern small-footed bat (*Myotis leibii*)
- silver-haired bat (*Lasionycteris noctivagans*)
- tri-colored bat (*Perimyotis subflavus*)
- big brown bat (*Eptesicus fuscus*)
- eastern red bat (*Lasiurus borealis*), and
- hoary bat (*L. cinereus*).

As shown in Table 1, several of these species are of interest to the NHFGD: the eastern small-footed bat is state-listed as endangered, and five species (eastern red bat, silver-haired bat, hoary bat, northern long-eared bat, and tri-colored bat) are species of special concern in the state. Little is known about the distribution of any of these species in New Hampshire and very little is known about their summer breeding habitat (NHFGD 2005; DeGraff and Yamasaki 2001). With the exception of the small-footed bat, which possibly uses rocky crevices on cliffs or crevices on buildings for summer roosting, the five state-listed species of special concern all apparently roost in trees (NHFGD 2005).

In addition to the species listed above, a single record exists for the federally endangered (and New Hampshire S1 ranked) Indiana Bat in New Hampshire. Aside from this record, there is no known population of Indiana bats in New Hampshire and this species is not managed within the state (because there is too little distribution data available to develop conservation or management strategies) (Veilleux and Reynolds 2005). Although the *New Hampshire Wildlife Action Plan* (NHFGD 2005) identified the Indiana bat (*M. sodalis*) as potentially occurring in the state, current available resources suggest that it is not present or is unlikely to be present (NHFGD 2011a, Reynolds 2007).

On October 2, 2013 the USFWS proposed to list the northern long-eared bat as endangered, due to population decline caused by White-nose Syndrome (WNS). This emerging disease has spread throughout the New England states in the past five years and has resulted in the unprecedented decline of all 6 bat species that hibernate in caves or mines in the northeast (NHFGD 2011b). The northern long-eared bat was listed as threatened on May 4, 2015.



### **3 TIERED SITE ASSESSMENT METHODOLOGY**

In accordance with the USFWS Land-Based Wind Energy Guidelines (“USFWS Guidelines”; USFWS 2012), AWE has applied a tiered approach to assessing potential risk to bird and bat species associated with the proposed Antrim Wind Energy Project.

Preliminary site evaluation and site characterization assessments have been performed to determine site suitability, and are described herein (see Section 4). These assessments are consistent with Tier 1 and Tier 2 as described within the USFWS Guidelines. In accordance with Tier 3 of the USFWS Guidelines, numerous environmental field studies have also been performed; the scope, duration and results of these Tier 3 field studies and evaluations are also described herein (see Section 5). This BBCS describes how the results of Tier 3 studies have been and/or will be applied to inform project design, construction and operation.

Furthermore, this BBCS defines post-construction monitoring and reporting commitments consistent with Tier 4 of the USFWS Guidelines. Finally, an adaptive management plan is proposed for addressing potential changes and unexpected events over the life of the Project. This plan provides a framework for any unforeseen, future Tier 5 study considerations that may arise. It also provides a framework to assess and introduce any future technological advances that are financially feasible and that offer benefits to bird and bat species while preserving the Project’s commercial viability.

## 4 PRELIMINARY SITE EVALUATION AND SITE CHARACTERIZATION

AWE's preliminary site evaluation and site characterization assessed numerous factors that are critical to the appropriate siting of an economically viable and environmentally sound wind project. These efforts have been conducted in a thorough manner and adequately address Tiers 1 and 2 of the USFWS Guidelines.

In general, the most viable wind sites include: sufficient projected wind speeds at turbine hub height to produce power in commercial quantities; proximity to adequate transportation; proximity to electric transmission or distribution infrastructure capable of handling the new generation; adequate setbacks from residences or other inhabited structures to ensure public safety; the absence of known sensitive ecological resources that may be disturbed such as critical wildlife habitats, major wetlands, and other sensitive areas ; and previous environmental impacts and/or commercial activities on site. Based on these criteria, the proposed site of the Antrim Wind Energy Project constitutes a well-sited wind power project location.

During its preliminary investigation, AWE confirmed that there are no current conservation restrictions on the site that would limit the development of the Project. In addition, desktop GIS review of known environmental factors did not reveal the presence of any known critical habitats or endangered species. Also, there are no known occurrences of species of habitat fragmentation concern, and there are no known critical areas of concentration for species of concern. In a letter dated October 13, 2011, the USFWS confirmed, based on available information, that no federally listed or proposed threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service were known to occur in the project area.

Importantly, the proposed Project site is located approximately ½ mile from a PSNH transmission corridor where the Project proposes to interconnect to the grid. This eliminates the need for a new transmission corridor and line, thereby avoiding

numerous potential impacts associated with such development (e.g. bird electrocution, wire strikes, habitat alteration, edge effects, etc.) The site is also located approximately  $\frac{3}{4}$  mile from Route 9, a substantial state highway that can handle transportation of turbine components and construction equipment. The proximity of this existing highway minimizes the need for extensive access improvements, again reducing the potential impacts associated with creating such access (such as habitat alteration, fragmentation, etc.).

Furthermore, the site does not support sensitive high elevation alpine habitats, thereby eliminating any potential impacts to such sensitive habitats. Finally, much of the northern slope of Tuttle Hill has been heavily logged in the past decade and, as recently as 2012, logging operations (unrelated to the Project) have impacted the site. The fact that much of the proposed Project area is already altered by industrial logging activity reduces the potential incremental impact of the Project on existing natural habitats.

In summary, the preliminary site assessment and site characterization validates AWE's conclusion that this is an appropriate site for continued development of a wind energy facility. When applied to Tier 1 and Tier 2 of the USFWS Guidelines, the findings of these preliminary assessments indicate that the overall probability of significant adverse impacts as a result of the proposed Project is low. As such, these findings indicate that advancement to Tier 3 studies is justified.

## 5 PRE-CONSTRUCTION BIRD AND BAT ASSESSMENTS

In the spring of 2011, AWE initiated consultation with various regulatory agencies to identify the scope of wildlife studies to be performed relevant to the Project, consistent with Tier 3 of the USFWS Guidelines. Consulting agencies included USFWS, NHFGD, New Hampshire Natural Heritage Bureau (NHNHB), New Hampshire Department of Environmental Services (NHDES), United States Army Corps of Engineers (USACE), and United States Environmental Protection Agency (USEPA). As a result of this consultation, the following pre-construction biological studies were identified as necessary to assess the potential impacts of the proposed Project on bird and bat species:

- Breeding bird surveys;
- Diurnal raptor migration surveys;
- Radar surveys for nocturnal bird migration;
- Rare raptor nesting surveys;
- Acoustic bat monitoring; and
- Bat mist nesting surveys.

All of the above listed studies have been completed as of fall, 2011. In addition (as a result of further consultation with NHFGD and USFWS in April 2012), a Tier 3 study to assess eagle use within the area of proposed development was performed in 2012.

All pre-construction studies were designed to be consistent with the methods and protocols recommended by state and federal regulatory agencies for proposed wind power projects. They were also designed to be consistent with surveys conducted in the past at other similar projects in New Hampshire and throughout New England. The specific protocol for each study was designed in consultation with USFWS and NHFGD. The scope, duration and results of bird and bat studies associated with the proposed Antrim Wind Energy Project are described in the following subsections (5.1, 5.2). A summary of potential risks to specific species as a result of the Project's construction and operation is provided in Section 5.3.

The results and findings of pre-construction studies have been compiled in stand-alone formal reports which will be included with Antrim Wind Energy, LLC's Application for a Certificate of Site and Facility submitted to the New Hampshire Site Evaluation Committee (SEC). The results and findings of these studies have been incorporated into the Project's preliminary planning and design (e.g. wetlands have been avoided, which provide important habitat and foraging opportunities for bird and bat species). They will also be accounted for, to the extent necessary and feasible, during the Project's final design and construction plans to avoid, reduce, and minimize potential impacts on birds and bats.

The findings of these Tier 3 studies will also provide the baseline, pre-construction reference data upon which the Tier 4 post-construction monitoring, reporting and adaptive management efforts will be based.

## **5.1 Bird monitoring**

### *5.1.1 Breeding Bird Surveys*

A breeding bird survey for the Antrim Wind Energy Project was performed in June of 2011. The goal of this survey was to document the pre-construction presence, diversity and relative abundance of breeding bird species in the proposed area of development. The specific objectives of the breeding bird survey were to:

- produce a comprehensive list of breeding bird species in the Project area;
- compile a species index and relative abundance for birds breeding in the Project area;
- calculate frequency of occurrence for each species;
- characterize habitat that is available for species which occur in the Project area; and
- qualitatively assess the general patterns of breeding bird use in the vicinity of the proposed Project.

The breeding bird survey used point count methods based on those used for the Vermont Institute of Natural Science's *Mountain Birdwatch* program (VINS 2005) and Bird Studies Canada's *High Elevation Landbird Program (HELP)* (Whittam & Ball 2002, and 2003).

Point counts were conducted at 12 locations along the ridge of Tuttle Hill and Willard Mountain. Point count locations were spaced at least 250 m apart and were located in representative habitat types within and adjacent to the proposed Project area. Six of the points were located in close proximity to areas that will be directly disturbed by the proposed development; the other six were located outside of the area of direct disturbance. Each point count location was visited twice during the study period. All surveys were conducted at dawn (between 4:30 AM and 8:30 AM).

Habitat parameters associated with point count locations were quantified using methods described by James and Shugart (James and Shugart 1970), who developed a methodology specifically for making habitat measurements associated with estimating bird populations. This methodology is still used by the national Breeding Bird Survey (USGS 2009), as well as other current studies.

A total of 131 individual birds, representing 25 different species, were documented during the formal breeding bird surveys. Biologists observed an additional 14 species incidentally while present in the Project area to perform the breeding bird survey, but not during the formal survey procedure. These observations constitute a total of 39 bird species recorded in the Project vicinity during the breeding season of 2011. Table 2 below summarizes the list of breeding bird species identified formally during breeding bird surveys, as well as the incidental observations.

The most frequently observed bird species, in terms of relative abundance, were ovenbird and blackburnian warbler: 17 individuals of each species were observed, constituting a 12.98% relative abundance for each. The next most abundant species were red-eyed vireo (n=14) and myrtle warbler (n=12), at 10.69% and 9.16% relative

abundance, respectively. The relative abundance of each species documented is presented in Table 2.

The assemblage and relative abundance of birds observed is typical for New England, given the habitats found within and adjacent to the study area. No rare birds or birds of conservation concern were observed during formal breeding bird surveys.

Incidental observations of the common nighthawk, a state listed endangered species, were made in the vicinity of Willard Mountain and Tuttle Hill in June of 2011. One of these observations was auditory and consisted of aerial vocalizations in the area of Willard Mountain. The other observation was visual and auditory, and consisted of several nighthawks foraging over the valley to the north of Tuttle Hill. All of the nighthawks heard and observed at both locations were outside of the proposed Project area.

**Table 2: Breeding Bird Species Identified Within the AWE Project Vicinity**

Breeding Bird Species Observed within the Antrim Wind Energy Project Vicinity				
Common Name	Latin Name	Residence*	Number Observed	Relative Abundance
<b>Species Observed During Formal Breeding Bird Surveys</b>				
American Goldfinch	<i>Carduelis tristis</i>	L/US	1	0.76%
Black and White Warbler	<i>Mniotilta varia</i>	NT	5	3.82%
Blackburnian Warbler	<i>Dendroica fusca</i>	NT	17	12.98%
Black-capped Chickadee	<i>Poecile atricapillus</i>	L	2	1.53%
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	US/NT	10	7.63%
Blue Jay	<i>Cyanocitta cristata</i>	US/L	4	3.05%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	L/US	2	1.53%
Chesnut-sided Warbler	<i>Dendroica pensylvanica</i>	NT	2	1.53%
Common Yellowthroat	<i>Geothlypis trichas</i>	NT	2	1.53%
Eastern Wood Pewee	<i>Empidonax</i>	NT	4	3.05%
Golden-crowned Kinglet	<i>Regulus calendula</i>	L/US	2	1.53%
Hairy Woodpecker	<i>Picoides villosus</i>	L	6	4.58%
Hermit Thrush	<i>Catharus guttatus</i>	US	9	6.87%
Magnolia Warbler	<i>Dendroica magnolia</i>	NT	3	2.29%
Morning Dove	<i>Zenaida macroura</i>	US/L	1	0.76%
Myrtle Warbler	<i>Dendroica coronata</i>	US/NT	12	9.16%
Ovenbird	<i>Seiurus aurocapillus</i>	US/NT	17	12.98%
Purple Finch	<i>Carpodacus purpureus</i>	L/US	1	0.76%
Red-breasted Nuthatch	<i>Sitta canadensis</i>	L/US	2	1.53%
Red-eyed Vireo	<i>Vireo olivaceus</i>	NT	14	10.69%
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	NT	3	2.29%
Scarlet Tanager	<i>Piranga olivacea</i>	NT	3	2.29%
Slate-colored Junco	<i>Junco hyemalis</i>	L/US	5	3.82%
Winter Wren	<i>Troglodytes troglodytes</i>	US	2	1.53%
Veery	<i>Catharus fuscescens</i>	NT	2	1.53%
<b>Total Species Observed During Formal Surveys</b>		<b>25</b>		
<b>Total Individuals Observed During Formal Surveys</b>			<b>131</b>	
<b>Species Recorded as Incidental Observations during Summer 2011</b>				
American Redstart	<i>Detophaga ruticilla</i>	NT		
Barred Owl	<i>Strix varia</i>	US/L		
Blue-headed Vireo	<i>Vireo solitarius</i>	US/NT		
Broad-winged Hawk	<i>Buteo platypterus</i>	NT		
Brown Creeper	<i>Certhia americana</i>	na		
Common Nighthawk	<i>Chordeiles minor</i>	NT		
Cooper's Hawk	<i>Accipiter cooperii</i>	US/L		
Least Flycatcher	<i>Empidonax minimus</i>	NT		
Pileated Woodpecker	<i>Picadae</i>	L		
Red-tailed Hawk	<i>Buteo jamaicensis</i>	US/L		
Ruffed Grouse	<i>Bonasa umbellus</i>	L		
TurkeyVulture	<i>Cathartes aura</i>	US		
Wild Turkey	<i>Meleagris gallopavo</i>	L		
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	US		
<b>Total Species Observed Incidentally</b>		<b>14</b>		
<b>Total Breeding Bird Species Recorded in 2011</b>		<b>39</b>		

\* L – Local year round resident; US – Migrates within US; NT – Neotropical migrant



### 5.1.2 Diurnal Raptor Migration Surveys

Surveys for diurnal migrating raptors were performed during the spring and fall seasons of 2011. The purpose of these migration surveys was to document the numbers, species, and flight patterns of migrating raptors within and immediately adjacent to the proposed Project area. The main objectives of daytime bird migration surveys were to:

- Assess species composition, relative abundance, distribution, and spatial patterns of use by raptors migrating during daytime hours in and around the proposed Project area;
- Identify routes used by daytime migrating raptors passing through/near the proposed Project area;
- Document flight heights and use of topographical features in and near the proposed Project area;
- Evaluate potential impacts of project development and operation on migrating raptors; and
- Evaluate potential for collisions at proposed turbine sites.

The protocol for diurnal raptor migration surveys at the proposed Antrim Wind Energy Project followed standards set forth by the Hawk Migration Association of North America (HMANA 2011), and by HawkWatch International (HawkWatch International 2011, Hoffman and Smith 2003). The study methods were also consistent with similar studies conducted at other proposed wind energy facilities in New Hampshire.

Spring surveys for migrating raptors were performed in mid March through late May, 2011. Fall surveys were performed between mid September and late November, 2011. Early survey dates (in March), and late survey dates (in November) were intended to capture the passage of species, such as bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), whose migration period is temporally extended.

Surveys were performed on multiple survey dates during each season. Sampling was performed based upon favorable weather for migration. In spring, fair weather days with southerly or southwesterly winds were favored. In fall, surveys favored fair weather

days with strong north to northwest winds, particularly following the passage of a cold front.

On each survey date, data was generally collected for eight consecutive hours between 9 AM to 5 PM. This timeframe encompasses the peak hours of thermal development and associated raptor movement. Detailed raptor observation data were collected continuously during each survey onto specialized data sheets; the flight path of each raptor observed was also recorded on a topographical map of the survey area. Weather conditions (including wind speed and direction, temperature, cloud cover, visibility, etc.) were also recorded at the commencement of and periodically throughout daily observations.

The spring 2011 diurnal raptor migration survey for the proposed Antrim Wind Energy Project consisted of 65 total hours of observation across 9 dates between March 25 and May 15. The fall survey consisted of 147.5 total hours of observation across 21 dates between September 1 and November 20.

In spring, a total of 441 individual raptors<sup>2</sup>, representing eleven species were identified within the immediate vicinity of the proposed Antrim Wind Energy Project. The vast majority of individuals observed were turkey vultures, which comprised 54% (n=237) of all observations. The next most abundant species observed were broad winged hawks and red-tailed hawks at 18% (n=77) and 14% (n=60) relative abundance, respectively. Table 3 lists all species observed in spring 2011 and their relative abundance.

In fall, a total of 978 individual raptors, representing 10 species were identified. The vast majority of these were broad-winged hawks, which comprised approximately 70% (n=689) of all observations. A total of 471 of these individuals were recorded on one date: September 18. The majority of these broad-wings passed in a few large aggregations (“kettles”). For a relative comparison, on the same date (September 18), Carter Hill Observatory (in Concord, NH) recorded a total of 7,212 broad-winged hawks

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<sup>2</sup> For the purpose of this study, the term “raptors” refers to all members of Order Falconiformes; this order currently includes the family Cathartidae (New World vultures), which includes turkey vultures.

and Pack Monadnock Observatory (in Peterborough, NH) recorded 5,208. Large, temporally concentrated fall movement of broad-winged hawks is typical in New England. Red-tailed hawks and turkey vultures were the next most frequently observed species at approximately 8% and 6% relative abundance, respectively. Table 3 lists all species observed and their relative abundance.

**Table 3: Species List and Relative Abundance of Diurnally Migrating Raptors, Spring and Fall 2011.**

Common Name	Binomial Nomenclature	Total Individuals Observed		Percent Relative Abundance	
		Spring	Fall	Spring	Fall
Accipiter spp. (small)	(n/a)	2	23	0.45%	2.35%
American Kestrel	<i>Falco sparverius</i>	1	0	0.23%	0.00%
Bald eagle	<i>Haliaeetus leucocephalus</i>	3	11	0.68%	1.12%
Broad-winged hawk	<i>Buteo platypterus</i>	77	689	17.46%	70.45%
Buteo spp.	(n/a)	30	22	6.80%	2.25%
Cooper's hawk	<i>Accipiter cooperii</i>	3	15	0.68%	1.53%
Falcon spp.	(n/a)	1	1	0.23%	0.10%
Golden eagle	<i>Aquila chrysaetos</i>	0	3	0.00%	0.31%
Merlin	<i>Falco columbarius</i>	0	3	0.00%	0.31%
Northern Goshawk	<i>Accipiter gentilis</i>	1	0	0.23%	0.00%
Northern Harrier	<i>Circus cyaneus</i>	5	0	1.13%	0.00%
Osprey	<i>Pandion haliaetus</i>	5	5	1.13%	0.51%
Peregrine Falcon	<i>Falco peregrinus</i>	1	0	0.23%	0.00%
Raptor spp.	(n/a)	13	48	2.95%	4.91%
Red-shouldered hawk	<i>Buteo lineatus</i>	0	1	0.00%	0.10%
Red-tailed hawk	<i>Buteo jamaicensis</i>	60	75	13.61%	7.67%
Sharp-shinned hawk	<i>Accipiter striatus</i>	2	19	0.45%	1.94%
Turkey vulture	<i>Cathartes aura</i>	237	63	53.74%	6.44%
<b>TOTAL</b>		<b>441</b>	<b>978</b>		

The overall passage rate in spring 2011 was 6.78 raptors per hour of effort (441 raptors/65 hours) with a range of 1.88 to 14.25. The overall passage rate in fall was 6.63 raptors per hour of effort (978 raptors/147.5 hours) with a range of 0 to 61.75. These passage rates were compared to data from the five most comparable (in terms of proximity and geographic similarity) hawk watch sites for which data was available across the same sampling period. The spring average at Antrim (6.78 raptors per hour of effort) is similar to the spring average of 5.78 raptors per hour of effort among five regional hawk watch

sites. The spring maximum of 14.25 raptors per hour of effort is well below the regional maximum of 49.08. The fall average of 6.63 raptors per hour of effort is well below the regional average of 21.83; likewise, the fall max of 61.75 raptors per hour of effort is significantly lower than the regional max of 730 raptors per hour of effort.

Flight height (above ground level) was estimated for raptors that used the ridge area and upper slopes of Tuttle and Willard Mountains, as these are the areas where potential development has been considered or proposed over the course of project development. The remaining birds were recorded as "outside" of the proposed Project area. Flight height estimates were grouped into 3 categories: 0-50 feet above the ground, 50-500 feet above the ground, and 500+ feet above the ground. Estimation of raptor elevation can be influenced by such factors as perspective, distance, topography, and individual observer perception. For this reason, the flight height categories were designed conservatively to produce the most conservative potential risk estimate, with field observers also erring on the side of caution around the 50-500-foot category.

Of 441 total raptors observed in spring 2011, 216 (49%) flew over the area of potential development. Of the birds that did fly over the area of potential development (n=216), 162 of them (or 37% of all birds observed) were judged to have flown within the 50-500-foot above ground range. Of the 162 birds that flew within this range, 108 of them were turkey vultures.

Of 978 total raptors observed in fall 2011, 460 of them (47%) were observed to fly over the area of potential development. Of the birds that did fly over the area of potential development (n=460), 296 of them (30% of all raptors recorded) were judged to have flown within the 50-500-foot above ground range. Of the 296 birds that flew within this range, 168 of them were broad-winged hawks; 104 of these passed in kettles on the single date of September 18.

Threatened or Endangered raptor species that were observed during spring and fall migration surveys for the proposed Antrim Wind Energy Project include:

- bald eagle (State Threatened);
- golden eagle (State Endangered);
- peregrine falcon (State Threatened); and
- northern harrier (State Endangered).

A total of 14 bald eagles were recorded (3 in spring and 11 in fall); 7 of these never flew within the proposed Project area. Of those bald eagles that did fly within the proposed Project area (n=7), 6 were judged to have passed within the 50-500 foot above-ground range. A total of 3 golden eagles were observed in the fall of 2011; one of these never flew within the proposed Project area. The remaining 2 golden eagles were judged to have passed within the 50-500 foot above-ground range within the proposed Project area. The single peregrine falcon that was observed in the spring of 2011 did not pass within the proposed Project area. Northern Harriers were documented on 5 occasions in the spring of 2011; three of these never flew within the proposed Project area, while 2 (a male and female together) were judged to have passed within the 50-500 foot above-ground range.

In addition to the threatened and endangered species listed above, three state listed species of special concern were also observed; these are American kestrel, northern goshawk, and osprey. One American kestrel was observed in the spring; it did not fly within the proposed Project area. One northern goshawk was also observed in the spring; it did not fly within the proposed Project area. Ten total osprey were observed (5 in the spring and 5 in the fall). None of the 5 osprey recorded in the spring flew within the proposed Project area. In the fall, one osprey did not fly within the proposed Project area, one flew in the 0-50-foot above ground range, and 3 were judged to have passed within the 50-500 foot above-ground range.

Overall, the observed species assemblage, relative abundance, and passage parameters were as expected for southern New Hampshire. Potential risk to these species as a result of the proposed Project is discussed in Section 5.3.

### 5.1.3 Nocturnal Migration Surveys

Nocturnal radar surveys for bird migration were performed for the proposed Antrim Wind Energy Project in 2011. These studies served to assess and characterize nocturnal bird migration patterns in the proposed Project area. The objective of the study was to document the overall passage rates for nocturnal bird migration in the vicinity of the Project area, including the level of migration activity, and migrants' flight direction and flight altitude.

A Furuno 12 kilowatt (kW) X-band marine radar was operated from one location (near the meteorological tower on the northeastern end of Tuttle Hill) within the Project area from sunset to sunrise each survey night for the duration of each survey period as outlined below, weather permitting. Marine radars cannot detect targets in heavy or consistent rain, so sampling occurred on nights with generally clear weather.

Spring radar surveys were conducted from sunset to sunrise on 30 nights between April 18 and May 26, 2011 resulting in 284 total hours surveyed. Fall radar surveys were conducted during 30 nights between August 17 and October 8, 2011 resulting in 327 total hours surveyed.

Video samples were analyzed using specialized digital analysis software. Data analysis included the removal of insects based on flight speed and the calculation of migration passage (traffic) rates over the radar location. Passage rates (expressed in targets/kilometer/hour) were summarized hourly for each night as well as the overall mean and median nightly passage rates for the entire season. The mean flight direction of recorded targets was calculated for each night of data collected. These were also summarized by night and for the entire season. Mean flight height of targets and percentage of targets below maximum turbine height was determined using the vertical data and summarized by hour, night, and season.

Results from this study were compared to results from other similar studies performed in similar locations in the northeast to present the range of results found at publicly

available pre-construction studies and show where Antrim falls within that range. Of these studies, further comparisons were made to those projects that were conducted at locations in the same region as Antrim (New England) and were conducted at projects that are now either permitted or operational. These include (but may not be limited to):

- Granite Wind Project in Errol, Coos County, New Hampshire (Stantec Consulting Services Inc. 2007a and b) – Permitted and under construction;
- Groton Wind Project in Groton, New Hampshire (Stantec Consulting Services Inc. 2008a and b) - Permitted;
- Lempster Wind Project in Lempster, New Hampshire (Woodlot Alternatives, Inc. 2006a and 2007a) – Permitted and Operational;
- Sisk Wind Project in Franklin County, Maine (Stantec Consulting Services Inc. 2009) - Permitted;
- Sheffield Wind Project in Caledonia County, VT (Woodlot Alternatives, Inc. 2006b) – permitted and operational; and
- Stetson Wind Project in Washington County, Maine (Woodlot Alternatives, Inc. 2007b) – permitted and operational.

### **Spring Results**

The overall mean passage rate for the entire spring survey period was  $223 \pm 23$  targets per kilometer per hour (t/km/hr), and nightly passage rates varied from  $6 \pm 3$  t/km/hr on May 17 to  $1215 \pm 299$  t/km/hr on May 20.

Individual hourly passage rates varied between nights and throughout the season, and ranged from 0 t/km/hr during various hours of various nights, to 2279 t/km/hr during the 7th hour of May 20. For the entire season, mean passage rates increased rapidly between hours one and two after sunset, then gradually increased to the 6th hour after sunset before steadily declining until sunrise.

Mean flight direction through the Project area in the spring was generally northeast ( $44^\circ \pm 49^\circ$ ), but varied between nights.

The seasonal mean flight height of targets was  $305 \pm 1$  meters (m; 1000 ft [']) above the radar site, and nightly flight heights ranged from  $135 \pm 31$  m to  $486 \pm 85$  m. Flight heights, when analyzed for the anticipated 150 m (492') height of the proposed turbines; indicate that the percentage of targets flying below turbine height ranged from 7 to 63 percent with a seasonal average of 30 percent.

These results are within the range of those recorded at other radar studies conducted at other proposed wind projects in the northeast. Of note, the spring average passage rate at the Project ( $223 \pm 23$  t/km/hr) is the lowest recorded spring passage rate recorded at any wind project site in New Hampshire and is at the low end of the range of results from among other spring radar studies conducted at proposed wind projects on forested ridges in the east. See Attachment B for a summary of nocturnal passage rates. Results from other projects range from 147 t/km/hr at the Stetson Wind Project in Washington County, Maine (Woodlot Alternatives, Inc. 2007b) to 1020 t/km/hr at the New Creek Wind Project in Grant County, WV (Stantec Consulting Services Inc. 2008c).

The spring average flight height ( $305 \pm 1$  m) is near the mid-range of average flight heights recorded at other radar studies conducted on forested ridges in the east, and is above the proposed turbine height (150 m). Comparative results range from 210 m at the Stetson Wind Project in Washington County, Maine (Woodlot Alternatives, Inc. 2007b) to 552 m at the Sheffield Wind Project in Caledonia County, VT (Woodlot Alternatives, Inc. 2006b). Both of these projects have been permitted and are now operational.

### **Fall Results**

The overall passage rate for the entire fall survey period was  $138 \pm 9$  targets per kilometer per hour (t/km/hr). Fall nightly passage rates varied from  $4 \pm 2$  t/km/hr on October 1 to  $538 \pm 71$  t/km/h on August 26. Individual hourly passage rates varied between nights and throughout the season, and ranged from 0 t/km/hr during various



hours of various nights to 839 t/km/hr during the 2nd hour of August 26. For the entire season, mean passage rates increased rapidly between the 1st and 3rd hours after sunset, then gradually declined until sunrise.

Mean flight direction through the Project area in the fall was generally southwest ( $217^{\circ} \pm 56^{\circ}$ ), but varied between nights.

The fall seasonal mean flight height of targets was  $203 \pm 1$  m (666') above the radar site. The average nightly flight height ranged from  $147 \pm 23$  m on August 24 to  $266 \pm 45$  m on September 9. The percent of targets observed flying below 150 m was 40 percent for the season and varied nightly from 25 percent (169 targets) on September 9 to 56 percent (74 targets) on August 18 (Figure 2-9). For the entire fall season, the mean hourly flight heights were lowest during 1st and 10th hour after sunset.

The fall average flight height ( $203 \pm 1$  m) is among the lowest average flight heights recorded among other fall radar studies conducted at proposed wind projects on forested ridges in the east. Comparative study results ranged from 287 m at the Sisk Wind Project in Franklin County, Maine (Stantec Consulting Services Inc. 2009) to 583 m at the Liberty Gap Wind Project in Pendleton County, West Virginia (Woodlot Alternatives, Inc. 2005). Of note, the recorded flight height at the proposed Project of  $203 \pm 1$  m is still above the proposed turbine height (150 m) for the Project. The nightly average flight height was below the proposed turbine height on only one night (August 24) and at the proposed turbine height on only one night (October 1) out of a 30 night season. It should be noted, however, that passage rates on these nights were very low: 38 t/km/hr on August 24 and 4 t/km/hr on October 1.

The fall average passage rate at the Project ( $138 \pm 9$  t/km/hr) is the lowest recorded fall passage rate at any wind project site in New Hampshire and is at the low end of the range of results of other fall radar studies conducted at proposed wind projects on forested ridges in the east. See Attachment B for a summary of nocturnal passage rates. Comparative study results range from 91 t/km/hr at the Sheffield Wind Project in

Caledonia County, VT (Woodlot Alternatives, Inc. 2006b) to 811 t/km/hr at the New Creek Wind Project in Grant County, WV (Stantec Consulting Services Inc. 2008c).

#### 5.1.4 Rare Raptor Nesting Survey

An assessment of rare raptor nesting within a 10-mile radius of the proposed Antrim Wind Energy Project was conducted in 2011, consistent with USFWS recommendations. The purpose of rare raptor nest surveys associated with the proposed Project was to determine the current status of bald eagle, golden eagle, and peregrine falcon breeding activity in the Project area and surrounding vicinity. Specific study objectives included:

- confirm presence or absence of bald eagle, golden eagle and peregrine falcon nesting activity at any known nest sites (current or historical) or suitable habitat within roughly a 10-mile radius of the proposed Project;
- monitor the proposed Project vicinity for bald eagle, golden eagle, or peregrine falcon activity that may indicate nesting at previously undocumented sites through incidental observations during other field surveys; and
- map (if found) bald eagle, golden eagle, or peregrine nest site locations within or adjacent to the proposed Project vicinity.

A desktop research exercise, including data inquiries, was conducted to ascertain the location of any historic nest locations or potential nesting habitats for the species being assessed. This exercise found that no territorial golden eagles have been documented during the breeding season in New Hampshire in nearly three decades. All of the State's historic golden eagle nesting sites are located in the White Mountains or in the Lake Umbagog region, all of which are considerably north of the proposed Project area. It was also found that the State's current peregrine falcon population occupies territories which occur mostly in the White Mountains. A few additional nests occur on cliffs in the far northern portion of the state, and one nest is located in an urban site (on a building) in the city of Manchester, in southern New Hampshire. All known peregrine falcon breeding sites in New Hampshire are on cliffs with the exception of the site in the City of Manchester. The closest known peregrine falcon nesting site relative to the

proposed Antrim Wind Energy Project is the urban location in the City of Manchester; this location is over 25 miles away from the proposed Project. No high quality nesting habitat for golden eagles or peregrine falcons was identified within 10 miles of the proposed Project. For these reasons, the potential for nesting establishment by golden eagles or peregrine falcons within 10 miles of the Project area was estimated to be extremely low. Conversely, it was determined that there are several areas of potential bald eagle breeding habitat within a 10 mile radius of the proposed Antrim Wind Energy Project. Given the recent success and expanding population of this species, establishment of nest sites (and breeding home ranges) within 10 miles of the Project area was deemed possible. Furthermore, data from the New Hampshire Audubon identified one historic bald eagle nest site within a 10-mile radius of the proposed Project. This nest site, located in an historic bald eagle territory on Nubanusit Lake in Nelson, NH, was occupied most recently in 2010. Based on the findings of this exercise, and associated consultation with the agencies, it was decided that the rare raptor nest survey for this area should focus on bald eagle nesting.

Pursuant to this consultation, on May 6, 2011, an aerial survey was conducted in an effort to identify and document bald eagle nesting activity within a 10-mile radius of the proposed Antrim Wind Energy Project.

During the aerial survey, two biologists (both experienced in conducting aerial bird and wildlife surveys) visually inspected the shoreline and islands of 34 lakes and ponds that were identified as having potential bald eagle breeding habitat (i.e. ponds greater than 35 acres in size) and which were located (at least partially) within a 10-mile radius of the proposed Project area. The survey was performed from a helicopter which flew as low and as slowly as possible. The survey was performed during favorable weather conditions, which consisted of calm to light winds and clear conditions with unlimited visibility.

During the survey, bald eagle nesting was confirmed at Nubanusit Lake. One adult bald eagle was observed sitting on a nest located on the north shore, on the far west end of the north arm of Nubanusit Lake. At least two chicks (in gray down) were also

confirmed on the nest during the flight. This nest is located approximately 3.4 miles from proposed turbine #9, which is the closest proposed turbine associated with the Project.

Nubanusit Lake is a known historic bald eagle nesting territory which has been occupied for 15 years (1997-2011). Nesting was documented in 13 of these years. This 15-year-long occupation constitutes the second most persistent bald eagle territory documented within the State of New Hampshire since 1988 (a territory at Lake Umbagog has been occupied during 22 years of monitoring (New Hampshire Audubon 2010). The female at this territory was banded as a fledgling (in Massachusetts) in 1992 and has been confirmed present at Nubanusit Lake since 1999; in October of 2011, this female was found mortally injured at 19 ½ years of age (New Hampshire Audubon 2011). It is expected that a new female will occupy the matriarchal vacancy at Nubanusit Lake.

The Nubanusit Lake bald eagle territory is one of 41 occupied territories identified in New Hampshire as of 2014. The number of occupied bald eagle territories has been increasing in New Hampshire: the 41 occupied territories in 2014 represent a “record-high”. Bald eagle territories have been increasing significantly recently, from 10 occupied territories in 2005, to 22 occupied territories in 2010, to the currently high number of 41 (<http://wildnh.com/Newsroom/2014/Q4/eagle.html>).

#### 5.1.5 Eagle Use Survey

Based on the findings of the rare raptor nesting survey conducted in 2011 (which identified an active bald eagle nest which is approximately 3.4 miles from the nearest proposed Project turbine), USFWS requested additional eagle use data for the area of proposed development. This data would allow the USFWS to perform a qualitative prediction of potential risk to bald eagles as a result of Project development.

Eagle use data for the Project was collected from mid-May through August, 2012. The eagle use survey consisted of two survey events per month over the course of the

survey period. Each survey entailed approximately 6 hours of continuous observation generally spanning from late morning to mid-afternoon. Surveys were performed from a vantage which allows a view of the majority of the area of proposed development. The primary vantage for eagle use surveys was the same as that used during fall raptor migration surveys, on the southeast flank of Willard Mountain. This vantage provided for visibility of all proposed wind turbine generator development locations for the Project. We conservatively estimate that we could see approximately 1,457 acres within a two mile radius, which includes the proposed project area and airspace above. The Willard Mountain survey location was scoped based on the availability of obtuse views of the area of proposed development. This location provided an obtuse horizontal view of the ridgeline where development has been proposed. On the vertical plane, this location provided views of: the Meadow Marsh valley on the south side of Tuttle Hill; the majority of the southeastern facing slope of Tuttle Hill and the northeastern slope of Willard Mountain; significant areas of the Tuttle Hill ridgeline; and, a broad expanse of airspace over the landscape. Furthermore, the meteorological tower on the east summit of Tuttle Hill was visible, providing a landmark of known elevation which operated as a scale of reference. All data have been provided to the USFWS to inform the agency's bald eagle risk assessment.

Data were gathered that are sufficient to satisfy the prescriptions and data needs described within the Draft USFWS Eagle Conservation Plan Guidance (2011), the Draft Eagle Conservation Plan Guidance Module 1 – Land-Based Wind Energy Technical Appendices (2012), and the most current U.S. Fish and Wildlife Service Eagle Conservation Plan Guidance – Module 1 – Land-based Wind Energy Version 2 (2013). In total, 36 total hours of observation were performed across 6 dates between May 15 and August 31. Surveys dates occurred on June 1, June 18, July 3, July 20, August 7 and August 20.

No bald eagles were observed during the entire Eagle Use Survey effort. This null observation accounts for the visible portions of Project area as well as the entire viewshed available from the Willard Mountain vantage location.

## 5.2 Bat monitoring

### 5.2.1 *Acoustic Monitoring*

Passive acoustic bat surveys for the proposed Antrim Wind Energy Project were performed in 2011. The purpose of this passive acoustic bat echolocation monitoring survey was to sample and document bat activity patterns and species composition within the Project area during spring, summer and fall seasons, when bats are known to be active.

A total of six bat detectors were deployed in the Project area by April 15, 2011. Two detectors were deployed in the guy wires of an existing meteorological tower at the east end of the Tuttle range. The remaining four detectors were deployed throughout the Project area, suspended from trees along forested corridors and adjacent to wetlands where bats would likely travel or forage. The detectors were removed in late October, 2011.

Anabat II detectors (Titely Electronics Pty Ltd.) were used for data collection based upon their widespread use for this type of survey, their ability to be deployed for long periods of time, and their ability to detect a broad frequency range, which allows detection of all species of bats known to occur in New Hampshire. Detectors were programmed to begin monitoring at one half hour before sunset each night and end monitoring at one half hour after sunrise each morning.

All data collected was visually inspected to screen out bat calls, and each call file was qualitatively identified to guild and to species, when possible. This method of guild identification represents a conservative approach to bat call identification. Once all call files were identified and categorized in appropriate guilds, nightly tallies of detected calls were compiled to provide an index of bat activity. Detailed weather data as recorded by the meteorological tower on Tuttle Hill was obtained. These data were applied to describe bat activity levels in relation to site-specific weather variables

that have been documented to affect rates of bat mortality at operational wind projects in the Northeast.

### **Spring Results**

Spring acoustic bat surveys were conducted between April 7 and June 1, 2011. The six detectors recorded a total of 1,483 bat call sequences yielding an overall detection rate of 4.9 bat call sequences per detector-night.

Rate of detection varied among individual detectors (ranging from 5 sequences at the high detector on the met tower, to 760 sequences at a lower elevation, forested site). Detection rates also varied by night, ranging from 0.1 sequences per detector-night, to 14.1 sequences per detector-night. These types of variation are typical of this type of survey.

Bats within the *Myotis* genus comprised the greatest overall percentage of detected call sequences (32 %) recorded in the spring; however, most of these sequences were recorded at a single detector over only a few nights. The big brown bat/silver-haired bat guild was the second most commonly identified guild, comprising 31 percent of the total call sequences recorded. Most call sequences within this guild were identified as big brown bats or big brown/silver-haired bats, and only a small fraction were classified as silver-haired bats. Hoary bats comprised 12 percent of bat call sequences recorded; this species was recorded at all six detectors. The eastern red bat/tri-colored bat guild was the least commonly detected guild, comprising only 1 percent of the recorded call sequences. Twenty-four percent of call sequences were classified as “unknown” due to their relatively short length or quality.

Overall, spring 2011 acoustic bat surveys documented variable activity levels within the Project area, with May activity increasing relative to April's.

### **Summer/Fall Results**

Summer/fall acoustic bat surveys were conducted between June 1 and October 23, 2011. The six detectors recorded a total of 35,450 bat call sequences yielding an overall detection rate of 52.4 bat call sequences per detector-night.

Among sampling locations, detection rates ranged from 2.6 to 126.2 bat call sequences per detector-night. Typical of this type of survey, activity levels varied considerably among nights within the survey period and among detectors. Bats within the big brown bat/silver-haired bat (BBSH) guild comprised the greatest overall percentage of detected call sequences (48%, n=17,006). The majority of BBSH calls were recorded at the low detector positioned on the met tower. The eastern red bat/tri-colored bat guild comprised 15 percent of the recorded call sequences. The *Myotis* guild comprised 12 percent and the hoary bat guild comprised 5 percent of the recorded call sequences. Twenty of the call sequences were classified as “unknown” due to their relatively short length or quality.

Of note, hoary bats were detected at five of the six detectors during the summer/fall study period, and species belonging to the *Myotis* guild and the eastern red bat/tri-colored bat guild were recorded by all six detectors.

Overall, summer/fall 2011 acoustic bat surveys documented variable activity levels within the Project area, although results suggest that activity was highest in July and August.



### 5.2.2 Bat Mist Netting Survey

A bat mist netting survey was conducted for the proposed Project in the summer of 2011, subsequent to a consultation with the NHDFG and the USFWS on June 21, 2011 to agree upon protocol for a mist net survey at the proposed Project. The primary objective of this summer survey was to document the potential presence of the eight bat species known to occur in the region.

Since there currently is no prescribed protocol for each bat species known to occur in New Hampshire, the federal Indiana Bat Survey Protocol was followed. (USFWS 2007). The bat mist net survey was conducted at four survey sites, as agreed upon during consultation with the agencies. Two of these sites were located at the south end of the proposed area of Project development, on or near Willard Mountain; one site was located in a wetland near the center of the proposed Project area; and one site was located near the existing meteorological tower on Tuttle Hill, at the northeast end of the proposed Project area. There were no suitable mist net sites on the immediate summits of Tuttle Hill or Willard Mountain, so sites were placed slightly off the peaks where better canopy closure provided more suitable mist net set locations.

The location of mist net sites was based on habitat features that may be selected by foraging little brown and northern long-eared bats, as well as eastern small-footed bats. Good-quality bat capture sites were sought; such sites are located in potential travel corridors such as forest roads, trails, streams, or other linear corridors that serve to funnel traveling bats into mist nets.

Mist net surveys were conducted on eight survey nights, which commenced on July 12, 2011 and were completed on July 28, 2011. During each sampling event, two mist net sets were erected over trails, roads, or across forest gaps. Each mist net set contained three vertically-stacked nets.

One bat was captured during 41 total survey hours among the four survey sites. This juvenile, male, big brown bat (*Eptesicus fuscus*), weighing 17.25 grams, was captured

on July 27, 2011 at the northeastern survey site (located downslope from the meteorological tower on Tuttle Hill). This bat was banded with NHFG band # 43152. No other bats were captured during the bat mist netting survey.

Low capture rates were not unexpected for this survey location. Mist net surveys can be biased toward those species that fly beneath the forest canopy such as North American *Myotis* species; as such, the relative abundance of expected captures is expected to trend toward *Myotis* species. In New England, high concentrations of *Myotis* species are generally expected at low elevations, where temperatures tend to be warmer and more stable than at higher elevations; however, *Myotis* bats are still expected to be present and active in lower concentrations at higher elevations such as ridge tops. For these reasons, it was expected that this study would result in the capture of at least some myotis bats. The capture of only one bat (which was not a *Myotis* species) was not the expected outcome of this effort. While not known definitely, the capture of only a single individual may be evidence of diminished populations of bats as a result of white-nose syndrome (WNS).

White-nose syndrome (WNS) is an emerging disease that has spread throughout the New England states in the past five years and has resulted in the unprecedented decline of all 6 bat species that hibernate in caves or mines in the northeast. *Myotis* species have been most affected by this disease. Of note: the USFWS listed the northern long-eared bat on May 4, 2015, as threatened, due to population decline caused by White-nose Syndrome (WNS). This emerging disease has spread throughout the New England states in the past five years and has resulted in the unprecedented decline of all 6 bat species that hibernate in caves or mines in the northeast (NHFGD 2011b). As noted earlier, after consultation with USFWS in 2015 and review of the studies performed and Project changes proposed, USFWS agreed that no further preconstruction studies would be required for northern long-eared bats or other species.

### 5.3 Potential Project Impacts to Birds and Bats

Potential impacts to birds and bats during operation of the proposed Project include indirect and direct forms of impacts. Indirect impacts may include fragmentation, habitat loss, displacement, or increased energy demands through turbine avoidance during migration or foraging. Direct impacts include turbine-associated mortality through either collision or barotrauma.

Indirect impacts, particularly habitat impacts, have largely been addressed in the siting and design phases of the Project, as previously described. As previously noted, no species of habitat fragmentation concern is known to occur; this, coupled with the compact footprint of the Project on the landscape (9 turbines arranged on approximately 57 acres of development), minimizes impacts associated with fragmentation. Likewise, displacement and turbine avoidance issues are expected to be negligible, given the small area and overall footprint of the Project. For these reasons, this BBCS focuses on the direct impact of collision and barotrauma. Direct mortality impacts to birds and bats that may potentially be expected at the Project are discussed below.

It is important to note that in advance of the submittal of AWE's application to the SEC and the development of this BBCS, AWE has secured binding letters of intent with six private landowners and the Harris Center for Conservation Education and the Town of Antrim to enact local land conservation agreements which will protect approximately 908 acres of land adjacent to the proposed Project. This undeveloped land encompasses forest, wetlands and streams in the immediate vicinity of the Project. Conservation of this land will permanently preserve large tracts of valuable foraging and nesting/roosting habitat for bird and bat species as well as other wildlife species. AWE has also entered into a land conservation funding agreement with the New England Forestry Foundation ("NEFF") whereby AWE will fund \$100,000 for the acquisition of new permanent conservation lands in southern New Hampshire.

### 5.3.1 *Potential Impacts to Birds*

In the past, developers have conducted extensive pre-construction risk assessments to calculate expected mortality at their proposed facilities, and this includes AWE. Recent studies have shown, including studies performed at the operational Groton Wind Project in New Hampshire, that there is little correlation between pre-construction risk assessments and actual documented mortality of bird species at wind farms (de Lucas et al. 2008, Ferrer et al. 2011, Sharp et al. 2011, Taucher et al. 2012, Stantec 2013). As such, it is difficult to predict expected mortality rates at a proposed facility from pre-construction survey data alone and post construction data at nearby and regional operational wind projects is a more accurate predictor of risk. In response to these scientific findings, this BBCS is designed to allow AWE to work continuously with USFWS and NHFGD in order to adapt to actual results and unknown circumstances, so that unexpected events and changes over time may be addressed.

In general, bird mortality documented during post-construction studies at 27 wind facilities in New England and New York is low, with a total of 1,160 bird fatalities (not corrected for searcher or removal biases) documented among all 27 facilities (Stantec 2014 unpublished). The majority of these fatalities were passerines (79%; n=922). The range of fatality estimates for known wind farms studies in Maine and New Hampshire is 0.44 birds per turbine per study period to 10.4 birds per turbine per study period. (Stantec 2014 unpublished).

Large, episodic bird mortality events have been documented at certain wind projects as well as at tall communication towers, lighted buildings, and other structures (Avery 1979, Shire et al. 2000, Longcore and Gauthreaux Jr. 2008, Gehring et al. 2009,). In general, the majority of bird collisions at existing wind projects tends to occur during spring and fall migration, and appears to involve nocturnally migrating songbirds. As such, impacts to nocturnal migrants tend to occur exclusively at night. Nocturnal bird mortality events have been correlated with inclement weather events and certain artificial lighting scenarios.

Project lighting plans, as described in this BBCS, have been designed to minimize lighting-associated mortality events.

While most bird mortality at wind farms tends to be associated with nocturnally migrating songbirds, collisions are also known to occur during the breeding season. Risk of collision for breeding birds is expected to occur primarily during evening or morning courtship behavior, daytime foraging and territory establishment, and during initial flying by juvenile birds. Population-level effects have not been attributed to collision mortality at wind projects or other structures (Loss et al. 2013).

Pre-construction bird studies for the Project generally found bird assemblage and use to be comparable to that of similar (in terms of topography and habitat) areas in New Hampshire and New England. Based on observations at operational wind projects in the region, bird collisions at the Antrim Wind Energy Project are expected to occur at a low frequency. Impacts are not expected to occur at a degree which would adversely affect populations.

A recent study shows that bald eagles exhibit a high rate of avoidance of operational wind turbines (Sharp et al. 2011). In fact, no bald eagle mortalities have been documented at wind farms in New England to date. In addition, the Project location is not good habitat for bald eagles. Bald eagles nesting habitat is typically in close proximity (< 1 mile) to larger waterbodies, such as lakes, ponds, rivers, wide streams, or large wetlands. This is primarily because their preferred prey is fish, however they also feed opportunistically on many other prey items such as waterfowl, small mammals, turtles, and carrion. Nesting in close proximity to waterbodies provides the eagles with a relatively high abundance and diversity of food items. Eagles are considered visual hunters and prefer to forage from an elevated perch or on the wing and forage in areas with good visibility that are not heavily wooded. The terrain at the location of the Project is heavily wooded and the waterbodies that are found in the immediate area are small headwater streams that are mostly intermittent. The wetlands are small forested wetlands except where they are in cleared utility ROW. For these reasons there

is a low probability that bald eagles foraging in the vicinity of the Project. Therefore, it is expected that any bald eagles in the Project's vicinity are likely to successfully avoid contact with turbines.

NHFG has expressed concern regarding the potential occurrence of the State-endangered common nighthawk at the site due to the close proximity of the site to the existing Lempster wind project. The Lempster wind project experienced a turbine related mortality of a common nighthawk. That project had also identified a nighthawk nest on the ground during its preconstruction surveys. No such nests were observed at the Antrim Wind Project site during any of the formal or informal surveys, nor is there suitable habitat for such nests. AWE has agreed to vegetation restoration efforts at the Project that address this concern and will minimize the creation of any new suitable nesting habitat for common nighthawks. Therefore it is unlikely that common nighthawks will nest at the site, and will not be subjected to increase collision risk.

### *5.3.2 Potential Impacts to Bats*

As previously discussed, of eight species of bats expected to occur in the state of New Hampshire, one (the eastern small-footed bat) is state-listed as endangered, and five (eastern red bat, silver-haired bat, hoary bat, northern long-eared bat, and tri-colored bat) are state species of special concern.

Furthermore, the USFWS has proposed to list the northern long-eared bat as endangered, due to population decline caused by White-nose Syndrome (WNS). This emerging disease has spread throughout the New England states in the past five years and has resulted in the unprecedented decline of all 6 bat species that hibernate in caves or mines in the northeast (NHFGD 2011b). *Myotis* species have been most affected by this disease. The northern long-eared bat was listed as threatened in May 4, 2015.

The total bat fatality recorded between 2006 and 2013 of post-construction studies at 26 wind farms in New England and New York was 2,053 (not corrected for searcher or removal biases) (Stantec 2014 unpublished). The majority of these fatalities were recorded in New York (84%; n = 1,729), where bat fatalities ranged from 0.7 to 40.4 bats per turbine per study period. In Maine and New Hampshire, bat fatalities range from 0.17 to 6.78 bats per turbine per study period. (Stantec 2014 unpublished). None of the bat mortalities observed at New England wind farms consisted of northern long-eared bats.

Long distance migratory bat species are thought to be the most vulnerable to collision mortality at wind projects in general based on results of mortality surveys at operational projects. (Stantec 2014 unpublished, Taucher et al. 2012, Arnett and Baerwald 2013, West 2014). Long-distance migratory bats that are expected to occur within range of the Project include the eastern red bat, silver-haired bat and hoary bat. Although the majority of documented bat fatalities at existing wind projects is related to long-distance migratory species, some mortality among resident bat species is also associated with the spring and fall migration periods, and during the summer pup rearing period.

Bat fatalities at wind farms are also known to be affected by other factors, such as weather variables. It has been shown that most bat fatalities tend to occur during low wind speeds over relatively short periods of time (Arnett et al. 2008, Hein et al. 2014, West 2014). Operational measures which curtail turbine cut-in at low wind speeds between dusk and dawn have been shown to reduce bat mortality at some wind farms.

Baerwald, et al. (2009) found that curtailment of turbines at low wind speeds reduced bat fatalities by between 57% and 60%. Studies performed at the Casselman Wind Project in Pennsylvania found that curtailment reduced bat fatalities at individual turbines at rates from 44% to 93%. (Arnett et al. 2010). Arnett et al. (2010) concluded that curtailing operations offers an effective mitigation strategy for reducing bat fatalities at wind energy facilities.

For this reason, even though bat mortality at New England wind farms has been low and studies conducted at the Antrim Project site indicate that the site is comparable to other New England wind project sites, this BBCS proposes a study to assess an operational curtailment strategy to minimize bat fatality at the Project, should actual fatalities materialize and mitigation is deemed appropriate. This proposed study is described in detail in Section 8.

Based on the accumulated knowledge of bat mortality at wind farms in New England, mortality at the Project is expected to be low. In light of the WNS epidemic, however, the level of biologically significant mortality may change and therefore will be addressed during the adaptive management process as implemented by this BBCS.

### *5.3.3 Cumulative Impacts and Net Benefit*

According to the USFWS Land-Based Wind Energy Guidelines (USFWS 2012), “Cumulative impacts are the comprehensive effect on the environment that results from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions.” Based on the results of Tier 1, 2, and 3 assessments to date, Project impacts to birds and bats are expected to be low. Meanwhile, the Project has the potential to provide numerous benefits to human and natural communities, including birds and bats. This balance is expected to result in an overall net benefit to these communities. Some of the Project’s specific benefits are described in the following paragraphs.

AWE is providing for the permanent conservation of 908 acres of undeveloped forest land immediately adjacent to the Project area and funding \$100,000 towards the acquisition of additional off-site conservation lands. These significant conservation benefits represent a contribution to preserving important wildlife habitat in the area, and will help sustain local wildlife populations. It also represents a direct benefit to local bird and bat species which rely on undeveloped forested areas for foraging,



nesting and roosting. Further information with regard to these conservation benefits is provided in Section 8.1 of this BBCS.

Furthermore, the Project represents a new source of clean, renewable energy that will displace output from fossil fuel generation plants, which produce environmental pollutants that negatively affect regional air and water quality. A December 2013 report issued by Environment New Hampshire found that in 2012 New Hampshire wind projects resulted in 157,267 tons of avoided carbon dioxide emissions (the equivalent of taking 32,764 cars off the road) and saved over 70,265,000 gallons of fresh water consumption (Schneider, Dutzik, & Sargent 2013). The Antrim project will increase the amount of avoided carbon dioxide emissions and water savings. Collectively, the current and expected reduction in carbon dioxide emissions due to increased wind energy represents a significant reduction in the production of greenhouse gases and this supports AWE's position that the proposed Project will provide net benefit (or a positive net impact) in terms of air quality. In turn, improved air quality will positively affect the physical environment and its fauna, including birds and bats.

In summary, direct losses of individual birds and bats as a result of Project operations are expected to be low, and are not expected to impose population level impacts; however, bird and bat populations as a whole are expected to benefit from diminished toxic air emissions. The enhancements to air and water quality discussed above, together with the direct land conservation benefits, will constitute a net benefit to the environment and the species which depend on it, including birds and bats.

## 6 DEVELOPMENT AND CONSTRUCTION PHASE AVOIDANCE AND MINIMIZATION

Several avoidance and minimization measures have been or will be executed during Project siting, design, construction and maintenance in order to minimize risk to bird and bat species. These are described in the following subsections.

### 6.1.1 *Project Siting and Design*

The following paragraphs describe measures previously employed or to be employed during siting, design, construction and operation that will avoid or minimize potential impacts to birds and bats upon construction and operation of the Project.

#### **Project Siting**

As previously discussed in Section 4, AWE applied rigorous screening criteria to establish a well-sited Project that minimizes potential impacts associated with access, transmission and alteration of natural habitats. The close proximity of the proposed Project to existing infrastructure minimizes the overall area of disturbance and eliminates the need for new transmission lines. Furthermore, the Project will be constructed on previously impacted lands (as recently as 2012 by industrial timber harvesting), thereby greatly reducing the overall impact of Project construction and development on natural habitats.

#### **Structure Layout and Design**

Final turbine layout and facility design has taken into account the findings of the Tier 3 biological assessments and has avoided identified sensitive areas (such as wetlands and vernal pools) to the extent feasible.

#### **Collector System Design and Interconnection Proximity**

The Project will interconnect to PSNH's 115 kV Line L163 via a three breaker ring bus substation located adjacent to the Project access road and contained within the

Project's leased boundary. The interconnection substation will be a standard three phase 115 kV transmission level substation designed and constructed by PSNH. A 34.5 kV - 115 kV collector substation will be located adjacent to the interconnection substation and provide an interface between PSNH and the Project. A single 34.5 kV three phase collector line will be constructed from the collector substation to the individual turbines. This collector line will be a combination of overhead and underground facilities. All collector system facilities (substation & lines) will be designed and constructed consistent with industry standards, PSNH and ISO-NE requirements, applicable local, state and federal codes and good utility practice.

Furthermore, the Project collector lines and substation will be designed and constructed to meet or exceed the most recent recommendations of the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC), as necessary and applicable.

### **Operational Lighting**

Operational lighting will be minimized to the maximum extent practicable. Project design will incorporate minimum intensity lighting on all Project structures where feasible.

No steady burning lights will be left on at the facility buildings and substation unless necessary for safety or security; in such cases, manual lighting, motion detector lighting or infrared light sensors will be used whenever possible to avoid continuous lighting. Any required facility lights will be shielded downward to minimize skyward illumination, and will not use high intensity, steady burning, bright lights such as sodium vapor or spotlights. Motion detector or manual lights will be used above tower doors and at the operations and maintenance building for nighttime maintenance visits.

AWE will implement a protocol to confirm that manual lighting controls on buildings and Project facilities are always off at night unless required for specific ongoing tasks or in the event of an emergency response.

### **Turbine and Met Tower Lighting**

Turbine lighting will be minimized to the maximum extent practicable. Lighting will be limited to that required by the Federal Aviation Administration (FAA) or as required to meet other safety concerns. Permanent meteorological tower(s) will also utilize the minimum lighting as required by the FAA.

Wind turbine lighting will be limited to FAA required obstruction avoidance lighting. Based on FAA determinations for the Project, six (out of 9 total) turbines will be lit, and all lights within the facility will illuminate synchronously. FAA required lights are anticipated to be flashing red strobes (L-864) that operate only at night. The lowest intensity lighting as allowed by the FAA will be used.

To the extent possible, USFWS recommended lighting schemes will be used on the nacelles to the extent they are consistent with FAA requirements, including reduced intensity lighting and lights with short flash durations that emit no light during the "off phase".

In addition, AWE has reached an agreement with the Appalachian Mountain Club ("AMC") whereby AWE has agreed to install a radar activated lighting system that will control the FAA obstruction lighting. This system will only activate the nighttime FAA obstruction lights in the event that there is an aircraft flying at low altitude at night in close proximity to the Project, which will almost eliminate this nighttime light source. AWE has agreed to ensure that this system is installed within one year of the FAA issuing its revised advisory circular approving the use of this technology.

#### *6.1.2 Project Construction and Maintenance*

The following construction phase measures will be executed during Project construction. These measures will result in avoidance of construction activities in the vicinity of sensitive habitats during critical periods in bird and bat life cycles, and minimization of impacts to wildlife habitat and resources.

### **Tree Clearing**

Tree clearing activities will be timed to minimize impacts to bats and birds. AWE will use its best efforts to ensure tree clearing occurs during the period between October 1 – March 31 in accordance with New Hampshire Fish and Game and NHSEC recommendations. This timing will help to avoid mortality of roosting bats, nesting birds, and their respective young.

A New Hampshire licensed forester will also manage the tree clearing effort, following best management and forestry practices such as those contained in the publication Good Forestry in the Granite State.

Furthermore, prior to any tree removal, the limits of proposed clearing will be clearly demarcated with flagging tape, orange construction fencing, or similar. This will prevent inadvertent over-clearing and minimize the extent of tree removal.

### **Minimization of Soil Disturbance and Promotion of Natural Revegetation**

Clearing and construction activities will apply practices which reduce soil disturbance and allow for the reestablishment of natural vegetation. Where possible, vegetation will be cleared without grubbing or removal of stumps or tree roots. All construction equipment will be restricted to designated travel areas to reduce impacts. Construction clearings, storage yards, staging areas, or temporary roads that are not needed for long-term operation of the Project will be allowed to revegetate after commissioning of the Project. Best management practices that limit erosion, including revegetation, are proposed as part of the NH Department of Environmental Services (NHDES) Alteration of Terrain application. Annual vegetation surveys will be performed by Project operations personnel in conjunction with regular balance of plant inspections and will document revegetation progress. Reports will be submitted to NHDES and NHFG for a period of three years following construction. If turbines require substantial maintenance during operations, the Project will employ the same measures as used during construction to limit clearing of vegetation and disturbance of soil.

### **Invasive Species Avoidance**

Best management practices will be used to avoid the introduction and spread of invasive species. Construction vehicles and equipment that arrive from other areas will be regularly cleaned. In an effort to preserve natural habitat to the extent possible, areas to be revegetated will be re-seeded with native seed (to the extent possible pending seed availability) following construction. Re-seeding will be consistent with state permit requirements to avoid the introduction of invasive plant species.

### **Protection of Water Quality**

Best Management Practices for construction activities will minimize degradation of water quality from storm water runoff and sediment from construction. A plan note will be incorporated into the construction contract requiring that contractors adhere to all provisions of National Pollutant Discharge Elimination System (NPDES) permits and the Storm Water Pollution and Prevention Plan (SWPPP). Federal and state measures will be adhered to for handling toxic substances to minimize danger to water and wildlife resources from spills.

### **Minimization of Fire Potential**

Fire potential will be minimized and managed in accordance with the fire safety plan described in AWE's application.

#### *6.1.3 Bird and Bat Enhancement Options*

As previously discussed, AWE is providing for the permanent conservation of 908 acres of undeveloped forest land immediately adjacent to the Project area and funding \$100,000 towards the acquisition of additional off-site conservation lands. These significant conservation benefits represent a contribution to preserving important wildlife habitat in the area, and will help sustain local wildlife populations. It also represents a direct benefit to local bird and bat species which rely on undeveloped forested areas for foraging, nesting and roosting. Further information with regard to

these conservation benefits is provided in Section 8.1 of this BBCS. Additionally, the Project will result in significant benefits relevant to air and water quality; these benefits are described in detail in Section 5.3.3.

## 7 POST-CONSTRUCTION EVALUATION AND MANAGEMENT

Post construction evaluation and management efforts for the proposed Project have been (and will continue to be, per this BBCS) designed in consultation with NHFGD and USFWS, and are in accordance with the USFWS Land-Based Wind Energy Guidelines (USFWS 2012). Specifically, these efforts address questions outlined in Tier 4 of the USFWS guidelines. Post construction evaluation and management will include formal bird and bat mortality studies, a supplemental acoustic bat study, and evaluation of a curtailment mitigative strategy to reduce injury and mortality for bats. The results of these Tier 4 studies (coupled with Tier 3 study information) will provide the basis for understanding actual Project impacts to birds and bats, and will provide a foundation for future stewardship. This information will also inform future decisions regarding Tier 5 consultation and studies, if ever warranted.

Post construction evaluation and management of risk to bird and bat species will begin with a post-construction "Evaluation Phase". The Evaluation Phase will coincide with the first three years of operations, beginning on the Project's Commercial Operations Date (COD). The COD is expected to occur by July 2017. Objectives during the Evaluation Phase will include:

- documenting baseline mortality rates and patterns for birds and bats;
- evaluating potential mitigation options including the effectiveness of turbine curtailment at low wind speeds to reduce mortality for the first year; and,
- assessing the cost of implementing such a curtailment program.

Management objectives to be assessed during the Evaluation Phase will be analyzed separately across the following management groups:

- long-distance migratory bats,
- other bat species,
- nocturnally migrating birds,
- breeding birds, including common nighthawks,



- bald and golden eagles, and
- diurnally migrating raptors.

For each management group, the overall management objective is to avoid, minimize and/or reduce mortality rates in a scientifically sound and commercially reasonable manner.

The Evaluation Phase will require rigorous post-construction field evaluations, including a post-construction mortality survey, a post-construction acoustic bat monitoring survey, and a curtailment evaluation study. These studies are described below in Section 7.1.

At the conclusion of the Evaluation Phase, AWE will work with consulting agencies (USFWS and NHFGD) to develop more specific management objectives for each identified species group, if warranted. Management determinations will take into account: baseline mortality rates in comparison to those documented at other wind projects; potential ecological impacts of baseline mortality rates, including cumulative impacts; and the degree to which management actions are feasible and effective in reducing mortality.

Management of risk to bird and bat species over the life of the Antrim Wind Energy Project will be guided by an adaptive management strategy. This strategy is described in detail in Section 9.

## **7.1 Evaluation Phase Field Studies**

Evaluation Phase field studies will include: a post-construction bird and bat mortality study; an acoustic bat monitoring study; and a curtailment evaluation study. Taken together, these studies will correlate bat activity with mortality rates at specific turbines and assess the effectiveness of reduced cut-in speeds (curtailment) at reducing bat mortality. These studies will also serve to establish baseline mortality rates for all bird and bat species at the Project and assist AWE, USFWS and NHFGD in establishing thresholds of mortality that will trigger the adaptive management process.

### 7.1.1 Post-Construction Bird and Bat Mortality Study

Throughout the Evaluation Phases, the Project will perform a three-year formal post-construction bird and bat mortality monitoring study. The post-construction bird and bat mortality monitoring effort will include:

- Standardized searches for birds and bats from April 15 through October 15 each year;
- Common nighthawk nesting surveys, performed concurrent with standardized searches;
- Searcher efficiency trials to estimate the percentage of carcasses found by searchers; and
- Carcass removal trials to estimate the length of time that carcasses remain in the field for possible detection.

A detailed study protocol will be developed in consultation with NHFGD and USFWS. It is expected that all 9 of the Project turbines will be searched (in order to provide control data for treated and untreated turbines per the curtailment evaluation study described below). It is also expected that each turbine pad will be surveyed approximately once every 5 days for the duration of the study period.

Of note: turbine pads will be treated with erosion control mulch and seeded with native seed mixes subsequent to construction. It is expected that resultant vegetative growth will be minimal at the time of mortality search efforts.

To augment formal standardized mortality searches, the Project will complete a full three years of eagle carcass searches. In time periods outside of the formal mortality survey window, these searches will be performed once per week, by adequately trained operations and maintenance staff.

The results of the initial formal study will help inform the need for any future adaptive management initiatives (including Tier 5 consultation and studies, if warranted). Following each of the first three years of operation, mortality (and injury) will be entered in an electronic database, summarized, and reported under the provisions of a Wildlife Mortality Monitoring Program (see Section 9). This annual report will assess the year's injury and mortality data, and will include a discussion, as appropriate, on other performance indicators relevant to this BBCS. If necessary, the report will also make recommendations for improvement. This BBCS summary report will be provided to the USFWS and NHFGD annually, by January 30 of the year following the monitoring.

### *7.1.2 Acoustic Bat Surveys*

During the Evaluation Phase, the Project will conduct post-construction acoustic bat surveys between May 1 and October 15. Acoustic survey data will be used to correlate bat activity levels measured at rotor height to corresponding bat mortality levels.

Acoustic detectors will be deployed on the nacelle of a select number of study turbines distributed throughout the Project area and will be programmed to record on a nightly basis from at least 30 minutes prior to sunset until 30 minutes after sunrise.

Data will be analyzed and summarized by detector, detector night, and for the spring, summer, and fall seasons, including categorization by species and guild where appropriate. Where appropriate, bat call sequences will be individually marked and categorized by species group or "guild" based on visual comparison to reference calls.

### *7.1.3 Curtailment Evaluation Study*

During pre-construction consultation, representatives from USFWS and NHFGD expressed concern over the potential for the Project to cause bat mortality, at a time when certain bat species are being affected by White Nose Syndrome (WNS: see Section 2.3). NHFGD suggested that turbine curtailment may be a viable means of

avoiding and minimizing bat mortality at the proposed Project. For this reason, AWE will assess the effectiveness of a curtailment strategy to reduce impacts to bats during the first year of the evaluation phase. This study effort will help AWE, NHFGD and USFWS better understand the effectiveness of curtailment at an operating wind project in the State of New Hampshire, where documented bat mortality at wind developments has been low.

For bats, the highest risk periods include nights with low wind speeds (less than 5.0 m/s), particularly during the fall migration and swarming period. The highest numbers of fatalities among bat species at wind facilities have occurred in late summer and early fall, coinciding with the migratory period, which occurs between mid-August and late September in the eastern U.S. (Kunz et al. 2007, Arnett et al. 2008, Taucher et al. 2012, Arnett and Baerwald 2013).

The results of mortality surveys at operational wind projects to date suggest that long-distance migratory bat species are more vulnerable to collision mortality than other bat species, with three species apparently at the greatest risk: the foliage-roosting hoary bat; eastern red bat; and the cavity-roosting silver-haired bat (Kunz et al. 2007, Arnett et al. 2008, Taucher et al. 2012, Arnett and Baerwald 2013). All three of these bat species have the potential to occur in the Project area.

This curtailment study will follow conditions set forth at other recently approved wind developments in the northeast, including the Bull Hill Wind Project, in Maine (Stantec Consulting Services Inc. 2014). During the first year of the Evaluation Phase, the Project will apply the following operational parameters to 5 of the project's 9 turbines:

- Higher Cut-In Speed: cut-in speed will be raised to 5.0 meters/second (m/s) at turbine hub height. The cut-in speed of 5.0 m/s was selected based on results from studies recently completed at the Casselman Wind Farm in Somerset County, Pennsylvania (Arnett et al. 2010) and studies described in Section 5.3.2. The remaining turbines will be allowed to operate at a normal cut-in speed (approximately 3.5 m/s) without

curtailment or operational modifications in place. These turbines will represent an experimental control;

- Timing: Operational control limitations will be applicable from July 15<sup>th</sup> through September 30<sup>th</sup> during nighttime hours (roughly ½ hour after sunset until sunrise, when bats are active). This period coincides with higher documented mortality events at other operational wind projects, as well as the formal mortality surveys during the Evaluation Phase.

The operational control measures will be implemented through the Project's supervisory control and data acquisition (SCADA) system. The SCADA system provides an effective means to manage and document turbine curtailment based on real-time wind data from the site.

The curtailment study will provide AWE, NHGFD, and USFWS the data necessary to determine whether a curtailment strategy has the potential to reduce significantly any future bat fatality at the Project in a commercially reasonable manner. Based on the results of the curtailment study, the Project will be able to:

- assess the potential biological benefits, in terms of expected reduction in mortality;
- Estimate the long term cost and financial viability of implementing curtailment as a long term mitigation strategy; and
- recommend an operational control program, if warranted, which balances the Project's financial viability with positive outcomes in avoiding and reducing bat fatality at the Project.

The results and recommendations of this study will be subject to the phased consultation process described under the adaptive management strategy (see Section 9). This process will determine if curtailment should be implemented as an operational mitigative measure. This study and adaptive management consultation will guide the ultimate operational curtailment plan, if deemed necessary.



## 8 OPERATIONAL MITIGATIVE ACTIONS

### 8.1 Conservation Benefits

As previously mentioned, AWE is providing for the permanent conservation of 908 acres of undeveloped forest land immediately adjacent to the Project area and funding \$100,000 towards the acquisition of additional off-site conservation lands. This represents a significant contribution to preserving important wildlife habitat in the vicinity of the Project.

The area of conservation involves six properties for which AWE, the Harris Center for Conservation Education (HCCE), or the Town of Antrim, and the respective landowners (collectively "the Parties") have entered into binding letters of intent to execute conservation easement agreements within 180 days of commercial operations. These agreements all state that "The Parties further recognize that, if the Project proceeds, the Agreement and Easement will make a valuable contribution to the conservation interests of stakeholders in this region." The properties for which conservation easement agreements have been obtained are depicted on a map provided in Attachment C.

Parts of some of the properties subject to conservation will contain portions of the Project development (Ott, Cotran, Antrim Limited Partnership, Paul Whittemore and the Whittemore Trust see Attachment C), while one (Micheli) does not have any development associated with the Project. Respectively, approximately 14.4, 10.2, 16, 0.9, and 3.3 acres (for a total of approximately 44.8 acres) of the Ott, Cotran, Antrim Limited Partnership, Paul Whittemore and Whittemore Trust properties will be directly impacted by Project development. As previously discussed, much of this initial impact area will be allowed to revegetate after Project construction is complete.

After project decommissioning, the vast majority of all six properties will be conserved in an undeveloped state in perpetuity.

The area designated for conservation is undeveloped and forested. In general, the area contains a variety of forest cover types that are typical of the lower hills, slopes, and headwater areas of the Monadnock region of southwestern New Hampshire. The cover types are in various stages of succession, ranging from recently cleared forest to intact mature stands of hardwood, softwood, and mixed forest. According to a natural community assessment performed during Project pre-construction assessments, none of the natural communities identified on the site are considered rare or unusual. These lands, however, have been identified as open space worthy of protection in both the Antrim Master Plan of 2010 and the Antrim Open Space Committee Open Space Plan adopted by the Town of Antrim in 2006. Both plans state that preservation of unfragmented forest areas in the western portion of Antrim, including the properties to be conserved, is one of the principal objectives of its residents. These lands also constitute typical habitat for many of New Hampshire's wildlife species, including birds and bats. The conservation proposal will also protect a significant area of land identified in the New Hampshire Wildlife Action Plan (NHFG 2005; NHFG 2010). Specifically, 313.11 acres of Highest Ranked Habitat in New Hampshire, 156.3 acres of Highest Ranked Habitat in Biological Region, and 438.59 acres of Supporting Landscape will be protected by the AWE conservation proposal.

The land conservation funding agreement between AWE and the New England Forestry Foundation ("NEFF") requires that AWE make a payment of \$100,000 to NEFF within 30 days of the Project's commercial operations date. NEFF will use the funds to acquire new permanent conservation lands in southern New Hampshire, whether by a fee purchase or the purchase of a perpetual easement. Any new conservation land acquisition with these funds shall be required to be in perpetuity and shall forever extinguish all development rights except for sustainable forestry operations.

This conservation area represents a direct benefit to local bird and bat species which rely on undeveloped forested areas for foraging, nesting and roosting, and will help to sustain local wildlife populations.



## **8.2 Environmental Benefits**

As described in detail in Section 5.3.3, the Project represents a new source of clean, renewable energy that will displace output from fossil fuel generation plants, which produce environmental pollutants that negatively affect regional air and water quality. This displacement will result in a significant reduction in toxic air emissions and preservation of water quality. There are specific environmental benefits to these improvements (see Section 5.3.3). Collectively, the expected reductions in the production of toxic air emissions support AWE's position that the proposed Project will provide net benefit (or a positive net impact) in terms of air quality. In turn, improved air quality will positively affect the physical environment and its fauna, including birds and bats.

Direct losses of individual birds and bats as a result of Project operations are expected to be low, and are not expected to impose population level impacts; however, bird and bat populations as a whole are expected to benefit from diminished toxic air emissions. For these reasons, AWE believes that net benefits to bird and bat populations as a result of Project operation are likely.

## **8.3 Additional Mitigative Actions for Bats**

Bat fatalities directly attributable to AWE are expected to be low, based on the results of pre-construction surveys and the precedents at other facilities in the state and in New England (Stantec 2014 unpublished). Despite this expectation, AWE is offering to assess and implement (if Evaluation Phase studies and consultation deem such measures feasible, practical and effective) an operational curtailment protocol as a means of reducing risk to bat species. AWE believes that the curtailment study is the best use of limited post-construction biological funds. Not only will it have more scientific and commercial value, but it will enable the Project to implement, if deemed necessary during the Evaluation Phase, timely operational mitigative measures which are known to reduce risk to bats, rather than simply to perform studies that will result in no-action (at best) or the same (at worst).

In light of recent population declines as a result of white-nose syndrome in bats, even low mortality of some species could possibly become biologically significant over the life of the Project. The operational mitigative strategy assessed within this BBCS, in the form of curtailment, may help to avoid and reduce impacts to bats most susceptible to the WNS such as the *Myotis* species. This strategy may also reduce risk to the resident and migratory bats which may use the Project area.

The implementation of a long-term (beyond the 1-year Curtailment Evaluation Phase) operational mitigative strategy in the form of turbine curtailment will be assessed following completion of the Curtailment Evaluation Phase. Questions about if and how long-term curtailment measures should be implemented at the Project will be made in consultation with USFWS and NHFGD via the adaptive management process described in Section 9.

#### *8.3.1 Curtailment Evaluation Phase*

At the conclusion of the curtailment study during the Evaluation Phase, AWE will collaborate with USFWS and NHFGD to review effectiveness of the management treatment and cost and feasibility of management treatment options. The ultimate goal of the BBCS is to avoid and minimize levels of mortality for each species group such that they meet a reasonable threshold. Given the lack of existing baseline mortality data from the Project and the lack of data on the effectiveness of various curtailment strategies in a variety of landscapes, meaningful and defensible mortality thresholds cannot be established for the Project until the results of evaluation phase studies are available. Ultimately, the determination of what is “reasonable” will depend on the baseline mortality rate at the Project, and how it compares to mortality rates at similar projects. This “reasonableness” test will have to take into account the cost of potential management options in terms of Project financial viability, and balance these considerations with positive outcomes in terms of reducing bat fatalities.

The Evaluation Phase of the BBCS is intended to provide AWE, USFWS and NHFGD with a sufficient quantity and quality of data to identify specific treatment options that meet management objectives while minimizing cost of implementation. This evaluation will also insure the consideration that management actions to be implemented will be effective throughout the life of the Project without precluding the Project's financial viability.

### *8.3.2 Curtailment Implementation Phase*

Should AWE, NHFGD and USFWS agree that an operational control measure is warranted based on the results of the Curtailment Evaluation Phase, the parties will determine the most appropriate curtailment parameter for implementation. Depending on patterns and species composition of bird and bat mortality documented during the Evaluation Phase, parameters of curtailment (such as cut-in wind speed, daily and nightly timing of curtailment, seasonal timing of curtailment, and numbers of turbines to curtail), may be adjusted to best manage potential risk to particular species or species groups while maintaining Project viability and maximizing the clean energy benefit realized by the Project. If any unforeseen, biologically significant events occur over the life of the Project, then manipulation of any curtailment strategy may be considered (among other potential solutions, as appropriate) during the phased consultation process. Again, any changes in the curtailment strategy must balance Project financial viability with positive outcomes for birds and/or bats, and must be agreed upon by all parties participating in the phased consultation process.

Throughout the implementation phase, AWE will record and retain turbine operation and weather data to document the amount of time that turbines are curtailed at various seasons. This information will provide a means of tracking the cost of the management actions implemented at the Project and will provide consistent data on the degree to which "high risk" conditions for each species group are being avoided.

Turbine curtailment and a significant conservation effort are the primary management actions provided under this BBCS. However, if implemented beyond the curtailment

implementation phase, AWE may propose to modify Project curtailment procedures should viable future technology, such as acoustic or visual deterrents or blade design innovations, be developed that will reasonably and cost effectively reduce impacts to birds and bats. Any such potential changes to Project operations will be proposed and/or initiated by AWE and will need to be vetted and agreed to by all parties participating in the phased consultation process. Any such proposed changes to operation and management strategy may be incorporated by AWE in the annual report under the Wildlife Mortality Monitoring Program (WMMP), and will initiate the phased consultation process.

In the event that bat mortality at the Project is found to be very low during the implementation period, and that operational controls are not making a significant contribution to lowering mortality, AWE reserves the right to propose alteration or suspension of the curtailment regime. Likewise, if conditions change over the life of the Project which cause operational controls to financially jeopardize continued operation, then AWE may propose financially viable alternatives to the current regime. Any such proposal would be subject to the phased consultation process.

#### **8.4 Additional Mitigative Actions for Birds**

AWE has worked cooperatively with the relevant agencies and implemented the most current available scientific knowledge, technology and survey methods into the development and definitive planning of the Project. Furthermore, AWE has committed to pursuing the most feasible risk avoidance and minimization techniques for bird species through: 1) the development and construction phase measures described in Section 6; 2) the post-construction studies and consultation described in Section 7; 3) the adaptive management strategy of this BBCS, which includes a Wildlife Mortality Monitoring Program, an Immediate Alert Procedure, and a phased consultation strategy (see Section 9); and 4) the permanent conservation of 908 acres of forested that provide valuable habitat for bird species as well as other wildlife. Specific avoidance and minimization measures that will be incorporated into Project plans that apply directly to eagles include: 1) minimizing practices that attract and

enhance prey species habitat in the project area; 2) requiring low speed limits for vehicles utilizing project roads (< 25 mph) in order to reduce vehicle collision risk to wildlife; and 3) removing carcasses (deer, moose, etc.) from the project.

## 9 ADAPTIVE MANAGEMENT STRATEGY

Studies and evaluations relevant to the Antrim Wind Energy Project to date have not indicated a need for Tier 5 study per the USFWS guidelines. However, given the dynamic nature of the environment and technology, unforeseen future circumstances could arise which may require further consideration. This adaptive management plan provides a framework for revisiting tiers of evaluation, or proceeding with Tier 5 consultation and study, if warranted.

The state of knowledge regarding bird and bat interactions at wind farms on the forested ridges of the northeast is still evolving. Likewise, the technology available to mitigate risks to birds and bats at wind farms is continuously developing as the science matures. Furthermore, the population status of a given species is dynamic, as exemplified by the population impacts to bats incurred by white-nose disease and the increase in bald eagle populations in the northeast in recent years. As such, the biological significance of individual losses can change over time.

In order to continuously address changing circumstances in the area of bird and bat interaction at wind farms, and potentially changing circumstances at the proposed Project, AWE will implement an adaptive management strategy for managing risk to birds and bats over the life of the Project. Adaptive management allows decisions and actions to be tailored to specific problems and circumstances (e.g., a specific species, location, weather pattern, wind speed, or season) at the specific point in time at which they occur.

The adaptive management process needs to take into account impacts to Project operations. Any additional controls will need to be supported not only by science, but by economic considerations that ultimately determine the Project's viability. Project adaptation should not only be geared toward additional controls, but also should take into account positive outcomes such as the documentation of minimal impacts to wildlife.

Adaptive management will be guided by: formal post construction study results documented during the year-one Curtailment Evaluation Phase and the longer three year formal mortality monitoring evaluation phase; a continuous Wildlife Mortality Monitoring Program (WMMP), equipped with an Immediate Alert Procedure (IAP) for reporting of unusual mortality events; and a phased consultation strategy. The WMMP, the IAP and the phased consultation strategy are described in detail in the following subsections.

## **9.1 Wildlife Mortality Monitoring Program**

After formal monitoring is complete, AWE will implement a Wildlife Mortality Monitoring Program (WMMP) for all project site personnel. This program will provide for the proper identification, handling and reporting of dead or injured birds and bats that are found during Project operation. The WMMP will be described in a stand-alone document that will be developed during the Evaluation Phase. The WMMP document will describe, in detail, the actions to be taken upon discovery of any dead or injured bird or bat at the Project. The WMMP will also incorporate the Immediate Alert Procedure described in this BBCS (see Section 9.2, below).

The WMMP will also include: provisions for cataloging and reporting annual findings; a list of key contacts; a training initiative for wind farm personnel; detailed handling and documentation forms and procedures; and provisions for permit compliance. The WMMP will be an evolving document, subject to updates as necessary.

### **9.1.1 Training**

Under the WMMP, all appropriate personnel (including managers, supervisors, inspection and maintenance crews, etc.) will be trained in the identification, handling and reporting of dead or injured bird and bat species. This training will encompass the reasons, need, and method by which employees should report an injury or mortality,

dispose of carcasses, and comply with applicable regulations, including the consequences of non-compliance.

All appropriate new-hires will be trained to execute the WMMP prior to working on-site. Appropriate staff will be subject to annual refresher training. Supplemental training also may be appropriate where there are material changes in regulations, permit conditions, or internal policies. Any updates to the WMMP will be distributed and discussed during annual training.

### *9.1.2 Key Resources*

AWE will maintain a list of key resources to address bird and bat injury or mortality issues. This list will include a list of experts who may be called upon to aid in resolving various issues. Listed parties may include: Internal contacts, bird and bat study consultants, state and federal agency contacts, and local wildlife rehab facilities. The key resources list will be updated annually and presented during annual training.

### *9.1.3 Reporting*

All injuries and mortalities discovered at the Project will be documented in an electronic database developed to serve the needs of the WMMP. Each year, these data will be compiled into an annual summary report. This annual report will assess the year's injury and mortality data, and will include a discussion, as appropriate, on other performance indicators relevant to this BBCS. If necessary, the report will also make recommendations for improvement. This BBCS summary report will be provided annually, by January 30, to the USFWS and NHFGD.

The WMMP will also include an Immediate Alert Program (IAP) which will inform regulating agencies of significant mortality events within 24 hours of discovery. Reports made under the IAP will trigger a phased process of consultation under the adaptive management process. The IAP and the phased consultation strategy it activates are described in detail, below.



#### 9.1.4 Quality Control

Annual reporting under the WMMP will provide a mechanism for AWE and the agencies to review existing practices and ensure quality control.

#### 9.1.5 Permit Compliance

Any Project staff that may be handling birds or bird carcasses will have appropriate federal and/or state wildlife handling permits. AWE will assure that wildlife rehabilitation centers and consulting staff also have appropriate permits if they will be responsible for transporting dead or injured birds protected by the MBTA and/or the BGEPA.

AWE operating personnel or designated contractors will be responsible for making sure that the Project maintains copies of all applicable permits and permit conditions. AWE operating personnel or designated contractors will also be responsible for maintaining all copies of annual permit reports to the USFWS and to any state agencies where required.

Copies of any necessary permits will be contained in the WMMP document, and will be kept current during annual updates.

## 9.2 **Immediate Alert Procedure**

An Immediate Alert Procedure (IAP), as defined and summarized in this BBCS, will be fully developed in consultation with USFWS and NHDFG, and will be incorporated as part of the WMMP. The IAP provides a mechanism for the reporting, assessment and resolution of biologically significant incidents.

For the purpose of this BBCS, biologically significant incidents are defined as those that involve the individual injury or death of a listed species or an eagle, or the large scale injury or death of any bird or bat species or groups. In the event that a bird or bat species that is federally or state listed as “threatened” or “endangered” is discovered, injured or dead, the IAP will be triggered. If a single bald or golden eagle is discovered, the IAP will be triggered. Likewise, in the event that a large-scale mortality event is discovered, the IAP will be triggered.

Listed species will be defined in the WMMP, and changes to that list will be incorporated in annual updates to the WMMP. Likewise, the definition of what constitutes a large-scale event will be developed in consultation with agencies and incorporated in the WMMP; this definition is also subject to re-assessment over time and may be adjusted, as appropriate over the life of the WMMP.

In general, as described within the USFWS Land-Based Wind Energy Guidelines (USFWS 2012), baseline risk assessments, definitions of biologically significant or large-scale events, and mitigation thresholds relevant to the Antrim Wind Energy Project will be regionally relative, and generally qualitative. These assessments and thresholds will be developed in consultation with USFWS and NHFGD and will be based on: site specific data collected during pre- and post-construction surveys at the Project; regional information regarding bird populations; and known comparative mortality rates at other wind projects in the region.

The IAP, when triggered, will require notification of a biologically significant event to NHFGD and USFWS within 48 hours of discovery. AWE will immediately implement a “root cause analysis” to determine the likely cause of the event. This analysis will be presented during a consultation with NHFGD and USFWS which will occur within a fourteen-day period following the reported incident.

This meeting will constitute Phase 1 of a phased consultation strategy (described in detail, below). At this meeting, the participants will determine an appropriate course of action to address the specific event at hand. Decisions may range from no-action

to a course of further evaluation and potential mitigation. During consultation as a result of the IAP, AWE and consulting agencies will consider the most current, relevant knowledge, information and technology to determine an appropriate response.

### **9.3 Phased Consultation Process**

Generally, the phased consultation process will be initiated by an alert from AWE as prescribed by the IAP. Under unforeseen circumstances, however, the phased consultation process may be initiated based on the results of annual reporting under the provisions of the WMMP. The phased consultation process is also the mechanism by which evaluation phase studies and recommendations will be assessed. This process must seek solutions which balance Project financial viability and ability to operate with positive outcomes for bird and bat species.

#### *9.3.1 Phase 1 Consultation: Action/No Action Determination*

During Phase 1 consultation, AWE, USFWS and NHFGD will meet to determine whether the reported event (or other matter of concern) is isolated, and if further action is feasible or required. If it is agreed that no further action is required, the consultation shall be closed. If further action is required, Phase 2 consultation shall proceed. The consultation shall proceed to Phase 2 or be closed within 60 days of the initial IAP event.

#### *9.3.2 Phase 2 Consultation: Resolution/Research Initiative Determination*

Phase 2 consultation will occur, as needed, at the initial consultation meeting. If appropriate action measures are readily defined and agreed upon by all parties at this meeting, then the agreed-upon strategy will be implemented and consultation will be closed.

If it is determined that further research is needed to address the matter at hand, then Phase 3 Consultation shall proceed within 45 days of initiating Phase 2.

9.3.3 Phase 3 Consultation: Desktop Research and Recommendations

Phase 3 consultation will consist of a desktop analysis of action alternatives. This analysis will determine potential action alternatives based on the most current scientific knowledge and available technology relevant to the subject at hand. This assessment will also take into account the financial viability of the Project and the financial and/or operational impact of any measures considered.

This effort will result in the production of a formal report to be submitted to the agencies by a date determined during Phase 2 consultation. The Phase 3 report will include descriptions of the action alternatives considered, and will present final action recommendations.

The results of Phase 3 consultation will dictate the course of research or mitigative actions, if any. If Phase 3 consultation results in a no-action decision, then consultation shall be closed. If Phase 3 consultation identifies and agrees upon mitigative measures to be taken, then those measures shall be implemented and consultation shall be closed.

If Phase 3 consultation agrees upon a strategy, but determines that a final plan of execution must be developed based on desktop research, then such a plan will be produced and assessed at the Phase 3 level.

If Phase 3 consultation determines that field research is necessary, then Phase 4 consultation shall proceed.

#### *9.3.4 Phase 4 Consultation: Field Assessments*

A final plan for research, as applicable, will be developed, approved and executed during Phase 4. The results of any field studies conducted during Phase 4 shall be submitted and treated as in Phase 3 consultation.

As in Phase 3, if consultation results in a no-action decision, then consultation shall be closed. If mitigative measures are identified and agreed upon by all parties, then those measures shall be implemented and consultation shall be closed.

If consultation agrees upon a strategy, but determines that a final plan of execution must be developed based on desktop research, then such a plan will be produced and assessed at the Phase 3 level. If it is determined that more field research is necessary, then Phase 4 consultation shall continue.

#### *9.3.5 Closure of Consultation*

Consultation shall continue until resolution is reached among all parties. Upon resolution, AWE will prepare a formal letter and submit it to the agencies. This letter will summarize the history of consultation regarding the specific matter at hand, explain the resolution, and declare that formal consultation has been closed. The agencies shall respond in a formal letter which indicates their acceptance of resolution and closure. The failure of agencies to provide such a letter within 60 days of AWE's letter of closure shall be construed as an acceptance of resolution and closure.

#### *9.3.6 Dispute Resolution*

If an occasion should arise where consulting parties do not agree on resolution and closure, a qualified mediator will be selected to assist in resolution. The parties shall select a mediator agreed upon by all parties. Mediation shall occur in Concord or Portsmouth, New Hampshire. If the parties cannot agree on the selection of a mediator, then each party shall select its own consultant and the consultants shall then select a mediator to assist in the resolution of the dispute. The decision of the

consultants on the mediator shall be final. Upon selection of an agreed upon mediator, mediation shall be completed within 120 days. If a resolution acceptable to all parties cannot be achieved within the 120 days period, the Site Evaluation Committee shall then arbitrate the dispute in accordance with its rules and applicable New Hampshire Statutes.

## 10 PERMIT COMPLIANCE

Permit compliance will occur in several stages of project development and operation. In general, any project staff that may be handling birds or bird carcasses will have appropriate federal and/or state wildlife handling permits. AWE will assure that wildlife rehabilitation centers and consulting staff also have the appropriate permits or permission to handle or transport dead or injured birds protected by the MBTA and/or the BGEPA.

Handling, possession, and/or scientific collection permits will likely be needed for the post-construction mortality study. All necessary permits will be obtained and maintained by the contractor performing the study.

AWE operating personnel or designated contractors will be responsible for ensuring that the Project maintains copies (electronic and hard copy) of applicable permits and permit conditions. AWE operating personnel or designated contractors will also be responsible for maintaining all copies of annual permit reports to the USFWS and to any state agencies where required.

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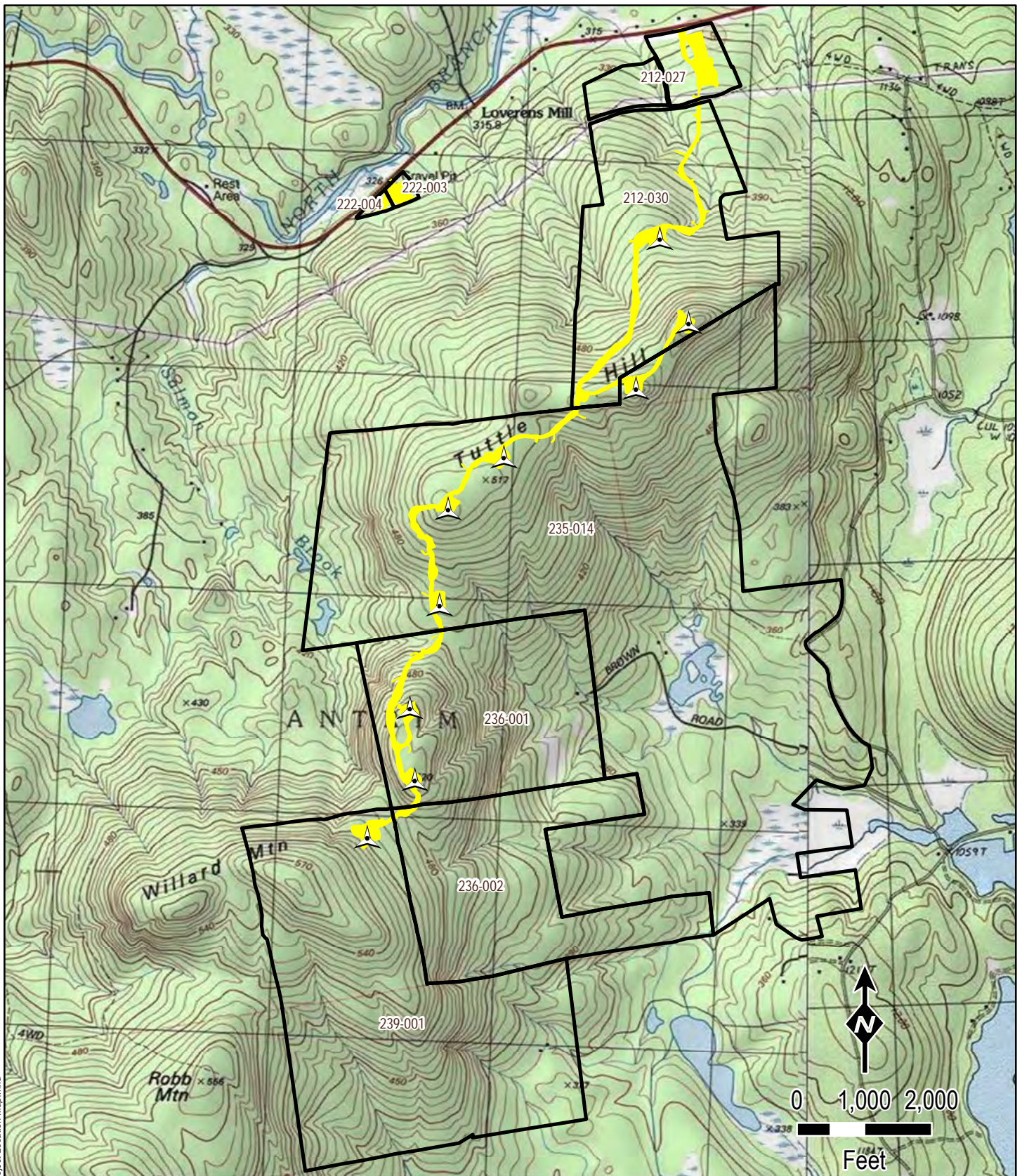
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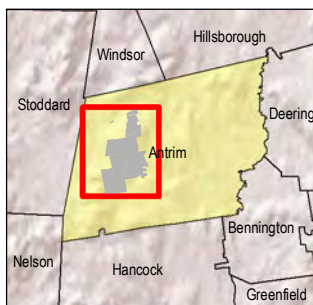
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## **Attachment A**




### **Site Map**



V:\PROJECTS\AUGUSTA\ANTRIM\Figure C-1 Project Location Map.mxd




**Legend**

-  Proposed WTG
-  Project Footprint
-  Project Parcels

**Antrim Wind Energy**

**ANTRIM WIND ENERGY PROJECT**  
 354 KEENE ROAD, ANTRIM, NH  
**Attachment A**  
 Project Location Map

Produced by: 

1/29/2015

## **Attachment B**

### **Nocturnal Migrant Passage Rates**



**Appendix A Table 5. Summary of available avian spring radar survey results conducted at proposed (pre-construction) US wind power facilities in eastern US, using X-band mobile radar systems (2004-present)**

Year	Project Site	Number of Survey Nights	Number of Survey Hours	Landscape	Average Passage Rate (t/km/hr)	Range in Nightly Passage Rates	Average Flight Direction	Average Flight Height (m)	(Turbine Ht) % Targets Below Turbine Height	Reference
<b>Spring 2005</b>										
2005	Sheffield, Caledonia Cty, VT	20	180	Forested ridge	166	12-440	40	552	(125 m) 6%	Woodlot Alternatives, Inc. 2006. Avian and Bat Information Summary and Risk Assessment for the Proposed Sheffield Wind Power Project in Sheffield, Vermont. Prepared for UPC Wind Management, LLC.
2005	Stamford, Delaware Cty, NY	35	301	Forested ridge	210	10-785	46	431	(110 m) 8%	Woodlot Alternatives, Inc. 2007. A Spring and Fall 2005 Radar and Acoustic Survey of Bird Migration at the Proposed Moresville Energy Center in Stamford and Roxbury, New York. Prepared for Invenery, LLC. Rockville, MD.
2005	Deerfield, Bennington Cty, VT	20	183	Forested ridge	404	74-973	69	523	(100 m) 4%	Woodlot Alternatives, Inc. 2005. Spring 2005 Bird and Bat Migration Surveys at the Proposed Deerfield Wind Project in Searsburg and Readsboro, Vermont. Prepared for PPM Energy, Inc.
2005	Franklin, Pendleton Cty, NY	21	204	Forested ridge	457	34-1240	53	492	(125 m) 11%	Woodlot Alternatives, Inc. 2005. A Spring 2005 Radar and Acoustic Survey of Bird and Bat Migration at the Proposed Liberty Gap Wind Project in Franklin, West Virginia. Prepared for US Wind Force, LLC.
2005	Dans Mountain, Allegany Cty, MD	23	189	Forested ridge	493	63-1388	38	541	(125 m) 15%	Woodlot Alternatives, Inc. 2005. A Spring 2005 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Dan's Mountain Wind Project in Frostburg, Maryland. Prepared for US Wind Force.
<b>Spring 2006</b>										
2006	Kibby, Franklin Cty, ME (Range 1)	10	80	Forested ridge	197	6-471	50	412	(120 m) 22%	Woodlot Alternatives, Inc. 2006. A Spring 2006 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
2006	Deerfield, Bennington Cty, VT	26	236	Forested ridge	263	5-934	58	435	(100 m) 11%	Woodlot Alternatives, Inc. 2006. Spring 2006 Bird and Bat Migration Surveys at the Proposed Deerfield Wind Project in Searsburg and Readsboro, Vermont. Prepared for PPM Energy, Inc.
2006	Mars Hill, Aroostook Cty, ME	15	85	Forested ridge	338	76-674	58	384	(120 m) 14%	Woodlot Alternatives, Inc. 2006. A Spring 2006 Radar, Visual, and Acoustic Survey of Bird Migration at the Mars Hill Wind Farm in Mars Hill, Maine. Prepared for Evergreen Windpower, LLC.
2006	Kibby, Franklin Cty, ME (Valley)	2	14	Forested ridge	443	45-1242	61	334	(120 m) n/a	Woodlot Alternatives, Inc. 2006. A Spring 2006 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
2006	Kibby, Franklin Cty, ME (Mountain)	6	33	Forested ridge	456	88-1500	67	368	(120 m) 14%	Woodlot Alternatives, Inc. 2006. A Spring 2006 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
2006	Kibby, Franklin Cty, ME (Range 2)	7	57	Forested ridge	512	18-757	86	378	(120 m) 25%	Woodlot Alternatives, Inc. 2006. A Spring 2006 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
<b>Spring 2007</b>										
2007	Stetson, Washington Cty, ME	21	138	Forested ridge	147	3-434	55	210	(120 m) 22%	Woodlot Alternatives, Inc. 2007. A Spring 2007 Survey of Bird and Bat Migration at the Stetson Wind Project, Washington County, Maine. Prepared for Evergreen Wind V, LLC.
2007	Laurel Mountain, Barbour Cty, WV	20	197	Forested ridge	277	13-646	27	533	(130 m) 3%	Stantec Consulting Services Inc. 2007. A Spring 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Laurel Mountain Wind Energy Project near Elkins, West Virginia. Prepared for AES Laurel Mountain, LLC.
2007	Errol, Coos County, NH	30	212	Forested ridge	342	2 to 870	76	332	(125 m) 14%	Stantec Consulting Inc. 2007. Spring 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Windpark in Coos County, New Hampshire by Granite Reliable Power, LLC. Prepared for Granite Reliable Power, LLC.
2007	Roxbury, Oxford Cty, ME	20	n/a	Forested ridge	539	137-1256	52	312	(130 m) 18%	Woodlot Alternatives, Inc. 2007. A Spring 2007 Survey of Bird and Bat Migration at the Record Hill Wind Project, Roxbury, Maine. Prepared for Roxbury Hill Wind LLC.
2007	Lempster, Sullivan Cty, NH	30	277	Forested ridge	542	49-1094	49	358	(125 m) 18%	Woodlot Alternatives, Inc. 2007. A Spring 2007 Survey of Nocturnal Bird Migration, Breeding Birds, and Bicknell's Thrush at the Proposed Lempster Mountain Wind Power Project Lempster, New Hampshire. Prepared for Lempster Wind, LLC.
<b>Spring 2008</b>										
2008	Allegany, Cattaugus Cty, NY	30	275	Forested ridge	268	53-755	18	316	(150 m) 19%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
2008	Oakfield, Penobscot Cty, ME	20	194	Forested ridge	498	132-899	33	276	(120 m) 21%	Stantec Consulting Services Inc. 2008. A Spring 2008 Survey of Bird and Bat Migration at the Oakfield Wind Project, Washington County, Maine. Prepared for Evergreen Wind, LLC.
2008	New Creek, Grant Cty, WV	20	n/a	Forested ridge	1020	289-2610	30	354	(130 m) 13%	Stantec Consulting Services Inc. 2008. A Spring 2008 Survey of Bird Migration at the New Creek Wind Project, West Virginia. Prepared for AES New Creek, LLC.
2008	Tenney, Grafton Cty, NH	40	373	Forested ridge	234	35-549	77	321	(125 m) 12%	Stantec Consulting Services Inc. 2008. Spring 2008 Radar Survey Report for the Groton Wind Project. Prepared for Groton Wind, LLC.
2008	Rollins, Penobscot Cty, ME	20	189	Forested ridge	247	40 - 766	75	316	(120 m) 13%	Stantec Consulting. 2008. Spring 2008 Bird and Bat Migration Survey Report: Visual, Radar and Acoustic Bat Surveys for the Rollins Wind Project. Prepared for First Wind, LLC.
<b>Spring 2009</b>										
2009	Sisk (Kibby Expansion), Franklin Cty, ME	21	193	Forested ridge	207	50-452	28	293	(125 m) 18%	Stantec Consulting Services Inc. 2009. Spring 2009 Nocturnal Migration Survey Report for the Kibby Expansion Wind Project. Prepared for TRC Engineers LLC.
2009	Vermont Community Wind Farm, Orleans Cty, VT	15	90	Forested ridge	435	49-771	48	320	(130 m) 22%	Stantec Consulting Services Inc. 2009. Spring and Summer 2009 Bird and Bat Survey Report. Prepared for Vermont Community Wind Farm, LLC.
2009	Moresville, Delaware Cty, NY	30	275	Forested ridge	230	30-575	53	314	(125 m) 12%	Stantec Consulting Services Inc. 2009. 2009 Spring Nocturnal Radar Survey Report for the Moresville Energy Center. Prepared for Moresville Energy LLC.
2009	Highland, Somerset Cty, ME (location 1)	21	192	Forested ridge	496	10-1262	47	287	(130.5m) 26%	Stantec Consulting Services Inc. 2009. Spring 2009 Ecological Surveys for the Highland Wind Project. Prepared for Highland Wind LLC
2009	Highland, Somerset Cty, ME (location 2)	19	161	Forested ridge	511	8-1735	53	314	(130.5m) 23%	Stantec Consulting Services Inc. 2009. Spring 2009 Ecological Surveys for the Highland Wind Project. Prepared for Highland Wind LLC
<b>Spring 2010</b>										
2010	Bowers, Carroll Plantation, ME	20	188	Forested ridge	289	20-589	56	243	(131 m) 26%	Stantec Consulting Services Inc. 2010. Draft 2010 Spring Avian and Spring/Summer Bat Surveys for the Bowers Wind Project. Prepared for Champlain Wind Energy LLC.
2010	Bull Hill, T16 MD, ME	20	184	Forested ridge	387	43-879	48	217	(145 m) 38%	Stantec Consulting Services Inc. 2010. Spring 2010 Avian and Bat Survey Report for the Bull Hill Wind Project. Prepared for Blue Sky East Wind LLC.
<b>Spring 2011</b>										
2011	Antrim, Antrim, NH	30	284	Forested ridge	223	6-1215	44	305	(150 m) 30%	Stantec Consulting Services Inc. 2011. Spring 2011 Radar and Acoustic Survey Report for the Antrim Wind Energy Project. Prepared for Eolian Renewable Energy.

Note:  
<sup>1</sup> The percent targets below turbine height can be found in the addendum to the report "Effect of Top Notch (now Hardscrabble) Wind Project revision to turbine layout and model changes on the spring and fall 2005 nocturnal radar survey reports." Prepared August 26, 2009, by Stantec Consulting Services Inc.

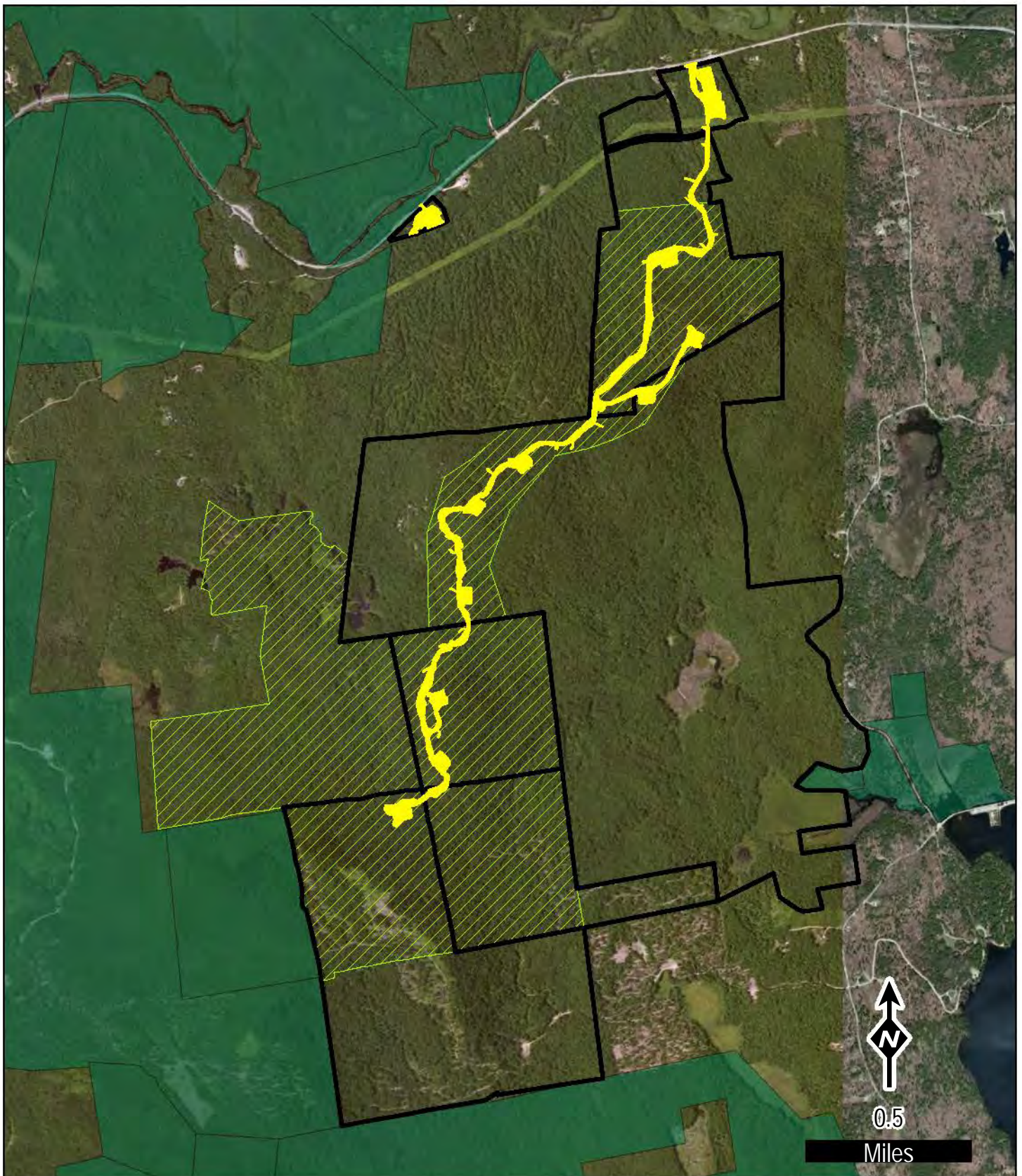
Appendix A Table 5. Summary of available avian fall radar survey results conducted at proposed (pre-construction) US wind power facilities on forested ridges in the eastern US, using X-band mobile radar systems (2004-present)

Project Site	Number of Survey Nights	Number of Survey Hours	Landscape	Average Passage Rate (t/km/hr)	Range in Nightly Passage Rates	Average Flight Direction	Average Flight Height (m)	(Turbine Ht) % Targets Below Turbine Height	Reference
<b>Fall 2004</b>									
Sheffield, Caledonia Cty, VT	18	176	Forested ridge	91	19-320	200	566	(125 m) 1%	Woodlot Alternatives, Inc. 2006. Avian and Bat Information Summary and Risk Assessment for the Proposed Sheffield Wind Power Project in Sheffield, Vermont. Prepared for UPC Wind Management, LLC.
Casselman, Somerset Cty, PA	30	n/a	Forested ridge	174	n/a	n/a	436	(125 m) 7%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
Dans Mountain, Allegany Cty, MD	34	318	Forested ridge	188	2-633	193	542	(125 m) 11%	Woodlot Alternatives, Inc. 2004. A Fall 2004 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Dan's Mountain Wind Project in Frostburg, Maryland. Prepared for US Wind Force.
Franklin, Pendleton Cty, WV	34	349	Forested ridge	229	7-926	175	583	(125 m) 8%	Woodlot Alternatives, Inc. 2005. A Fall 2005 Radar and Acoustic Survey of Bird and Bat Migration at the Proposed Liberty Gap Wind Project in Franklin, West Virginia. Prepared for US Wind Force, LLC.
<b>Fall 2005</b>									
Swallow Farm, PA	58	n/a	Forested ridge	166	n/a	n/a	402	(125 m) 5%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
Kibby, Franklin Cty, ME (Range 1)	12	101	Forested ridge	201	12-783	196	352	(125 m) 12%	Woodlot Alternatives, Inc. 2006. A Fall 2005 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
Fayette Cty, PA	26	n/a	Forested ridge	297	n/a	n/a	426	(125 m) 5%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
Stamford, Delaware Cty, NY	48	418	Forested ridge	315	22-784	251	494	(110 m) 3%	Woodlot Alternatives, Inc. 2007. A Spring and Fall 2005 Radar and Acoustic Survey of Bird Migration at the Proposed Moresville Energy Center in Stamford and Roxbury, New York. Prepared for Invenery, LLC. Rockville, MD.
Preston Cty, WV	26	n/a	Forested ridge	379	n/a	n/a	420	(125 m) 10%	Plissner, J.H., T.J. Mabee, and B.A. Cooper. 2006 A radar and visual study of nocturnal bird and bat migration at the proposed Preston Wind Development project, Virginia, Fall 2005. Report to Highland New Wind Development, LLC.
Highland, VA	58	n/a	Forested ridge	385	n/a	n/a	442	(125 m) 12%	Plissner, J.H., T.J. Mabee, and B.A. Cooper. 2006 A radar and visual study of nocturnal bird and bat migration at the proposed Highland New Wind Development project, Virginia, Fall 2005. Report to Highland New Wind Development, LLC.
Kibby, Franklin Cty, ME (Valley)	5	13	Forested ridge	452	52-995	193	391	(125 m) 16%	Woodlot Alternatives, Inc. 2006. A Fall 2005 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
Mars Hill, Aroostook Cty, ME	18	117	Forested ridge	512	60-1092	228	424	(120 m) 8%	Woodlot Alternatives, Inc. 2006. A Fall 2005 Radar, Visual, and Acoustic Survey of Bird Migration at the Mars Hill Wind Farm in Mars Hill, Maine. Prepared for Evergreen Windpower, LLC.
Deerfield, Bennington Cty, VT	32	324	Forested ridge	559	3-1736	221	395	(100 m) 13%	Woodlot Alternatives, Inc. 2006. Fall 2005 Bird and Bat Migration Surveys at the Proposed Deerfield Wind Project in Searsburg and Readsboro, Vermont. Prepared for PPM Energy, Inc.
Kibby, Franklin Cty, ME (Mountain)	12	115	Forested ridge	565	109-1107	167	370	(125 m) 16%	Woodlot Alternatives, Inc. 2006. A Fall 2005 Survey of Bird and Bat Migration at the Proposed Kibby Wind Power Project in Kibby and Skinner Townships, Maine. Prepared for TransCanada Maine.
<b>Fall 2006</b>									
Somerset Cty, PA	29	n/a	Forested ridge	316	n/a	n/a	374	(125 m) 8%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
Bedford Cty, PA	29	n/a	Forested ridge	438	n/a	n/a	379	(125 m) 10%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
Stetson, Washington Cty, ME	12	77	Forested ridge	476	131-1192	227	378	(125 m) 13%	Woodlot Alternatives, Inc. 2007. A Fall 2006 Survey of Bird and Bat Migration at the Stetson Wind Project, Washington County, Maine. Prepared for Evergreen Wind V, LLC.
Lempster, Sullivan Cty, NH	32	290	Forested ridge	620	133-1609	206	387	(125 m) 8%	Woodlot Alternatives, Inc. 2007. A Fall 2007 Survey of Nocturnal Bird Migration, Breeding Birds, and Bicknell's Thrush at the Proposed Lempster Mountain Wind Power Project Lempster, New Hampshire. Prepared for Lempster Wind, LLC.
<b>Fall 2007</b>									
Laurel Mountain, Barbour Cty, WV	20	212	Forested ridge	321	76-513	209	533	(130 m) 6%	Stantec Consulting Services Inc. 2007. A Fall 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Laurel Mountain Wind Energy Project near Elkins, West Virginia. Prepared for AES Laurel Mountain, LLC.
Errol, Coos County, NH	29	232	Forested ridge	366	54 to 1234	223	343	(125 m) 15%	Stantec Consulting Inc. 2007. Fall 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Windpark in Coos County, New Hampshire by Granite Reliable Power, LLC. Prepared for Granite Reliable Power, LLC.
Rollins, Lincoln, Penobscot Cty, ME	22	231	Forested ridge	368	82-953	284	343	(120 m) 13%	Woodlot Alternatives, Inc. 2008. A Fall 2007 Survey of Bird and Bat Migration at the Rollins Wind Project, Washington County, Maine. Prepared for Evergreen Wind, LLC.
Roxbury, Oxford Cty, ME	20	220	Forested ridge	420	88-1006	227	365	(130 m) 14%	Woodlot Alternatives, Inc. 2007. A Fall 2007 Survey of Bird and Bat Migration at the Record Hill Wind Project, Roxbury, Maine. Prepared for Roxbury Hill Wind LLC.
Allegany, Cattaraugus Cty, NY	46	n/a	Forested ridge	451	n/a	230	382	(150 m) 14%	New York Department of Conservation [Internet]. c2008. Publicly Available Radar Results for Proposed Wind Sites in New York. Albany, NY: NYDEC; [updated May 2008; cited June 2009]. Available at <a href="http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf">http://www.dec.ny.gov/docs/wildlife_pdf/radarwindsum.pdf</a>
New Creek, Grant Cty, WV	20	n/a	Forested ridge	811	263-1683	231	360	(130 m) 17%	Stantec Consulting Services Inc. 2008. A Fall 2007 Survey of Bird and Bat Migration at the New Creek Wind Project, West Virginia. Prepared for AES New Creek, LLC.
<b>Fall 2008</b>									
Georgia Mountain, VT	21	n/a	Forested ridge	326	56-700	230	371	(120 m) 7%	Stantec Consulting Services Inc. 2008. A Fall 2008 Survey of Bird Migration at the Georgia Mountain Wind Project, Vermont. Prepared for Georgia Mountain Community Wind.
Oakfield, Penobscot Cty, ME	20	n/a	Forested ridge	501	116-945	200	309	(125 m) 18%	Woodlot Alternatives, Inc. 2008. A Fall 2008 Survey of Bird and Bat Migration at the Oakfield Wind Project, Washington County, Maine. Prepared for Evergreen Wind, LLC.
Tenney, Grafton Cty, NH	45	509	Forested ridge	470	94-1174	260	342	(125m) 13%	Stantec Consulting Services Inc. 2008. Fall 2008 Radar Survey Report for the Groton Wind Project. Prepared for Groton Wind, LLC.
Highland, Somerset Cty, ME	20	216	Forested ridge	549	68-1201	227	348	(130.5m) 17%	Stantec Consulting. 2009. Fall 2008 Bird and Bat Migration Survey Report: Radar and Acoustic Avian and Bat Surveys for the Highland Wind Project Highland Plantation, Maine. Prepared for Highland Wind LLC
<b>Fall 2009</b>									
Sisk (Kibby Expansion) Franklin Cty, ME	20	210	Forested ridge	458	44-1067	206	287	(125m) 23%	Stantec Consulting Services. 2009. Fall 2009 Nocturnal Migration Survey Report. Prepared for TRC Engineers LLC.
Vermont Community Wind Farm, Orleans Cty, VT	20	227	Forested ridge	443	110-1029	215	330	(130m) 15%	Stantec Consulting Services. 2009. Fall 2009 Bird and Bat Survey Report. Nocturnal Radar, Acoustic, and Diurnal Raptor Surveys performed for the Vermont Community Wind Farm Project in Rutland County, Vermont. Prepared for Vermont Community Wind Farm, LLC.
Stetson, Washington Cty, ME	18	201	Forested ridge	457	106-1746	227	420	(119m) 2%	Stantec Consulting Services. 2010. Stetson I Mountain Wind Project Year 1 Post-Construction Monitoring Report, 2009. Prepared for First Wind Management, LLC.
Bull Hill, Hancock Cty, ME	20	232	Forested ridge	614	188-1500	260	357	(145m) 20%	Stantec Consulting Services. 2010. Summer and Fall 2009 Avian and Bat Survey Report for the Bull Hill Project. Prepared for Blue Sky East Wind, LLC.
Bowers, Washington Cty, ME	22	249	Forested ridge	344	95-844	231	453	(119m) 14%	Stantec Consulting Services Inc. 2010. 2010 Spring Avian and Spring/Summer Bat Surveys for the Bowers Wind Project. Prepared for Champlain Wind Energy, LLC.
<b>Fall 2010</b>									
Bingham, Somerset Cty, ME	20	232	Forested ridge	803	194-2463	234	377	(150m) 20%	Stantec Consulting Services Inc. 2010. 2010 Spring Avian and Spring/Summer Bat Surveys for the Bowers Wind Project. Prepared for Champlain Wind Energy, LLC.
<b>Fall 2011</b>									
Antrim, Hillsborough Cty, NH	30	327	Forested ridge	138	4-538	217	203	(150m) 40%	<i>this report</i>

## **Attachment C**

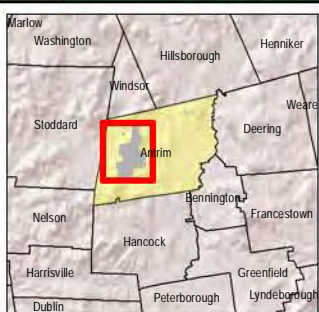
### **Conservation Easements**

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Miles




### Legend

-  Project Parcels
-  Proposed Project Area
-  Proposed Conservation Easements
-  Existing Conserved Lands



**ANTRIM WIND ENERGY PROJECT**  
*ANTRIM, NH*  
**Attachment C**  
 Proposed Conservation Easement Areas

Produced by: 

7/2/2015

*Conserved Lands layer courtesy of NH GRANIT and Town of Antrim*

## Appendix VII

## **Invasive Species Management Plan**

Antrim Wind Energy Project,  
Antrim, New Hampshire



**Prepared for:**

Walden Green Energy  
155 Fleet Street  
Portsmouth, NH 03801

**Prepared by:**

Stantec Consulting Services Inc.  
30 Park Drive  
Topsham, ME 04086

July 27, 2016

## INVASIVE SPECIES MANAGEMENT PLAN

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## INVASIVE SPECIES MANAGEMENT PLAN

Project Background  
July 27, 2016

### 1.0 PROJECT BACKGROUND

Antrim Wind Energy LLC (AWE), a subsidiary of Walden Green Energy, LLC, has proposed construction of the Antrim Wind Project (project), a wind energy facility in Antrim, New Hampshire (Figure 1). The project is proposed to include 9 turbines capable of generating up to 28.8 megawatts (MW) of electricity. The project will also include above ground and underground electrical collector lines, a substation, an Operations and Maintenance (O&M) building, one permanent meteorological tower, and new project access roads. Collectively, the project is expected to occupy approximately 11.3 acres of privately owned land once constructed, with an initial clearing area of approximately 57 acres (project area).

The turbine areas, access roads, and collector line are proposed to be located in primarily undeveloped forest areas where timber harvesting has occurred in the past and some new vegetation clearing will be required for the construction of the project components. The natural communities present in the project area will be converted from forested communities to communities dominated by shrubs and herbaceous vegetation for the life of the project. Because of this disturbance, the turbine areas, new electrical line, and new roads could be subject to colonization by invasive plant species, either by natural colonization from existing adjacent populations or as a result of construction activities.

This Invasive Species Management Plan (ISMP) addresses the anticipated procedures for managing invasive plant species within the project area. This ISMP is designed to address the requests of the New Hampshire Fish and Game Department (NHFG) to manage invasive plant species in the post-construction operations period of the project.

### 2.0 MANAGEMENT PLAN GOALS AND OBJECTIVES

The overall goal of this ISMP is to control the introduction and spread of invasive plant species as a direct result of project construction. The ISMP has been prepared to meet the purpose of the New Hampshire Department of Agriculture's Chapter Agr 3800, Invasive Species, namely to prevent and control the spread of invasive plant species, to minimize the adverse environmental and economic effects of invasive species, and to protect the public from potential health problems attributed to invasive species.<sup>1</sup>

The ISMP has also been prepared to meet the goals and objectives of the U.S. Army Corps of Engineers' (Corps) Invasive Species Policy.<sup>2</sup> Ultimately, the Corps' goal is to "prevent introduction and establishment of invasive species to reduce their impact on the environment, economy,

<sup>1</sup> New Hampshire Department of Agriculture. Chapter Agr 3800 Invasive Species. Available at: [http://www.gencourt.state.nh.us/rules/state\\_agencies/agr3800.html](http://www.gencourt.state.nh.us/rules/state_agencies/agr3800.html)

<sup>2</sup> Department of the Army. U.S. Army Corps of Engineers. *U.S. Army Corps of Engineers Invasive Species Policy*. June 2, 2009. Available at: <http://www.nae.usace.army.mil/Missions/Regulatory/Invasive-Species/>



## INVASIVE SPECIES MANAGEMENT PLAN

Invasive Species Background  
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and health of the United States” and to employ an early detection and rapid response system in order to “develop and enhance the capacity to identify, report, and effectively respond to newly discovered/localized invasive species”. Further, this ISMP was developed to preserve and enhance the functions and values of the wetlands and uplands within the project area. While complete eradication of invasive species is not a stated or realistic goal, this ISMP is designed to limit the spread of these species to the maximum extent practicable. The ISMP includes the following objectives:

- Identify locations within the project area in which invasive species presently exist in order to develop a baseline for future monitoring;
- Provide a plan for monitoring the status of invasive species within the project area and report the results of the monitoring to involved natural resource agencies;
- Outline the anticipated schedule and duration of monitoring; and
- Identify appropriate strategies for controlling and/or limiting the spread of invasive plant species within the project area (e.g., mechanical cutting, herbicide application, biological control, or a combination thereof).

### 3.0 INVASIVE SPECIES BACKGROUND

Invasive plants are non-native species whose introduction to an area causes or is likely to cause environmental or economic harm. Invasive plants often lack natural predators and can successfully colonize and thrive beyond their natural ranges, often out-competing native plants and contributing to the decline of native plant species diversity. Generally, these species have competitive adaptations, aggressive reproductive strategies, and efficient dispersal methods.

The New Hampshire Department of Agriculture, Markets & Food, Division of Plant Industry is the lead state agency responsible for the evaluation, publication and development of rules on invasive plant species. Chapter Agr 3800 establishes the New Hampshire Prohibited Invasive Plant Species List, provided in Table 1 below. The ISMP will focus on the species provided in this list.

## INVASIVE SPECIES MANAGEMENT PLAN

Existing conditions  
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**Table 1. New Hampshire Prohibited Invasive Plant Species List<sup>1</sup>**

Scientific Name	Common Name
<i>Acer platanoides</i>	Norway maple
<i>Ailanthus altissima</i>	Tree of heaven
<i>Alliaria petiolata</i>	Garlic mustard
<i>Berberis thunbergii</i>	Japanese barberry
<i>Berberis vulgaris</i>	European barberry
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Centaurea biebersteinii</i>	Spotted knapweed
<i>Cynanchum nigrum</i>	Black swallow-wort
<i>Cynanchum rossicum</i>	Pale swallow-wort
<i>Elaeagnus umbellata</i>	Autumn olive
<i>Euonymus alatus</i>	Burning bush
<i>Heracleum mantegazzianum</i>	Giant hogweed
<i>Hesperis matronalis</i>	Dame's rocket
<i>Iris pseudacorus</i>	Water-flag iris
<i>Lepidium latifolium</i>	Perennial pepperweed
<i>Ligustrum obtusifolium</i>	Blunt-leaved privet
<i>Lonicera x bella</i>	Showy bush honeysuckle
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Lonicera morrowii</i>	Morrow's honeysuckle
<i>Lonicera tatarica</i>	Tatarian honeysuckle
<i>Microstegium vimineum</i>	Japanese stilt grass
<i>Polygonum cuspidatum (Fallopia japonica)</i>	Japanese knotweed
<i>Polygonum perfoliatum</i>	Mile-a-minute vine
<i>Reynoutria x bohemica</i>	Bohemia knotweed
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Rhamnus frangula (Frangula alnus)</i>	Glossy buckthorn
<i>Rosa multiflora</i>	Multiflora rose

<sup>1</sup>New Hampshire Department of Agriculture, Markets & Food. *Fact Sheet: Prohibited Invasive Plant Species Rules, Agr 3800.*

## 4.0 EXISTING CONDITIONS

Between 2011 and 2014, TRC Environmental Corporation (TRC) has performed numerous natural resource surveys within the project area, including wetland delineations, vernal pool surveys, rare plant surveys, and natural community mapping. During these surveys, no incidental observations of invasive species were noted.

## INVASIVE SPECIES MANAGEMENT PLAN

Invasive Species Monitoring Program  
July 27, 2016

### 5.0 INVASIVE SPECIES MONITORING PROGRAM

#### 5.1 GOALS AND OBJECTIVES

The goal of the monitoring program is to implement a plan to monitor and assess the status of invasive plant species within the project area and to identify areas where invasive species control measures will be required to maintain or enhance the functions and values of uplands and wetlands. The monitoring will target potential new occurrences of the invasive plant species listed in Table 1 and provide recommendations that will be used to select and implement appropriate control options for each invasive species location.

The objectives of the monitoring will be to:

- Document the distribution and density of invasive species within the project area to target areas where control measures will be required;
- Recommend the type(s) of control measures that are most appropriate for each invasive species occurrence; and
- Monitor the effectiveness of control efforts and evaluate whether alternate or additional control measures should be implemented to provide effective control of the identified invasive species.

#### 5.2 METHODS

Upon completion of construction, AWE will retain a qualified botanist or ecologist to conduct the invasive plant species monitoring. The monitoring will consist of field surveys of the project area to determine whether invasive species are present and to provide recommendations concerning control options. For each invasive species occurrence, monitors will complete invasive species monitoring data forms, take photographs of the species and the surrounding landscape, and record the location of the invasive species using a Global Positioning System (GPS) receiver. Conditions that may influence the use of a particular type of invasive species control method will also be noted (e.g., wetlands, streams, vernal pools, private residences). If populations of invasive species are observed immediately outside of the project area, the occurrences will be noted but control strategies for these populations will not be developed. Field surveys will be conducted during the growing season when plant species are most easily identifiable. The monitoring effort will occur prior to the control effort and should be scheduled to allow time for invasive species control treatments to be implemented in the same growing season.

Invasive species monitoring within the project area will be initiated in the first full calendar year following the completion of project construction and will continue for 2 additional years, for a total of 3 years.

## INVASIVE SPECIES MANAGEMENT PLAN

Invasive Species Control Program  
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### 5.3 MONITORING REPORT

AWE will prepare an annual report summarizing the methods and results of each year of monitoring. Annual invasive species monitoring reports will include a summary of the field survey methods, a table that identifies the invasive species observed within the project area, a summary and discussion of the results, a figure(s) showing the GPS location of each occurrence, copies of the monitoring forms, and representative photographs. As appropriate, comparisons will be made as to whether invasive species distribution and/or densities are increasing or decreasing, based on pre-construction conditions and the results of the previous year's monitoring results. The monitoring report will include recommendations regarding where invasive species control measures are required, the suggested type of control strategy, and the schedule for the implementation of control measures.

The monitoring report will be provided to NHFG and the New Hampshire Department of Environmental Services (NHDES) by January 31 of the year following the year in which the monitoring was conducted (e.g., for monitoring conducted in the summer of 2017, the monitoring report will be submitted by January 31, 2018).

Implementation of invasive species control measures recommended in the report will be based on the results of the monitoring and will not require approval from the regulatory agencies. Control measures, specifically herbicide applications, will be performed pursuant to any standard permit and safety requirements governing such activities.

## 6.0 INVASIVE SPECIES CONTROL PROGRAM

### 6.1 GOALS AND OBJECTIVES

The goal of the invasive species control program is to limit the distribution and spread of invasive species within the project area, specifically those species or populations that became established after, or as a result of, project construction activities.

The objectives of the control program include:

- Use the recommendations provided during the invasive species monitoring program to identify appropriate control strategies based on the species, habitat, and project location; and
- Perform control efforts focused on reducing the density and distribution of identified invasive species.

## INVASIVE SPECIES MANAGEMENT PLAN

Invasive Species Control Program  
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### 6.2 FACTORS INFLUENCING INVASIVE SPECIES CONTROL

To develop an effective approach for controlling invasive species within the project area, the following factors will be considered:

- The characteristics of each invasive species observed, including growth rates, susceptibility to herbicides, etc.;
- The density and distribution within each occurrence and within the project area;
- The characteristics of the habitats at each invasive species occurrence;
- Proximity of the occurrence to sensitive areas within the project area, including wetlands, streams, vernal pools, rare or endangered species or communities, and protected wildlife habitat; and
- Proximity of the occurrence to adjacent land uses (residential development, agricultural land, etc.), which can influence the choice of control strategies.

As a result of these factors, invasive species control measures may not be practicable or highly effective in all areas within the project area. Additionally, as stated above, complete eradication of invasive species is not a stated goal of the control program, given the aggressive nature of most invasive species once they become established. Rather, the goal of the control effort is to prevent the introduction and spread of invasive plant species into new areas not previously colonized.

### 6.3 TYPES OF INVASIVE SPECIES CONTROL

There are 4 primary types of invasive species control methods: cultural, mechanical, chemical, and biological. These control methods may be combined to provide a more effective control strategy.

#### 6.3.1 Cultural Control

Cultural controls are important methods to reduce the spread of invasive species to areas not previously colonized. Methods such as immediate seeding with an approved, native seed mix and mulching disturbed soils can be effective at minimizing the opportunities for the establishment of invasive plant species. Additional cultural controls such as vehicle washing, isolation of excavated soils, washing of timber mats, and vehicle inspections are also effective in limiting the spread of invasive species as a result of construction activities.

#### 6.3.2 Mechanical Control

Mechanical control measures such as digging, pulling, and cutting individual plants may be effective in controlling isolated invasive plants or small stands of plants. These methods are often necessary in sensitive natural resource areas such as wetlands, streams, protected wildlife habitats, etc., where chemical control is not permitted or ecologically appropriate. However,

## INVASIVE SPECIES MANAGEMENT PLAN

Invasive Species Control Program  
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such techniques may be labor-intensive and may be impractical in areas with dense infestations of invasive species such as common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), and Japanese knotweed (*Fallopia japonica*).

### 6.3.3 Chemical Control

Chemical control (i.e., herbicides) is a common alternative used for controlling invasive species. If used selectively and in limited areas by licensed professionals, herbicides can be applied in an environmentally sound manner to provide effective control while adhering to applicable state and federal herbicide application regulations. In addition, herbicide applications often provide the most cost-effective method for controlling dense infestations of invasive species. However, chemical control may not be permitted in certain portions of the project area based on the presence of sensitive natural resources.

### 6.3.4 Biological Control

Biological controls can be effective in controlling some invasive species (e.g., purple loosestrife and mile-a-minute vine [*Polygonum perfoliatum*]) under certain conditions but are not yet proven for the control of other species that could be present within the project area. Consultation with the Corps indicates that species such as loosestrife beetles (*Galerucella californiensis* and *Galerucella pusilla*) native to Europe and Asia may be useful in controlling populations of purple loosestrife. Similarly, a stem-boring weevil (*Rhinoncomimus latipes*) native to Asia has been shown to provide control of mile-a-minute vine in the United States. However, at this time, the use of biological controls is unlikely to be recommended for this project.

## 6.4 CONTROL OF EXISTING INVASIVE SPECIES

The Bird and Bat Conservation Strategy for the Antrim Wind Energy Project (BBCS)<sup>3</sup>, prepared by TRC and Stantec, describes the best management practices that AWE will implement should any invasive species be detected during construction.

## 6.5 INVASIVE SPECIES CONTROL IMPLEMENTATION SCHEDULE

After construction is complete, AWE recognizes that early detection and rapid response can prevent the spread of invasive species. As a result, AWE will implement invasive species controls in the first full calendar year following the completion of construction. Particular treatment methods will be focused on preserving and enhancing the habitat characteristics of the wetlands and uplands in the project area.

Based on the results of the invasive species monitoring efforts described in Section 5.0 above, AWE will schedule invasive species control efforts annually, as soon as practicable after the field

<sup>3</sup> TRC Engineers and Stantec Consulting Services Inc. *Bird and Bat Conservation Strategy for the Antrim Wind Energy Project*. July 9, 2015.

## INVASIVE SPECIES MANAGEMENT PLAN

Invasive Species Control Program  
July 27, 2016

monitoring recommendations are received. The schedule for the treatment will depend on the types of controls recommended and the species identified. For example, cultural controls and mechanical removal of certain species can be performed almost any time of the year when plant species are identifiable, while herbicide applications may require that work be done during the growing season to be most effective. For locations where invasive species controls are implemented, monitoring performed in subsequent years of the monitoring period will serve to assess the effectiveness of such measures.

### 6.6 ANTICIPATED CONTROL STRATEGIES

Specific control strategies will be developed based on the results of the annual monitoring. It is anticipated, however, that the most effective general approach for controlling invasive species within the project area will be a combination of cultural methods (i.e., prevention of invasive species introduction and spread), mechanical removal, and application of herbicides in selected locations. If large populations of invasive species are observed, repeated manual control and/or herbicide applications may be required in multiple growing seasons in order to achieve effective control.

The need for and types of chemical control of invasive species will be carefully evaluated, particularly in and around sensitive areas such as wetlands and streams. Additionally, invasive species may be observed outside the defined project area boundaries. AWE has no authority to attempt to control invasive species that may be present in those areas outside of the project area.

Herbicide applications will be performed according to applicable laws and regulations put forth by the New Hampshire Department of Agriculture, Markets & Food, Division of Pesticide Control, as well as NHDES and the U.S. Environmental Protection Agency. The type of herbicide(s) to be used, method of application, and schedule for application will be determined based on the locations of the targeted areas and the particular invasive species to be controlled.

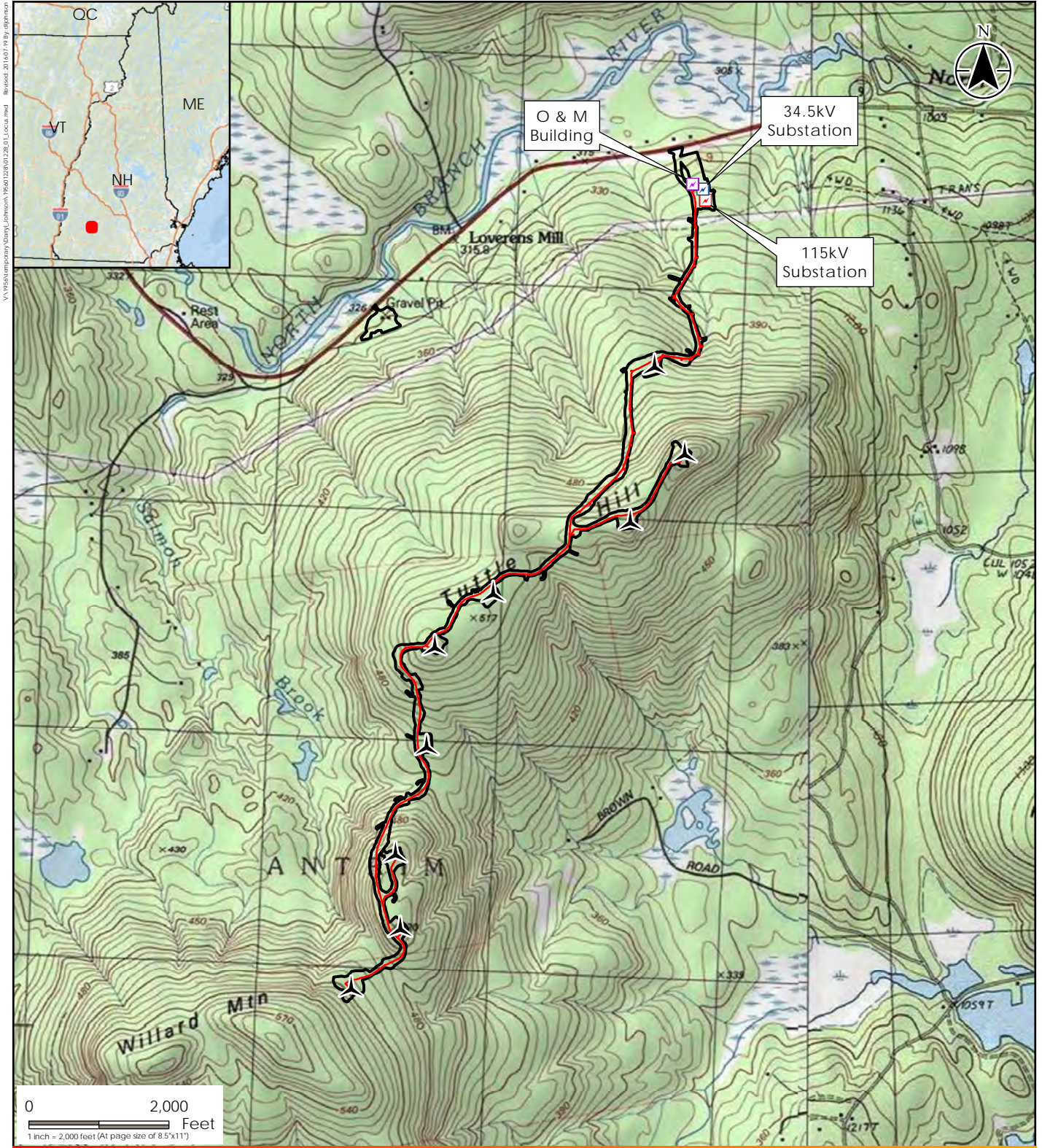
Similarly, the use of any biological control measures, while not expected for this project, will be coordinated with NHDES and the Corps. The species used for biological control will be obtained from approved sources.

**INVASIVE SPECIES MANAGEMENT PLAN**

Appendix A Project Location Map  
July 27, 2016

**Appendix A PROJECT LOCATION MAP**





Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

195601228









30 Park Drive  
 Topsham, ME USA 04086  
 Phone (207) 729-1199

Prepared by DLJ on 2016-07-18  
 Quality Review by KWH on 2016-07-19  
 Independent Review by BPE on 2016-07-19

01228\_01\_Locus.mxd

Legend

-  Proposed Turbine Location
-  115kV Substation (Approximate)
-  34.5kV Substation (Approximate)
-  O&M Building (Approximate)
-  Proposed Collector
-  Proposed Limit of Disturbance

Client/Project  
 Walden Green Energy  
 Antrim Wind Project  
 Antrim, New Hampshire

Figure No.  
 1

Title  
 Project Location Map  
 7/19/2016

## Appendix IIX

## MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (“MOU”) is entered into by and among the New Hampshire Fish & Game Department (NHFGD), The Audubon Society of New Hampshire (“ASNH”) and Antrim Wind Energy, LLC (“AWE”). Throughout this MOU each of NHFGD, ASNH and AWE may be referred to individually as a Party and collectively as the “Parties”.

Whereas, AWE has applied for a Certificate of Site & Facility (“Certificate”) from the New Hampshire Site Evaluation Committee (“SEC”) in Docket 2015-02 and proposes to construct a 9 turbine, 28.8 MW wind energy facility in Antrim, NH (the Project); and

Whereas, AWE has developed a Bird and Bat Conservation Strategy (“BBCS”) in consultation with NHFGD and the US Fish and Wildlife Service (“USFWS”) that addresses the management of risks to birds and bats during the life of the Project, and which has been included with its application to the Committee in Appendix 12F; and

Whereas, ASNH and NHFGD have expressed concerns over possible impacts to common nighthawks resulting from the operation of the Project; and

Whereas, the Parties have reached an agreement with respect to certain measures to be taken by AWE, as more fully set forth below, which resolve the concerns of ASNH and NHFGD regarding potential impacts to nighthawks;

Now Therefore, the Parties hereby agree as follows:

### **I – Amendments to the BBCS:**

At least thirty (30) days prior to the commencement of construction for the Project, Antrim Wind shall amend the BBCS to include the following provisions:

1. Section 7.1.1 identifies that common nighthawk nest surveys shall occur during the first three years in concurrence with standardized searches. This shall be amended to clarify that such nighthawk surveys shall occur as follows:
  - a. There shall be three surveys per year, one in each of the periods June 1-15, June 16-30, and July 1-15.
  - b. The surveys shall occur not less than 14 days apart.
  - c. The surveys shall occur either between the hours of 8:00-9:30 PM or 3:30-5:00 AM.
  - d. Surveys shall occur during times when wind speeds are 10 MPH or less and when there is no rain.
2. Section 9.1 of the BBCS discusses the Wildlife Mortality Monitoring Program (“WMMP”).
  - a. This section shall be amended to clarify that trained AWE operations staff shall continue to perform the nighthawk surveys during each year of the Project’s operational life in accordance with the same survey protocols as outlined in paragraph 1(a) – 1(d) above.

## MEMORANDUM OF UNDERSTANDING

- b. AWE shall include a provision that a freezer shall be kept onsite for the storage of dead specimens pending retrieval by appropriate agency personnel.
3. Section 9.2 of the BBCS discusses the Immediate Alert Procedure (“IAP”), detailing the notices required for biologically significant events. This section shall be amended to clarify that any injury or mortality of the common nighthawk shall trigger the IAP.
4. Section 9 of the BBCS discusses adaptive management and the tiered consultation process. AWE will amend this Section of the BBCS to include the following adaptive management measures in the event that a “displaying” nighthawk is observed on the Project site. In such an event, AWE shall:
  - a. Document the location that the displaying nighthawk was observed
  - b. Notify NHFGD within 48 hours.
  - c. Conduct three searches within 1 week of the initial observation to attempt to locate the nighthawk nest. Any located nest shall be cordoned off to prevent disturbance from vehicular or pedestrian traffic.
  - d. Curtail (shut down) the wind turbine closest to the discovered nest as follows:
    - i. Daily between the hours of 8:00 PM and 9:30 PM and between the hours of 3:30 AM and 5:00 AM.
    - ii. Commencing from the date of the observation of the displaying nighthawk, or as soon as reasonably possible thereafter, and continuing until the earlier to occur of: a) the date upon which no nest is discovered after the initial observation despite having conducted three searches in accordance with 4(c) above; b) the following August 31<sup>st</sup> and; c) the date on which AWE documents to NHFGD that the nesting nighthawks are no longer on the site.

Should a displaying nighthawk be present at the same site in a subsequent survey, these procedures shall be repeated.

5. AWE shall add language to the BBCS to clarify that, with respect to the decommissioning period:
  - a. In the event that no nesting nighthawk activity has been documented during the Project’s operational life, all monitoring and survey work shall cease upon the final shutdown of the Project turbines; and
  - b. In the event that nesting nighthawk activity has been documented at any time during the 10-year period preceding the final shutdown of the Project turbines, then nighthawk surveys shall continue during the decommissioning period in the same manner as during Project operations until all decommissioning activities have been completed.

## **II – Administrative Conditions**

6. Counterparts
  - a. This MOU may be executed in several counterparts, each of which shall be deemed an original and all of which shall constitute one and the same

## MEMORANDUM OF UNDERSTANDING

instrument, and shall become effective when counterparts have been signed by each of the Parties and delivered to the other Parties; it being understood that all Parties need not sign the same counterparts.

- b. The exchange of copies of this MOU and of signature pages by facsimile transmission, by electronic mail in “portable document format” (“.pdf”) form, or by any other electronic means intended to preserve the original graphic and pictorial appearance of a document, or by combination of such means, shall constitute effective execution and delivery of this MOU as to the Parties and may be used in lieu of the original Agreement for all purposes. Signatures of the Parties transmitted by facsimile shall be deemed to be their original signatures for all purposes.

### 7. Amendments

- a. This MOU may be amended when such an amendment is agreed to in writing by all Parties.

### 8. Termination

- a. Upon completion of the measures outlined in this MOU, AWE’s obligations under this MOU shall be considered complete and this MOU shall terminate

### 9. Condition to Certificate

- a. The Parties hereby agree that a copy of this MOU shall be provided to the Committee and the changes to the BBCS described herein shall be recommended to be included as a condition to any Certificate for the Project issued by the Committee. This recommendation shall supersede any prior recommendations or requests to the Committee by any Party with respect to common nighthawks.

**MEMORANDUM OF UNDERSTANDING**

Execution of this Memorandum of Understanding by the Parties, and the implementation of its terms, addresses all concerns by any of the Parties with respect to the subject matter hereof.

Signed and agreed this 22nd day of September 2016 by:

**NEW HAMPSHIRE FISH AND GAME DEPARTMENT**



9/22/2016

By: Glenn Normandeau  
Executive Director

Date

**AUDUBON SOCIETY OF NEW HAMPSHIRE**

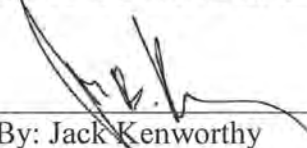


9/22/16

By: Douglas A. Bechtel  
Its: President

Date

**ANTRIM WIND ENERGY LLC**



September 22, 2016

By: Jack Kenworthy  
Its: Executive Officer

Date

## Appendix IX



Glenn Normandeau  
Executive Director

# New Hampshire Fish and Game Department

11 Hazen Drive, Concord, NH 03301-6500  
Headquarters: (603) 271-3421  
Web site: [www.WildNH.com](http://www.WildNH.com)

TDD Access: Relay NH 1-800-735-2964  
FAX (603) 271-1438  
E-mail: [info@wildlife.nh.gov](mailto:info@wildlife.nh.gov)

July 1, 2016

TRC  
c/o Dana Valleau, Environmental Specialist  
14 Gabriel Drive  
Augusta, ME 04330

RE: Antrim Wind Project – Biological Assessment

Dear Mr. Valleau:

The New Hampshire Fish and Game Department (NHFGD) have received your Biological Assessment summary for the Wildlife Species of Concern identified in the updated Natural Heritage Bureau (NHB) report (NHB15-1904) for this project. The staff at NHFGD has reviewed the information and we concur with the findings that the project will not likely have any adverse impact on these identified species; the Ebony Boghaunter (*Williamsonia fletcheri*), Wood Turtle (*Glyptemys insculpta*) and the Marsh Wren (*Cistothorus palustris*).

However, the Department would like to recommend that monitoring of the proposed project laydown/staging areas, identified on the Project location map as parcels #222-003 (gravel pit) and #212-027 be monitored for Wood turtle movement while the project is under construction during the summer. This should avoid the potential for construction equipment encountering and potentially impacting Wood turtles seeking upland habitats within close proximity to the North Branch River, if found.

The NH Fish and Game Department does appreciate the applicant's efforts of involving the agency in the proposed project and we encourage the continuation of these discussions throughout the permitting process. If you have any questions or comments, please do not hesitate to contact the Department's Environmental Review Coordinator, Carol Henderson via email at [carol.henderson@wildlife.nh.gov](mailto:carol.henderson@wildlife.nh.gov) or by phone at 603-271-3511. Thank you.

Sincerely,

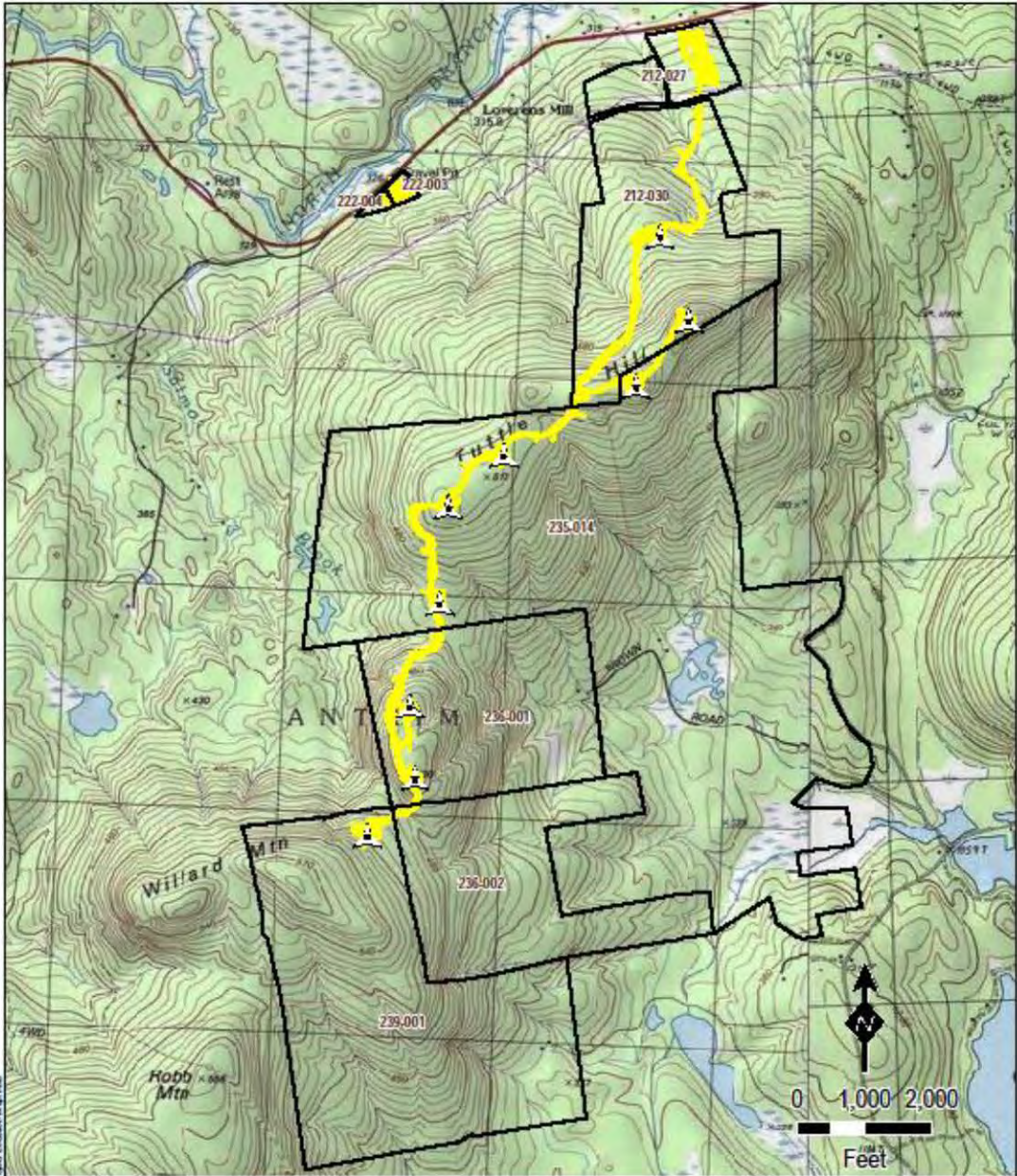
A handwritten signature in black ink, appearing to read "G. Normandeau".

Glenn Normandeau  
Executive Director

CC: Craig Rennie, DES




Enclosures:  
Biological Assessment Memo  
Project Location Map





\PROJECT\15A\150157\AntrimWindEnergy.ctb Project Location Map.mxd



- Legend**
-  Proposed WTG
  -  Project Footprint
  -  Project Parcels

**Antrim Wind Energy**

**ANTRIM WIND ENERGY PROJECT**  
 354 KEENE ROAD, ANTRIM, NH

**Project Location Map**

Produced by:  1/29/2015