

VISUAL IMPACT ASSESSMENT ANTRIM WIND POWER



Prepared for:

Counsel for the Public

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EXECUTIVE SUMMARY

Antrim Wind Energy LLC (AWE) is proposing to construct a 28.8-Megawatt (MW) wind power project on the Willard Mountain and Tuttle Hill Ridge in Antrim, New Hampshire. The proposed project will include (9) 3.2-Megawatt (MW) wind turbines and a 328-foot tall metrological (met) tower. In addition to the wind turbines and met tower, the project will also include the construction of access roads, a crane path, electrical collector lines (above and below ground), an electrical substation, an Operations and Maintenance (O&M) building (with associated parking), and temporary laydown yards and work areas, including job trailers, temporary parking, and storage.

The project was previously submitted by the AWE to the New Hampshire Site Evaluation Committee (SEC) in Docket 2012-01 as a (10) wind turbine facility at the same site location; however, the original submission received an Order Denying a Certificate of Site and Facility for that project (dated 04/25/2013) by the SEC due to aesthetic concerns that included, but are not limited to; scale, the effect on sensitive resources in the study area, and insufficient mitigation measures. The SEC decision was based upon AWE's original visual impact assessment (VIA) submission supplied by Saratoga Associates and peer reviewed by Jean Vissering Landscape Architecture on behalf of the NH Counsel for the Public. As a result of the concerns raised by the SEC, AWE modified the project to include (9) wind turbines, all of which are in the same coordinate position as the original project, with just turbine (10) removed, turbine 9 reduced in height by approximately 46 feet and the remaining turbines reduced in height approximately 4 feet. The application was resubmitted to the SEC - and the SEC took jurisdiction of the current project on September 29, 2015.

The Terraink VIA has reviewed and referenced the previous work of LandWorks and Jean Vissering Landscape Architecture, as well as the Bureau of Land Management (BLM) and other accepted visual impact methodologies as a basis for examination and study of the proposed project. The potential project visibility and visual impact were evaluated through viewshed analysis, field review, preparation of visual simulations, and the use of a 3-person rating panel to determine the existing scenic quality and user sensitivities, and the resulting contrast with the project in place. The resulting VIA is a defensible report that evaluates and concludes on the project's appropriateness in the study area. Terraink's visual impact assessment determined that with the wind project in place, the overall project's resource contrast within the entire study area was 14.65, or high-moderate, and the threshold of acceptable visual impact was exceeded in (6) sensitive resources occurring at Willard Pond, Meadow Marsh Preserve, White Birch Point Historic District, Gregg Lake, Bald Mountain, Goodhue Hill and Black Pond. The only means to reduce, or mitigate, the visual impact in these (6) regional sensitive resources is to relocate the project.

I. INTRODUCTION

Terraink, Incorporated has been retained by the New Hampshire Counsel for the Public to prepare a visual impact assessment (VIA) for the re-submitted Antrim Wind Power Project (the Project) in Antrim, New Hampshire. The purpose of the VIA is to determine if the re-submitted Project meets the requirements for aesthetic impacts as defined in New Hampshire, RSA 162-H:16,IV.,(c), which states (c) *The site and facility will not have an unreasonable adverse effect on aesthetics, historic sites, air and water quality, the natural environment, and public health and safety*, and also by the standards defined in *Site 301.50 Effects on Aesthetics*. This VIA report will encompass a version of existing agency approved/developed methodologies to reach a determination on the potential visual effect by describing the proposed project and study area, inventorying the sensitive resources, developing and evaluating visual simulations based upon the Project's specifications and location, and then assessing the potential visual impact of the Project on the study area. This VIA report and associated rating panel assessments were completed by Registered Landscape Architects that are experienced in the participation and preparation of visual impact assessments.

II. PROJECT DESCRIPTION

A. Project Site

The proposed project site is made up of approximately 1,870-acres of private land leased by Antrim Wind Energy LLC (AWE) from six landowners in the Town of Antrim in Hillsborough, New Hampshire (Figure 1). The project is located in a rural conservation zoning district and will permanently occupy 11.3-acres of land; including roads, turbine foundations, and miscellaneous facilities. The staging areas and work pads will include approximately 45.8-acres of additional disturbance that is proposed to be revegetated with native grasses. The project is located on an elevated ridgeline that starts with Tuttle Hill; approximately .75-miles south of NH Route 9 to Willard Mountain, approximately 2-miles to the south-southwest. The project site is located approximately 4-miles northwest of the Town of Antrim, approximately 5-miles north of the Town of Hancock, and approximately 4-miles southeast of the Town of Stoddard. The project ridgeline runs nearly parallel to, and is bordered by, NH State Route 9 approximately .75-miles to the north, bordered to the east by NH State Route 31/ US Route 202, to the south by NH State Route 137 and NH State Route 123 to the west, until it intersects with NH State Route 9 creating a full loop. Land use within the project site is dominated by rural conservation and lakefront residential zoning districts. There is an existing Public Service of New Hampshire (PSNH) transmission corridor with 115kV electric transmission and 34.5 kV electric distribution lines that run between the ridge and NH State Route 9. Dense settlement and human activity are concentrated to the north and east of the project site in the Town of Antrim and along the State route corridors.

B. Proposed Project Components

For the purpose of this visual impact assessment (VIA), it is assumed that the proposed project includes (9) 3.2-megawatt (MW) wind turbines, meteorological tower (Figure 2) creating up to 28.8 MW of electricity, approximately 3.55-miles of new access roads, a substation and Operations and Maintenance building. A detailed description of each component relative to its location and scale within the study area is included below:

1. Wind Turbines

The proposed wind turbines for the purpose of this VIA are the Siemens Wind Turbine SWT-3.2-113 (92.5HH and 79.5HH), which consists of three major components, the tower, the rotor and the nacelle (Figure 3). The tubular steel towers for this project are proposed to be installed at two different heights. Wind turbines #1 through #8 will have a hub height of 303.5-feet (92.5-meters) and wind turbine #9 will have a hub height of 260.8-feet (79.5-meters). The towers are approximately 16-feet in diameter at the bottom and taper at the top. According to the Siemens technical specification the turbines are painted with a semi-gloss, light grey paint color with no exterior ladders or catwalks. The tower installation includes a buried 24-foot diameter concrete footing, approximate 1-acre assembly area and crane pad, and a 34-foot wide crane path that are specified as compacted aggregate except at turbine locations #1 and #9, which will have an additional 200-feet by 50-feet crane assembly pad and are proposed to have erosion control mix reclamation improvements.

The rotor size for the project is proposed to be 370.7-feet (113-meters) in diameter with three 185.37-feet (56.5-meter) long blades that have a Siemens proprietary aerodynamic profile that is best suited to the project site conditions. The blades are a semi-gloss, light grey paint color. The total height of wind turbines #1 through #8 from the concrete base to the tip of the most upright blade will be 488.84-feet (149-meters) and wind turbine #9 under the same conditions will be 446.19-feet (136-meters) in overall height. The blades will spin slowly at varying speeds between 6-15.5 revolutions per minute (rpm), which will cut out when the wind velocity and turbulence reach a maximum level. The aerodynamically designed nacelle is a glass fiber reinforced polymer unit that is mounted to the top of the steel tower and connects with the rotor hub and houses the generator and the electrical and mechanical components, and is typically equipped with aviation warning lights, per the Federal Aviation Administration (FAA) standards. It is assumed for the purpose of this VIA that the nacelle is also light grey in color and that there will not be any visible insignias, logos, lettering or other markings on any side of the nacelle and related components.

2. Project Aviation Lighting

The proposed project is committed to using radar activated lighting that will follow the Federal Aviation Administration (FAA) standards. According to the FAA study, the Antrim project received a determination of no hazard to air navigation, provided that wind turbines 2, 5, and 8 are marked in accordance with FAA Advisory circular *70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint only – Chapters 12&13 (Turbines)*, and that wind turbines 1, 3, 4, 6, 7 and 9 are marked/lit in accordance with the FAA Advisory circular *70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights – Chapters 4,12&13 (Turbines)*. The FAA standard reads that there should not be a gap of more than 1/2-mile (2,640-feet) between lit turbines and the preferred illumination source is the FAA L-864 aviation red-colored flashing lights, with a slow-on, slow-off profile, that are synchronized to flash simultaneously. Due to daylight and the off-white color of the wind turbines daytime lighting is not required for the project.

The purpose of the radar activated lighting system is to detect when an aircraft is in the vicinity of the project and automatically triggers the aviation warning lights, then, upon the aircraft's departure from the airspace, the aviation warning lights will automatically turn off. This approach has the potential to greatly reduce the effects of nighttime lighting on users near the project area; however, the final lighting plan and acceptance of the radar activated lighting is subject to FAA approval, which has not been received by AWE to date. For the purpose of this VIA, the effects of nighttime lighting are not included in this study due to the ongoing coordination between AWE and the FAA.

3. Meteorological Towers

A permanent 328-feet (100-meter) tall, freestanding metal lattice meteorological tower will be installed between turbine #3 and turbine #4 for the collection of wind data and to monitor the wind turbine performance. This meteorological tower will also house the radar system that controls the aviation obstruction lights that are required by the FAA on the wind turbines.

4. Access Roads, Crane Path and Staging Areas

The construction of approximately 3.55-miles of new gravel surface roads, with a 40-foot to 50-foot cleared corridor within the existing woodland cover will access, and link, the wind turbines during construction and maintenance. The initial road construction will begin at NH State Route 9, leading past the proposed Operations and Maintenance (O&M) Facility, the 34.5 kV Collector Substation, and the 115kV Substation up the ridge to wind turbine #1. This section of access road will be approximately .70-miles (3,710-feet) long and 34-feet wide upon initial construction; however, the access road will be restored to 16-feet wide after construction is complete. The

second section of the crane path construction will be approximately 2.3-miles (12,147-feet) long and is to occur along the ridgeline to connect wind turbines #1, #4, #5, #6, #8, and #9. This crane path will also be 34-feet wide during active construction and then restored to a 16-foot width after construction is complete, by seeding the road shoulders with a native seed mix.

In addition to the main crane path, there are two proposed spur paths that connect the wind turbines to the main crane path. The first spur is located near the meteorological tower position on the main crane path, and is an approximately .40-mile (2,127-foot) crane path to connect wind turbines #2 and #3 to the main crane path. The second spur is an approximately .14-mile (765-feet) road to connect wind turbine #7 to the main crane path. All spur crane paths follow the same 34-foot wide dimension as the main access road and crane paths and will be reduced to 16-foot wide through vegetative (seeding) re-naturalization after construction is complete.

In addition to the access road and crane path, temporary staging areas are proposed at each wind turbine pad, along NH State Route 9 and at the O&M Building and Substation. The staging pads at each of the wind turbines are anticipated to be one-acre in size and adjacent to the 34-foot wide crane path. Two temporary staging areas are also proposed along NH State Route 9, with the largest occurring on the south side of NH State Route 9, 1/2-mile southwest of the O&M and Substation facility entrance and is approximately 3-acres in size on semi-cleared land. The second temporary staging area is approximately 2-acres in size and is directly adjacent to the O&M Building and Substation. The O&M facility site will require extensive clearing of the existing woodland; therefore, new evergreen and deciduous screen plantings are proposed along the NH State Route 9 clearing edge. The temporary staging areas are intended to be re-naturalized through seeding and natural successional reestablishment versus intensive landscape planting measures.

It should be noted that the proposed access road, crane path, and staging areas utilize a series of specialized engineering techniques, including varying levels of cut and fill, and/or blasting to create a safe passage way for the construction vehicles; however, the more aggressive engineering cut and fill, and/or blasting activities, can create additional visual impacts in tandem to the wind turbine installation. Therefore, these effects of the access roads, crane path and staging areas will be noted as part of the visual simulation evaluation, but a standalone evaluation of the access road, crane path, and staging area improvements are not included as part of this VIA.

5. Electrical Collection System, Substation and O&M Building

The project's power collection will include a single 34.5 kV cable that extends from each individual wind turbine to the collector substation. The main collector line will follow the main

access road and crane path, and will include a combination of both overhead and buried cables. Underground cables will be installed from the 34.5vK substation, beneath the PSNH transmission line to an overhead line just south of the discontinued High Range Road. The main collector overhead line will extend up the Tuttle Hill Ridge adjacent to the east side of the access road to wind turbine #1, where it will transition to an underground cable at the turbine pad and then re-emerge as an overhead line, continuing up the east edge of crane path ridge to wind turbine #3 at spur crane path, where it will permanently transition to an underground collector line along the east side of the crane path along Tuttle Hill and Willard Mountain ridgeline, thus connecting all of the remaining wind turbines #2, #4, #5, #6, #7, #8, and #9.

Where the 34.5kV collection line is above ground, it will be supported by approximately 32 wooden poles within an approximately 10-foot cleared right-of-way adjacent to the access road (16-foot wide) and crane path (34-foot wide). The overhead collection system will include medium voltage spacer cables, optical ground wires, and fiber optic communication cables. The 35-foot high wood poles are proposed to be freestanding, with the exception of various junctions where guying is proposed. There will be approximately 4,742-feet of above ground transmission lines proposed within the project that will require periodic clearing of vegetation from beneath the overhead power lines.

The underground 34.5vK collection line will also include fiber optic cables and a plant grounding system. The trenches for the underground collection line and fiber optic cables are intended to be on the east side of the access road and crane path, as allowed by field conditions, in trenches that are approximately 4-feet below grade and constructed per the best practices and construction methodology within the power industry.

The project electrical collection system terminates at a collection and intercollection substation that will be located adjacent to the PSNH transmission corridor. The collection yard will be 110-foot by 111-foot, and will contain a transformer and a 16-foot by 12-foot control house that will collect the power from the wind turbines. The second, 172-foot by 186-foot interconnection yard will be located directly adjacent to the collection yard and will contain a three-breaker ring bus. Both substation yards will be enclosed by approximately 10'-0" high chain link fencing (with barbed wire tops) and will have access gates facing the access road and leading from the O&M parking area at the collection yard. All yard and specific task lighting within the substation will be downward facing and shielded.

The O&M Building is a 3,000-square foot structure; the single story building will include offices, a maintenance bay, and comfort facilities for the project technicians. The O&M Building will have potable well-water, a septic tank and leach field, heat, HVAC, and electrical and computer

connections. The O&M facility will also have associated parking and storage within close proximity to the building.

III. VISUAL ASSESSMENT METHODOLOGY

RSA 162-H:16,IV,.(c), which states: (c) The site and facility will not have an unreasonable adverse effect on aesthetics, historic sites, air and water quality, the natural environment, and public health and safety, has led to the development of a set of visual impact assessment standards as defined in Site 301.50 Effects on Aesthetics. This VIA has utilized the standards put forth in Site 301.50 Effects on Aesthetics as well as encompassing a version of existing agency approved/developed methodologies that include, but are not limited to; the Bureau of Land Management, Visual Resource Management System (VRM), the United States Army Corp of Engineers, Visual Resource Assessment Process (VRAP), the United States Department of Agriculture, Forest Service, Landscape Aesthetics Handbook, and the United States Department of Transportation, Federal Highway Commission, Guidelines for the Visual Assessment of Highway Projects, and the New York State Department of Environmental Conservation, DEP-00-2; Assessing and Mitigation Visual Impacts.

Terraink consulted with Environmental Design & Research (EDR) Landscape Architecture, Engineering & Environmental Services, D.C.P. from Syracuse, New York to develop the technical portions of the VIA, including the Viewshed Analysis, Field Data Collection, Visual Simulations, Methodology Text, and Figures. The specific methodologies utilized by Terraink with EDR to determine project visibility and potential impacts are described below.

A. Determination of Existing Visual Character

The visual assessment process initiates with an overview of the physiographic and visual setting of the project study out to a 10-mile study area radius from the proposed project site. The landscape character analysis includes the development of detailed descriptions for the major landscape characteristics that include landform, vegetation, water, and land use. In addition, a review of the study area user groups, distance zones to the project site, and consideration of the recreational opportunity spectrum (ROS) analysis are included in the determination of the existing character.

B. Determination of Project Visibility

The viewshed analysis were conducted to determine the geographic areas that include visually sensitive resources, historic and cultural resources, and public vantage points that would have potential visibility to the project from within the study area. The manner in which the visibility analyses were conducted is described below.

1. Viewshed Mapping

Viewshed maps define areas of potential Project visibility by identifying areas within the study area that could have an unobstructed line of sight from the viewer to any portion of one or more of the proposed turbines (NYSDEC, not dated). Topographic viewshed maps for the Project were prepared by EDR using 10-meter resolution USGS digital elevation model (DEM) data, the location and height of all proposed turbines (see Figures 2 and 3), and ESRI ArcGIS® software with the Spatial Analyst extension. Two, ten-mile radius topographic viewsheds were mapped, one to illustrate “worst case” visibility (based on a maximum blade tip height of 149 meters above existing grade for Turbines #1 - #8 and 136 meters above existing grade for Turbine #9) and the other to illustrate potential visibility of the turbine hubs (based upon the hub height of 92.5 meters above existing grade for Turbines #1 - #8 and 79.5 meters above existing grade for Turbine #9).

The ArcGIS program defines the viewshed (using topography only) by reading every cell of the DEM data and assigning a value based upon visibility from observation points throughout the study area. The resulting topographic viewshed maps define the maximum area from which any portion of any turbine within the completed Project (up to either the maximum blade tip height or the hub height) could potentially be seen within the study area (ignoring the screening effects of existing vegetation and structures).

Because the screening provided by vegetation and structures is not considered in this analysis, the topographic viewshed represents a "worst case" assessment of potential Project visibility. Topographic viewshed maps assume that no trees exist, and therefore, are very accurate in predicting where visibility will not occur due to topographic interference. However, they are less accurate in identifying areas from which the Project would actually be visible. Trees and buildings can limit or eliminate visibility in areas indicated as having potential Project visibility in the topographic viewshed analysis.

To supplement the topographic viewshed analysis, a vegetation viewshed was also prepared to illustrate the potential screening provided by forest vegetation. A base vegetation layer was created using the 2011 USGS National Land Cover Dataset (NLCD) to identify the mapped location of forestland (including the Deciduous Forest, Evergreen Forest, and Mixed Forest NLCD classifications). Based upon standard visual assessment practice, the mapped locations of the forest land were assigned an assumed height of 40-feet and added to the DEM. Field review of the study area indicated that much of the forest vegetation within the study area is significantly taller than 40 feet, making this assumption a very conservative assumption. The viewshed analysis was then repeated, as described above. As with the topographic viewshed

analysis, two vegetation viewsheds were mapped, one to illustrate the “worst case” visibility (based upon a maximum blade tip height of 149 meters above existing grade for Turbines #1 - #8 and 136 meters above existing grade for Turbine #9) and the other to illustrate potential visibility of turbine nacelles (based on the hub height of 92.5 meters above existing grade for Turbines #1 - #8 and 79.5 meters above existing grade for Turbine #9). Once the viewshed analysis was completed, the areas covered by the forest vegetation layer were designated as “not visible” on the resulting data layer. Although there are certainly areas of mapped forest that have natural or constructed clearings that provide open outward views, these openings are generally rare, and the available views would typically be narrow/enclosed and include little of the proposed Project. In most forested areas, views will be well screened by the overhead tree canopy. During the growing season, the forest canopy will fully block views of the proposed turbines, and such views will typically be almost completely obscured, or at least significantly screened by tree trunks and branches, even under “leaf-off” conditions.

As it accounts for the screening provided by mapped forest stands, the vegetation viewshed is a much more accurate representation of the potential Project visibility. However, it is important to note that because screening provided by buildings and street/yard trees, as well as characteristics of the proposed turbines that influence visibility (color, narrow profile, distance from viewer, etc.), are not taken into consideration in the viewshed analyses, being within the viewshed does not necessarily equate to actual Project visibility.

C. Field Data Collection

Field data collection was conducted on a clear, high visibility day(s), using the previously developed visual simulations by the offices of Jean Vissering and LandWorks to confirm the approximate field data collection point. If previous simulations were unavailable for a proposed viewpoint, existing landform and identifiable structures were used as reference points in the photographs. The field data collection exercise for the project was conducted by Terraink staff and the staff of the technical sub-consultant, EDR, through field visits, which included:

1. 22 February 2016 – A Site Inspection was held, which included all the docket parties and intervenors. The Site Inspection included visiting specific vantage points within the 10-mile project area that included Crotched Mountain, Gregg Trail, Nubanusit Lake Boat Launch, Willard Pond, Island Pond Boat Ramp, Keene Road Substation Location, Gregg Lake Beach, Meadow Marsh, and White Birch Point. Character photos and field notes were recorded by Terraink at each of the eight stops. Character photographs were taken using a Canon PowerShot ELPH 170 IS Digital Camera at varying focal lengths.

2. 19-20 March 2016 – Photographic field visit was conducted by two field crews by foot, canoe, and automobile within the 10-mile study area during late winter season. The purpose of this visit was to determine if unobscured lines of sight to the Project were available from identified sensitive sites, and to obtain photographs for subsequent use in the development of visual simulations. Clear to partly cloudy skies provided good visibility, and a representative variety of lighting conditions throughout the field review. The field visit included, but was not limited to, specific vantage points based upon the SEC Decision. The sites included Willard Pond, Bald Mountain, Goodhue Hill, Gregg Lake, White Birch Pint Historic District, Meadow Marsh Preserve, Robb Reservoir, Island Pond, Pitcher Mountain, Highland Lake, Black Pond, Windsor Mountain, Meetinghouse Hill, Meeting House Hill Cemetery, Loverens Mill Cedar Swamp, Stacy Hill Road, Liberty Farm Road, Franklin Pierce Lake, and Crotched Mountain.

During the field verification, Terraink and EDR staff members drove public roads and visited potential scenic resources within the 10-mile radius study area to document locations from which the proposed wind turbines would likely be visible, partially screened, or fully screened under “leaf-off” conditions. This determination was made based upon the degree of tree screening present when looking toward the Project Site, and visibility of the ridgeline where the turbines are proposed. At several of the locations visited, photography and simulations from previous visual studies for the Project were used to help identify the location of open views. EDR’s Photos were taken from a total of 75 representative viewpoints within the study area. All photos were obtained using digital SLR cameras with the focal length set between 28 and 35 mm (equivalent to between 45 and 55 mm on a standard 35 mm film camera). This focal length is the standard used in visual impact assessment because it most closely approximates normal human perception of spatial relationships and scale within the landscape. Terraink’s supplemental character photographs were taken using a Canon PowerShot ELPH 170 IS Digital Camera at varying focal lengths, and were not used for any of the visual simulations.

Viewpoint locations were determined using hand-held global positioning system (GPS) units and high-resolution aerial photographs (digital ortho quarter quadrangles). The time and location of each photo were documented on all electronic equipment (camera, GPS unit, etc.) and noted on field maps and data sheets (see Appendix E). Viewpoints photographed during field review generally represented the most open, unobstructed available views toward the Project site (see representative photos from each viewpoint in the Photo Log included in Appendix D).

D. Determination of Visual Impact

In addition to the viewshed mapping and field verification, the VIA also employs the use of 3-D modeling and visual simulations to assist in the determination of visual impact within the study area as interpreted by a panel of Registered Landscape Architects. The manner in which the determinations were made is described below.

1. Viewpoint Selection

The viewpoints that were indicated as having potential visibility throughout the viewshed mapping process, and were verified during the field data collection, are further evaluated as to their suitability for visual simulations that will be used by the rating panel. The viewpoints are evaluated based upon the range of landscape character they exhibit within the study area, the level of potential turbine visibility, the duration and angle of view, the time of day, leaf-on or leaf-off conditions, and the screening effect of the existing built form and/or vegetation in the view. The final selection of viewpoints to be developed into visual simulations includes those that have a high level of contrast (worse-case scenario) and include a range of character zones within the study area.

2. Visual Simulations | Photo Renderings

To illustrate anticipated visual changes associated with the proposed Project, high-resolution computer-enhanced image processing was used by EDR to create realistic photographic simulations of the proposed Project from each of the 14 selected viewpoints. The photographic simulations were developed by using Autodesk 3ds Max Design® to create a simulated perspective (camera view) to match the location, bearing, and focal length of each existing conditions photograph. Existing landscape features within the view (e.g., hills, lakeshores, buildings, roads) were modeled based upon aerial photographs and DEM data in AutoCAD Civil 3D®. A three dimensional (“3-D”) topographic mesh of the landform (based on DEM data) was then brought into the 3-D model space. At this point, minor adjustments were made to camera and target location, focal length, and camera roll to align all modeled elements with the corresponding elements in the photograph. This assures that any elements introduced to the model space (i.e., the proposed turbines and meteorological tower) will be illustrated in proportion, perspective, and proper relation to the existing landscape elements in the view. Consequently, the alignment, elevations, dimensions, and locations of the proposed Project structures will be accurate and true in their relationship to other landscape elements in the photograph.

To-scale computer models of the proposed wind turbines and meteorological tower were prepared based upon specifications and data provided by the Applicant (see representations

of 3-D models in Figure 3). Using the camera view as a guide, the visible portions of these modeled Project components were imported to the landscape model space described above and then set at the proper coordinates. Coordinates for proposed structures were provided to Terraink and EDR by the Applicant. For the purpose of this visual impact assessment, and in accordance with SEC guidance, all turbines were shown with the rotors facing the viewer, and at least one turbine was shown with a blade in the 12:00 o'clock position to illustrate maximum height. The turbines were assumed to be white in color and the meteorological tower was assumed to be unpainted galvanized steel.

Once the proposed Project was accurately aligned within the camera view, a lighting system was created based upon the actual time, date, and location of the photograph. Using the Mental Ray Rendering System® with Final Gather and Mental Ray Daylight System® within the Autodesk 3ds Max Design® software, light reflection, highlights, color casting, and shadows were accurately rendered on the modeled Project based on actual environmental conditions represented in the photograph. As directed by the SEC guidelines, no hazing or fog effect was applied to any of the modeled structures.

The rendered Project was then superimposed over the photograph in Adobe Photoshop CS5® and portions of the Project that fell behind vegetation, structures, or topography were masked out. Photoshop was also used to take out any existing vegetation proposed to be removed as part of the Project. The extent of vegetation removal shown at the base of each turbine, at the base of the meteorological tower, and along all proposed Project access roads was based on proposed clearing limits provided by the Applicant. As the new Project components were added to the photo, any shadows cast on the ground by the proposed structures were also included by rendering a separate "shadow pass" over the DEM model in Autodesk 3ds Max Design® and then overlaying the shadows on the simulated view with the proper fall-off and transparency using Adobe Photoshop CS5®. A graphic illustration of the simulation process is included in Figure 4.

3. Rating Panel

A rating panel of three Registered Landscape Architects; two in-house landscape architects and one consultant landscape architect, experienced in the visual rating process and familiar with wind power projects, was utilized in this VIA to determine the levels of scenic quality and sensitivity within the existing viewpoint conditions, as well as the level of contrast with the proposed project in place. Each rating panel member received a rating package that included the (14) simulation views, a rating form developed by Terraink, reference sheets, and viewpoint and sensitive site maps. The rating forms are based upon the Bureau of Land Management,

Visual Resource Management System (VRM) methodology and includes an existing conditions form that elicits a verbal description of the existing view. The evaluator then rates the view from Low (1) to High (5) relative to the scenic quality of the existing view based upon key factors; including, landform, vegetation, water, color, adjacent scenery, scarcity, cultural modification. These ratings were totaled and averaged in order to develop a scenic quality total. The existing conditions form also examined the sensitivity levels of users and adjacent land use or special areas, also ranking from Low (1) to High (5). Upon totaling and averaging these two rankings, a sensitivity level classification was able to be assigned to the existing viewpoint. The proposed conditions were also described and rated from None (0) to Strong (5) in contrast to key factors such as landform, water, user activity, land use, and special areas. Note was made as to any variable effects and recommended mitigation measures. Each rating panel member's comments and rankings were then tallied into a composite rating for each viewpoint simulation.

IV. EXISTING VISUAL CHARACTER

The project visual study area is determined by the *Site 301.05; Effects on Aesthetics* visual assessment methodology requirements, which includes a 10-mile radius surrounding each individual wind turbine. The aggregate turbine radii make up the entire study area of 353.2-square miles, that includes 105-square miles of public and private conservation land in the Town of Antrim, Hillsborough County, New Hampshire (Figure 5) which is described below in further detail in its physiographic characteristics that include, but are not limited to the existing landform, vegetation, water resource, land use, cultural features, and user activity that occur within the study area.

A. Existing Visual Setting

1. Landform

The State of New Hampshire is part of the overall physiographic providence of New England and has three sub-categories within it, i.e., Seaboard Lowland Section, New England Upland Section, and White Mountain Section as described in the USGS *Physiographic Divisions of the United States* (Fenneman and Johnson 1946).

The New England Upland Section physiographic region is described by Fenneman (1946, p. 358) as “an unpraised peneplain bearing occasional monadnocks and dissected by narrow valleys.” The region is significantly modified by glaciation, resulting in rolling, rounded topography and numerous lakes. The visual study area is consistent with this physiographic description and includes rolling topography with small mountains at the center of the study area that transition to the lower elevation waterway and wetland regions that border the project site. The topography within the study area ranges from 2,000-feet in the mountains with the highest

elevations at Pitcher Mountain (2,153-feet), Crotched Mountain (2,066-feet), Bald Mountain (2,037-feet), Willard Mountain (1,920-feet), Robb Mountain (1,920-feet), Tuttle Hill (1,760-feet) and Goodhue Hill (1,620-feet) to less than 1,000-feet in the low-lying areas that feed into the Contoocook River watershed, which is part of the Merrimack River Basin.

The New England physiographic providence can be further detailed by referencing *The Nature of New Hampshire* (Sperduto and Kimball 2011), which describes eight ecological regions within the State of New Hampshire. The visual study area is located in the physiographic transition between the Monadnock-Sunapee Highlands and Southwest New Hampshire Lowlands ecological regions and is a combination of characteristics between the two ecological typologies. The northern extents of the study area reflect the Monadnock-Sunapee Highland characteristics of low hills and small mountains, no major river valleys but numerous lakes and ponds with small marshes, swamps, and wetlands. The soils are rocky and a moderate to shallow depth with granite bedrock and metamorphic rock below. A Laurentian mixed forest, which is a mix of conifer and hardwood forest with hemlock-hardwood-pine, as the dominant vegetation cover. However, the southern portions of the study area take on the characteristics of the Southwest New Hampshire Lowland rolling hills, drumlins, broad and narrow stream and river valleys that lead to the Connecticut and Merrimack River Valleys. The glacial till soils are generally acidic with granite bedrock below. Dominant vegetation cover consists of Laurentian mixed forests and Appalachian oak and pine forests. The relatively lower elevations in this region have abundant lakes, ponds, wetlands, and swamps.

2. Vegetation

The visual study area is predominately a northern hardwood forest that include maple, beech, birch and oak species, in addition to hemlock and spruce. The pre-settlement forest of the region included white pine and hemlock with the hardwood forests becoming dominant after the impacts of farming and timber harvesting on the land. The regional woodland is also an important component of the *Quabbin to Cardigan Conservation Collaborative* (Q2C) that is 100-miles of both public and private interconnected conservation lands along the Monadnock-Sunapee Highlands that extends from Mount Cardigan, New Hampshire to the Quabbin Reservoir in Central Massachusetts. The intact, contiguous forestland is one of the largest remaining woodland corridors in central New England and provides habitat to many birds and animals that are in decline elsewhere in the region. There are also small agricultural lands and grazing areas within the study area; however, the rocky and hilly terrain preclude major agricultural field production.

The immediate project area at Willard Mountain and Tuttle Hill consists of mature forested landscapes including steep slopes, and undeveloped woodland areas that are in various stages of successional growth as a result of the cessation of sheep farming, as well as from the periodic timbering activities. The project area was previously recommended for permanent land conservation in order to protect the wildlife corridors and unfragmented forestlands within the *Antrim Master Plan and Open Space Conservation Plan for Antrim* (2010).

3. Water

The State of New Hampshire has established a *Rivers Management and Protection Program; RSA 483:1* that reads “New Hampshire’s river and streams comprise one of its most important natural resources, historically vital to New Hampshire’s commerce, industry, tourism and the quality of life of New Hampshire people.” The Contocook River, which forms the boundary between the Towns of Antrim and Bennington, and the North Branch of the Contocook, which flows from the Town of Stoddard to its confluence with Contocook River, are designated rural rivers under the River Management and Protection Program. It is important to note that the rural river designation states that “some instream structures may exist, including low dams, diversion works, and other modifications” but no new dams or channel alterations shall be permitted without extenuating circumstances. In addition to the two major rivers in the Town of Antrim, the study area also hosts several lakes, ponds, and streams that are both important water and sensitive resources; however, they also provide active and passive recreational opportunities such as swimming, boating, canoeing, kayaking, hiking, and fishing. The most prominent waterbodies in the study area include, in alphabetical order: Campbell Pond (17-acres), Cochran Brook, Franklin Pierce Lake (483-acres), Great Brook, Gregg Lake (201-acres), Lily Pond (10-acres), Mill Pond (2-acres), Rye Pond (13-acres), Steele Pond (36-acres), and Willard Pond (110-acres). In total, the Town of Antrim has 1,572-acres of water, 88-miles of streams and 1,592-acres of wetland, which in total reflect 14% of the Town’s land holdings.

4. Land Use

In 2007, the Town of Antrim was recorded to be 23,368-acres (36.50-square miles) of land with 4,928-acres (7.5-square miles) of Conservation/Public Lands, 1,572-acres of water, 88-miles of streams, and 1,592-acres of NWI Wetlands, with the remaining 16,183-acres of land in use. It should be noted that the proposed wind project is to be constructed in the rural conservation district. Of the land that is in use, the Town of Antrim Master Plan indicates the following land uses; Residential, Conservation, Public/Institutional, Undeveloped, Industrial, and Commercial, which were used as a means to categorize the various land uses within the study area.

a. Residential (Res)

The residential land use includes structures and land that have a mix of single and multi-family housing, as well as apartment buildings, condominiums, and manufactured and seasonal homes.

b. Conservation (Con)

Conservation lands are permanently held lands that prohibit development and can be owned by a variety of public and private individuals and agencies.

c. Public/Institutional (Pub/Inst)

The public/institutional land is owned and/or used by non-profit organizations and the public. Public utilities, such as sewer and water are included in this land use, along with public and private schools, a library, churches, cemeteries, a fire station, and municipal buildings.

d. Undeveloped (Und)

Undeveloped lands do not include conservation land, but rather are areas that may not be in use due physical and environmental constraints such as steep slopes, poorly drained soils or there is a lack in demand to develop these areas.

e. Industrial (Ind)

The industrial land use includes facilities and land that are used for manufacturing, transportation, distribution, packaging, storage, wholesale trade, construction, gas, electric and sewage, communication services, and mining; however, it does not include lands for excavation and utilities.

f. Commercial (Com)

The commercial land use is both the land and facilities that provide goods and services to the general public. This includes retail and wholesale establishments, restaurants, lodging, service stations, grocery stores, as well as professional, medical and financial institutions.

B. User Groups

The project study area includes three major user groups, Local Residents, Commuters, and Recreational Users which each have a varying level of activity, duration of view, and use, which are considered when determining the sensitive levels of a visual resource.

1. Local User/ Residents (LU)

The local users/residents include both full-time and seasonal property owners and renters within the study area. Their level of sensitivity to visual change is variable based upon their history within the region and potential emotional attachment to the visual landscape that they routinely engage. The visual landscape that this user group will be most familiar with includes those that they routinely pass through while driving, shopping, working, and recreating, as well as from more stationary activities that take place in their neighborhood, property, and from within their homes.

2. Commuters (CO)

Commuters within the study area will tend to be concentrated along the major roadways and highways within the visual study area. These users tend to react less to visual changes within the transportation corridor since the majority of their view is forward focused, at a high speed with the driver concentrating on traffic activity and patterns. However, commuters may have visual markers within the corridor they travel, but the duration in which they engage those views are often fleeting, except for the passenger, which would have more time to take in the visual landscape.

3. Recreational Users (RU)

Recreational users is a broad category including local residents, regional users, and tourists that visit the visual study area in order to participate in both passive and active recreational resources such as parks, nature preserves, lakes and ponds, historic sites, camps, sports, hunting and fishing activities, as well as summer and winter sports such as swimming, sailing, water skiing, boating, snowmobiling, downhill, and cross country skiing, etc. These users can be sensitive to visual change depending upon the type of recreational use within which they are participating.

C. Distance Zones

The most commonly referred to visual assessment resources; the Bureau of Land Management, *Visual Resource Management System (VRM)*, the United States Army Corp of Engineers, *Visual Resource Assessment Process (VRAP)*, the United States Department of Agriculture, Forest Service, *Landscape Aesthetics Handbook* and the United States Department of Transportation, Federal Highway Commission, *Guidelines for the Visual Assessment of Highway Projects*, all reference the use of distance zones when evaluating visual resources. The distance zone is important because the distance between the viewer and what the object of their view directly affects the perceived level of color, texture, scale, and patterns experienced. However, each of these respected agencies has a slightly different definition for distance zones, and therefore, for the purposes of this VIA, the distance zones are defined as follows:

1. Foreground (FG)

The foreground is the immediate view to the project area where elements have a high level of visual detail, texture, and color. Atmospheric conditions have less effect in this distance zone. This zone is within the first 0 to 1/2-miles of the project site.

2. Midground (MG)

The midground is where the view to the project site is able to be viewed in detail. At the furthest boundary of this distance zone, the texture and form of individual elements are no longer discernable but instead become part of a unit, geometric shape, line, or mass. Atmospheric conditions can reduce visibility and shorten the distance that is normally covered by each zone. This zone is more than 1/2-mile up to 5-miles from the project site.

3. Background (BG)

The background is the long distance view of the project area where elements are seen as a topographic form or outline, and vegetation takes on a light and dark quality. This zone is more than 5-miles up to 15-miles from the project site. Atmospheric conditions can severely reduce visibility and full obliterate visibility at the 15-mile distance.

D. Recreational Opportunity Spectrum (ROS)

The Recreational Opportunity Spectrum (ROS) is an experience based inventory system developed by the United States Department of Agriculture; Forest Service that is based upon the premise that individuals expect certain types of recreational experiences within public lands. The ROS was originally developed for public lands in the Western United States; however, it was further expanded in 2003 to be applicable to public lands in the Eastern States, USDA FS *General Technical Report NE-309*, where the public land areas are often smaller and closer to urban environments. The New England ROS inventory system separates incompatible managerial and user activities, thereby maintaining recreational settings that are in keeping with the user expectations, and is "intended to safeguard the quality of the natural, aesthetic, and cultural resources and of the visitor experience". The ROS classes for New England include; Primitive, Semiprimitive Nonmotorized, Semiprimitive Motorized, Semideveloped Natural, Developed Natural, and Highly Developed Large Natural, Highly Developed Small Natural and Highly Developed Facilities. Each ROS class has two inventory classifications and five inventory criterion that further define the quality and experience that can be found within each class.

This VIA has utilized the first two New England ROS inventory classifications; Setting and Experience, and the initial criteria; Remoteness to categorize the level of experience, i.e.,

remoteness and user sensitive or sensitivity that a recreational user could expect to have within the project study areas visually sensitive resources. Summarizations of the New England ROS classes are included below; however, the full description of each class is included in Appendix A; Reference 1. The levels of remoteness and user sensitivity considered as part of this VIA are as follows:

1. Primitive (P) | Level of Remoteness/User Sensitivity: High

Primitive classes are large tracts of essentially unmodified natural environment. There may be remnants of past human intervention; however, they are subordinate to its natural state. There is a low level of user interaction and minimal evidence of other users. The areas are generally management free, and motorized or mechanized use is not permitted. Timber harvesting and vegetation management are not compatible with this class. There is an extremely high probability that users will experience isolation from human development, use and impact, and their experience is likely to include independence, closeness to nature, tranquility, and self-reliance in an environment that offers a high degree of challenge and risk. Primitive areas are at least 2-3 miles from all maintained roads, railroads, or trails with designated motorized or mechanized use.

2. Semiprimitive Nonmotorized (SPNM) | Level of Remoteness/User Sensitivity: Moderate

Semiprimitive Nonmotorized areas are medium-to-large in size and appear to be a predominately natural or natural appearing environment. There is a low level of user interaction; but evidence of other users is evident. The area is managed with subtle on-site controls and restrictions. Nonmechanized use predominate, however mechanized, uses may be permitted, but motorized uses are not permitted. The area is managed for low-density, pedestrian recreation. Timber harvesting and vegetation management may occur on a short-term basis. Users will have a moderately high probability of experiencing isolation from human development, use, and impact, and their experience is likely to include independence, closeness to nature, tranquility, and self-reliance in an environment that offers challenge and risk. Area is at least 1/2-miles (but not farther than 2 to 3-miles) from all maintained roads, railroads, or trails with designated motorized or mechanized use; can include unimproved roads and trails if usually closed to motorized use.

3. Semiprimitive Motorized (SPM) | Level of Remoteness: Moderate

Semiprimitive Motorized areas are medium-to-large in size and are a natural or natural appearing environment where the interaction between users is low, but evidence of other users is apparent. The area is subtly managed with minimum on-site controls and restrictions, and mechanized uses may be permitted. All mechanized and motorized uses are restricted to

designated corridors, and primary motorized travel corridors are not permitted. Timber harvesting and vegetation management are compatible. Users will have a moderate probability of experiencing isolation from human development, use and impact, and their experience will likely include a high degree of interaction with the natural environment, but a moderate probability of experiencing independence, closeness to nature, tranquility and self-reliance in an environment that offers challenge and risk. Opportunity to use motorized equipment. Area may contain unimproved roads or secondary trails but is at least 1/2-miles from any improved, maintained roads, railroads, or primary motorized or mechanized trails.

4. Semideveloped Natural (SDN) | Level of Remoteness: Moderate

Semideveloped Natural areas are naturally appearing environments that include moderate levels of human activity and sounds that usually harmonize with the natural environment. The interactions between users may be low to moderate, but there is prevalent evidence of other users. Resource modification and utilization practices are evident but harmonize with the natural environment. Construction standards and facility design accommodate conventional motorized and mechanized uses. Motorized and mechanized uses are permitted. Trail uses are managed in designated, maintained corridors. Many timber harvesting and vegetation management practices are compatible. Users have an equal probability of encountering other user groups and experiencing isolation from sights and sounds of people. There is an opportunity for a high degree of interaction with the natural environment; however, challenge and risk opportunities generally are not important. Opportunities for both motorized and nonmotorized forms of recreation are possible. Area is within 1/2-mile from improved, maintained roads, railroads, or trails.

5. Developed Natural (DN) | Level of Remoteness/User Sensitivity: Low

Developed Natural areas are a substantially modified natural environment where resource modification and utilization practices are employed to enhance specific recreation activities and maintain vegetative cover and soil. The sights and sounds of people will be readily evident, and user interactions will be moderate to high. Many facilities are designed for use by a large number of people; however, the density levels decline with increasing distance from developed sites. The facilities are designed for large groups; intensified motorized and mechanized uses and parking is available. All trail uses may be permitted. Users may pass through various landscape types, and many timber harvesting and vegetation management practices are compatible. The physical setting is not as important as the activity opportunity, and risk taking and testing of outdoor skills generally are unimportant except for specific activities in which challenge and risk-taking are important elements, e.g., mountain skiing. No distance criteria from improved, maintained roads, railroads, or trails.

6. Highly Developed – Large Natural (HDLN) | Level of Remoteness/User Sensitivity: Low
Highly Developed – Large Natural areas contrast with the surrounding cityscape; however, suburban/urban elements are common and readily apparent. Vegetation often is non-native and manicured, and users can choose between social and secluded areas within a naturalistic setting that may include benches, footpaths and gathering areas. A large number of users can be expected, both onsite and in nearby areas, and facilities are designed to serve individuals or small groups but can accommodate high use. Access is available through a variety of means, including pedestrian, motorized, mechanized and mass transit. Most types of recreational experience are consistent with this class, but emphasis is on generally unstructured activities such as community gardens, open trails, beaches, and picnic areas. The observation of natural appearing elements is important; however, nature-related challenge and risk opportunities generally are not important. Opportunities for unstructured uses of highly human influenced parks and open spaces are common. No distance criteria from improved, maintained roads, railroads, or trails.

7. Highly Developed – Small Natural (NDSN) | Level of Remoteness/User Sensitivity: Low
The Highly Developed – Small Natural setting is in contrast with the surrounding cityscape, but suburban/urban elements are common and readily apparent. The sights and sounds of people are expected and desired, and the site design facilitates social encounters in a naturalistic setting. “Naturalistic” may include highly designed environments that incorporate noninvasive, exotic species. For the user, observing natural appearing elements is important; however, nature-related challenge and risk opportunities generally are not important. Opportunities for unstructured uses of highly human influenced parks and open spaces are common. No distance criteria from improved, maintained roads, railroads, or trails.

8. Highly Developed – Facilities (HDF) | Level of Remoteness/User Sensitivity: Low
The Highly Developed – Facilities area is characterized by a substantially developed environment that is highly structured to accommodate the activity being provided. Social encounters are expected and often programmed, and the site design is dictated by the requirements of the particular activities involved. Most types of recreational experience are consistent with this class, but facilities tend to be designed and managed for specific activities such as; skate parks, tennis courts, ball fields. Social encounters are expected. And site activity access is convenient. The physical setting is not as important as the activity opportunity. Challenge and risk opportunities are not important, except for specific activities in which challenge and risk taking are important elements, e.g., sports completion. Opportunities for competitive and spectator sports and organized events in highly human-influenced parks and

open spaces are common. No distance criteria from improved, maintained roads, railroads, or trails.

V. EXISTING VISUAL RESOURCES

Typically, when conducting a VIA, great effort is taken to thoroughly review the Federal, State, and Regional visually sensitive resources that are located within the project study area, in this case 10-miles. However, since the visually sensitive resources for the study area have been previously identified by the SEC, Counsel for the Public's former expert, Jean Vissering, as well as in Antrim 1 and most extensively by their current visual expert, LandWorks, it was determined that a third comprehensive review of Federal, State and Regional visually sensitive resources was not required. Therefore, Terraink has applied the definitions of the SEC Site 102.45 "Scenic Resources" to this VIA task and developed a comprehensive visually sensitive resources map for the entire project study area (see Figure 6). Terraink then supplemented the map with a focused examination of the sensitive sites that were prominent within the Jean Vissering VIA, LandWorks VIA, and the SEC Decision; Docket No. 2012-01; dated April 25, 2013, as well as the additional sites determined during the Applicant's Site Tour on the 22 February 2016.

A. Sensitive Resources Identified by the SEC Decision

The following sensitive resources were highlighted by the SEC Decision; Docket No. 2012-01; dated April 25, 2013; page 50 as being visually sensitive resources that would have "significant qualitative impacts" as a result of the Antrim Wind Power Project. The sensitive resources are described individually below and also listed in Table 1.

1. Willard Pond; Willard Pond Road, Antrim, NH

Willard Pond is approximately 110-acres within the 1,700-acre dePierrefeu-Willard Wildlife Sanctuary and is a valuable cold-water fishery and natural area. No petroleum motors are allowed on the pond and hunting, firearms, camping, fires and swimming are also prohibited. There are great opportunities for canoeing, kayaking, fly fishing, bird watching and hiking and other passive recreation activities; however, no horses, bicycles or motor vehicles are allowed on the trails. Views to the project study area from Willard Pond boat ramp and from the pond itself are from within a conservation land use with the turbines visible at a midground distance.

2. Bald Mountain; Willard Pond Road, Antrim, NH

Bald Mountain (2,037-feet) is one of the highest summits in Hillsborough County and is a premiere hiking spot within the 1,700-acre dePierrefeu-Willard Wildlife Sanctuary. The Tamposi Trails travel through large boulder formations up to a stunning ledge overlook that provides expansive views to Willard Pond and the greater Antrim landscape. The Bald Mountain summit allows worthy 180-degree view to Goodhue Hill, Crotched Mountain, North Pack Monadnock,

Mount Kersarge and Cardigan Mountain. Views to the project study area from the Bald Mountain ledges off the Tamposi Trail are from within a conservation land use with the turbines visible at a midground distance.

3. Goodhue Hill; Willard Pond Road, Antrim, NH

Goodhue Hill (1,620-feet) is a hiking area also within the dePierrefeu-Willard Wildlife Sanctuary. The Mill Pond trail cross an old stone dam before spurring off to the Goodhue Hill Trail that leads to a recent 15-acre woodland clearing that provides expansive views to Bald Mountain and the Willard and Tuttle Hill Ridge, but more importantly, the clearing provides successional habitat for predators, large and small mammals and a variety of birds. Views to the project study area from the successional meadow opening on the Goodhue Hill Trail are from within a conservation land use with the turbines visible at a midground distance.

4. Gregg Lake; Gregg Lake Road, Antrim, NH

Gregg Lake is approximately 201-acres and is a moderate warm water fishery that feeds into Great Brook, and in turn the Contoocook River. It is an active public recreation resource for Antrim that allows petroleum boats with motors under 150hp and water skiing as long as it is in a counter-clockwise direction. Other active recreation activities include sailing, canoeing, and kayaking and beach activities such as sand sports, picnicking and grilling. Bird watching opportunities are available in the adjacent Meadow Marsh natural area at the north end of Gregg Lake. Views to the project study area from Gregg Lake, as well as from the public picnic area are from within a public recreational area and residential land use with the turbines visible at a midground distance.

5. Meadow Marsh Preserve; Craig Road and Hattie Brown Road intersection, Antrim, NH

The Meadow Marsh Preserve includes wetlands on either side of Craig Road. Hikers pass over a small wooden bridge and connect to the Meadow Marsh Trail that occurs on both sides of Craig Road. Upon crossing Hattie Brown Road, the trail leads to a small wooden bench overlook with views across the wetland to Bald, Robb and Willard Mountains and Tuttle Hill. Views to the project study area from Meadow Marsh bridge crossing on Craig Road, as well as from the Meadow Marsh Trail viewing bench are from within a conservation land use with the turbines visible at a midground distance.

6. Robb Reservoir; NH State Route 123, Stoddard, NH

Robb Reservoir is 96-acres of water within 1,670-acres of land that is described as having one of the most diverse ecosystems in New England, providing critical habitats for plants, birds and fish species. The environmental importance of this land parcel led to a permanent conservation easement being placed on the land in 2008 by the New Hampshire Division of Forest and

Lands, in partnership with The Harris Center for Conservation Education. The Robb Reservoir land is included in the Harris Center Supersanctuary, which includes 14,000-acres of conserved land. The reservoir is accessed by a shore bank put in off State Route 123, which appears to have limited navigable access via small boat. Views to the project study area from Robb Reservoir are from the southern portion of the reservoir from within a conservation land use with the turbines visible at a midground distance.

7. Island Pond; NH State Route 123, Stoddard, NH

Island Pond is approximately 179-acres of warm water fishery that includes several small islands within the overall water body. There is a large beach and boat landing directly off of State Route 123 providing access for unsupervised swimming, canoes, kayaks, small sailboats and powerboats; however, personal watercraft are not allowed. Small private cottages dot the shoreline and there is an Island Pond Association (2016) whose purpose is to “promote the beauty of the area and maintain the purity of the water”. Views to the project study area from the Island Pond beach/parking area and lakeside cottages are from within a public recreation area and residential land use with the turbines visible at a midground distance.

8. Pitcher Mountain; State Route 123, Stoddard, NH

Pitcher Mountain (2,162-feet) is a frequently hiked mountain that is part of the Monadnock-Sunapee Greenway, and has an active fire tower on its summit. The mountain is readily touted as a superior wild blueberry picking area, including an “honor” payment can at the parking area for those that pick the berries for personal use. The mountain is readily accessible by a short woodland hiking trail, or it can be reached by a farm path that leads to the bucolic high pastures of the Faulkner Family Pitcher Mountain Farm. The open summit has 360-degree views to the regional landscape, which include Mount Monadnock, Mount Sunapee, distant White Mountain peaks and Vermont’s Green Mountains. In addition, it is also possible to see the Lempster Wind Project when viewing to the North. Views to the project study area from the Pitcher Mountain fire tower summit are from within a conservation land use with the turbines visible at a background distance.

9. Highland Lake; State Route 123, Stoddard and Washington, NH

Highland Lake is approximately 697-acres of warm water fishery that is split between the Towns of Stoddard and Washington, and is accessible from State Route 9, as well as State Route 31 and State Route 123. The lake is considered to have a high level of recreation value and offers a variety of active and passive recreation, including but not limited to power boats, personal watercraft, kayaks, canoes, sailing, fishing and swimming. The shoreline is heavily developed with residential properties; however, the majority of the watershed has remained as

undeveloped land and forest thereby maintaining an attractive rural aesthetic. Views to the project study area from Highland Lake are from within a public recreation area, residential and conservation land use with the turbines visible at a Midground-background distance.

10. Nubanusit Lake; Hunts Pond Road, Hancock and Nelson, NH

Nubanusit Lake is 718-acres and is considered a cold-water fishery that is also split between the two Towns of Nelson and Hancock with boat ramp access off of King's Highway in Hancock. The lake is heavily wooded with low levels of shoreline development due to the large tracts of conservation and public land, including the Louis Cabot Preserve (Island) that is owned by Keene State College. The lake has a variety of active and passive recreation activities including power boats, kayaks, canoes, sailing, fishing, fly-fishing, swimming and scuba-diving. A smaller pond, Spoonwood Pond is located on the north side of Nubanusit Lake, separated by a small dam and offers passive recreation use as well. Views to the project study area from Nubanusit Lake are limited to a small section of the southern portion of the lake from within a public recreation area and residential land use, which could possibly have the tips of turbines visible at a background distance.

11. Black Pond; Black Pond Road, Windsor, NH

Black Pond is one of three ponds found in the Town of Windsor, and is the principal water body with White Pond and Bagley Ponds being smaller in size. There is little evidence to support that Black Pond is a significant public recreation or fishing location; however, the pond is important to the private institutions of the Wediko School, Windsor Hills Camp and Retreat Center and the Windsor Mountain International Summer Camp. The Black Pond lakeside setting is described as being quiet and pristine, and each of these academic and recreational institutions has views across the pond towards the Tuttle Hill and Willard Mountain ridge. Views to the project study area from Black Pond are from within a public/institutional land use with the turbines visible at a midground distance.

12. Franklin Pierce Lake; State Route 9, Antrim and Hillsborough, NH

Franklin Pierce Lake, also known as Jackman Reservoir, includes the southern third of the lake in the Town of Antrim, while the main body of the lake is in the Town of Hillsborough. The reservoir was originally formed in 1926 when the Jackman Dam and Power Plant was constructed. The lake is approximately 483-acres and is considered a warm water fishery. Petroleum boats are allowed on the lake with water access available at Manahan Park. Other active recreation opportunities such as personal watercraft, fishing, water skiing, sailing and boating, as well as more passive activities such as swimming and bird watching. There are numerous recreational opportunities available for recreational users, as well as the population

of lakeshore residents. Views to the project study area from Franklin Pierce Lake are from within a public recreation area and residential land use with the turbines visible at a midground distance.

B. Supplemental Sensitive Resources Identified during the SEC Site Tour.

The supplemental sensitive resources are described individually below and also listed in Table 2.

13. Crotched Mountain; Mountain Road, Bennington, NH

Crotched Mountain (2,055-feet) is a classic Monadnock Region hike with opportunities for a variety of users including families with children and seniors. The summit of Crotched Mountain lacks views due to the dense tree cover; however the trails include a variety of environmental conditions including protected forests, open fields, vernal pools and wetlands and dramatic ledges with views to the Merrimack River watershed. Views to the project study area from Crotched Mountain summit ledges are from within a public recreation area and conservation land use with the turbines visible at a background distance.

14. Crotched Mountain ADA Accessible Trail; Mountain Road, Bennington, NH

The mountain also offers the Crotched Mountain Accessible Trail System, which is part of the New Hampshire Fish and Game Department; Merrimack River Wildlife Heritage Trail that is “a system of natural areas and special places that connect people and communities with nature in the Merrimack River watershed”. The accessible trail leads to a formal viewing platform with interpretive signage that describes the Merrimack River Watershed, including the Willard Mountain and Tuttle Hill Ridgeline. Views to the project study area from Crotched Mountain Gregg Trail Accessible Route are from within a public recreation area and conservation land use with the turbines visible at a background distance.

15. White Birch Point Historic District; White Birch Point, Gregg Lake, Antrim, NH

The White Birch Point Historic District is a 40-acre parcel on the eastern shore of Gregg Lake on Pattern Hill (1,390-feet). The district is made up of 23 cottages that date to the early twentieth century and have varying degrees of original architecture and contemporary architectural additions. The district has been submitted to the New Hampshire Division of Historic Resources, as of 09/12/2012 but there is no record of a decision regarding the status of the National Register of Historic Places eligibility listing; however, in a letter dated 04/19/2013 The New Hampshire Division of Historical Resources (NHDHR) determined that the original Antrim Wind Power Project would have an “Adverse Effect” on the integrity of the White Birch Point Historic District. The USACE; Section 106 process is not resolved to date and a final designation has not been issued to date. Views to the project study area from White Birch Point

Historic District are from within a private recreation area and residential land use with the turbines visible at a midground distance.

16. Loverens Mill Cedar Swamp; Lovern Mill Road, Antrim, NH

Loverens Mill Cedar Swamp is an approximately 613-acre preserve jointly owned by The Nature Conservancy in cooperation with the Society for the Protection of New Hampshire's Forests (SPNHF). There are several trails that lead throughout the rarely occurring 50-acre boreal cedar swamp. In addition, the land links the 5,000-acre Pierce Reservation and the 1,693-acre Otter Brook Preserve. Views to the project study area from Loverens Mill Cedar Swamp are from within a conservation land use with the turbines visible at a foreground-midground distance.

17. Windsor Mountain; Farmstead Road, Windsor, NH

Located to the south of Black Pond, Windsor Mountain is a rural residential area with limited road and hiking trail access into the private residential area. Windsor is the smallest Town in New Hampshire, but has expansive views across the North Branch River valley to the Tuttle Hill and Willard Mountain ridge. Views to the project study area from Windsor Mountain are from within a private residential land use with the turbines visible at a midground distance.

18. Meetinghouse Hill Cemetery; Meetinghouse Hill Road, Antrim, NH

Meetinghouse Hill Cemetery is the oldest cemetery in the Town of Antrim, dating back to 1785. The headstones are in excellent condition and great care is taken in the maintenance of the grounds. There is a hiking trail, the Hurlin Trail, that begins at the cemetery and goes to Route 31 (opposite Center Cemetery) passing through woodland areas, glacial erratics, ledges and a beaver dam. Views to the project study area from Meetinghouse Hill Cemetery are from within a private land use with the turbines visible at a midground distance.

19. Meetinghouse Hill Summit; Meetinghouse Hill Road, Antrim, NH

Meetinghouse Hill (1,370-feet) is the oldest settled area of Antrim. Views to the project study area from Meetinghouse Hill summit are from within a private residential land use with the turbines visible at a midground distance.

20. Stacy Hill Road; Antrim, NH

Stacy Hill Road is a representative view along rural residential roads to the north-west of the Project area that extend north-south and east west along the lower slopes of Windsor Mountain. Views to the project study area from the Stacy Hill Road are from within a public right-of-way and residential land use with the turbines visible at a midground distance.

21. Liberty Farm Road; Antrim, NH

Liberty Farm Road is a representative view along rural residential roads to the north-west of the Project area that extend north-south and east west along the lower slopes of Windsor Mountain. Views to the project study area from the Liberty Hill Road are from within a public right-of-way and residential land use with the turbines visible at a midground distance.

C. Cultural Features

In addition to the previously listed sensitive site resources, there are additional cultural features, intensive land use or man-made installations that are within the 10-mile viewshed of the proposed project site that a variety of small villages, commercial and industrial development, transportation corridors, and recreation areas. In addition to the areas of intensive land use, this assessment also includes sites that were deemed "Open Space Priorities" by the Public in the *Antrim Open Space Conservation Plan for Antrim*; dated 11/11/2005. The cultural features within the study area include, but are not limited to the following:

1. Intensive Land Use:

| | |
|-----------------------------|---|
| Towns of Antrim | Town of Bennington |
| Town of Hillsborough | Town of Stoddard |
| Town of Hancock | Town of Windsor |
| Hawthorne-Feather Airpark | Monadnock Paper Mill |
| Antrim Marketplace | Windsor Hill Camp and Retreat Center |
| Wediko School | Crotched Mountain Rehabilitation Hospital |
| Camp Cheboa Girl Scout Camp | Windsor Camp International Summer Camp |

2. Major Transportation Corridors:

| | |
|--------------------|--------------------|
| NH State Route 9 | NH State Route 31 |
| NH State Route 123 | NH State Route 137 |
| US Route 202 | |

3. Parks, Recreation and Natural Areas:

| | |
|---|-------------------------------------|
| Lily Pond, Ziegler/Hurlin Trail | McCabe Forest trail |
| diPierrefue-Willard Pond Wildlife Sanctuary | Bald Mountain Management Area |
| Meadow Marsh Conservation Area | Loverens Mill Cedar Swamp Preserve |
| Hosmer Wildlife Management Area | North Branch of the Cootocook River |
| Contocook River | Cochran Brook |
| Campbell Pond | Great Brook |
| Franklin Pierce Lake | Lily Pond |

| | |
|---------------|--------------|
| Gregg lake | Rye Pond |
| Mill Pond | Willard Pond |
| Steele's Pond | Shea Field |
| Memorial Park | Goodell Park |

4. Antrim Open Space Priorities; Specific Sites:

| | |
|----------------------------------|-----------------------------------|
| Meetinghouse Hill | Area around Gregg Lake |
| West side of Antrim | Great Brook |
| Contoocook River corridor | Girl Scout property at Gregg Lake |
| Loverns Mill, White Cedar Swamp | North Branch Village |
| Education Property/ North Branch | Campbell Pond |
| Route 9 business corridor | Gibson Mountain/ Pierce Lake Road |
| Tuttle Mountain area | Antrim Marketplace |

VI. VISUAL IMPACT ASSESSMENT

A. Analysis of Viewshed Maps

The viewshed analysis is conducted over a four-map series that reviews the potential visibility of the project from within the 10-mile study area. The first set of figures evaluates the potential visibility of the turbine blade tip, which is the worst case scenario for visibility, from sensitive resources using topography only to determine visibility, while the second viewshed mapping exercise utilizes both topography and vegetation to determine the level of visibility from the selected viewpoints. The same exercise is conducted for the second set of viewshed maps; however, it focuses on the turbine hub height as the basis for visibility in this VIA, but it should be noted that our preferred method of viewshed mapping is to run the mapping at set elevation just above the hub in order to simulate the potential visibility of FAA lighting as part of the viewshed analysis. For this VIA it was determined to conduct the viewshed mapping in the same method as LandWorks so as to keep the data results as consistent as possible. The findings of the viewshed mapping are included below (Figure 7; Sheets 1 - 4).

1. Topologic Viewshed; Blade Tip Visibility – Topography Only (Sheet 1 of 4)

The Blade Tip - Topography Only viewshed map indicates that the uppermost turbine blade tip, positioned at 12-o'clock, and are potentially visible within 46.2% (163-square miles) of the study area. Since this is a "topography only" viewshed map, it disregards the screening effect of vegetation, built form and structures and atmospheric conditions. The potential visibility to the project area is most heavily concentrated in the central, northeast and southeastern portions of the study area, with visibility diminishing in the southwest portion. The visual resources indicated as having potential project visibility include the (14) sensitive sites as

outlined in the SEC Decision; Willard Pond, Bald Mountain, Goodhue Hill, Gregg Lake, Meadow Marsh Preserve, Robb Reservoir, Island Pond, Pitcher Mountain, the southern portion of Highland Lake, the southeastern portion of Nubanusit Lake, Black Pond, and Franklin Pierce Lake. In addition, the supplemental that also have potential visibility and include Crotched Mountain, Crotched Mountain Accessible Trail, White Birch Point Historic District, Loverens Mill Cedar Swamp, Windsor Mountain, Meetinghouse Hill Cemetery, Meeting House Hill Road and local roadway right-of-ways such as Stacy Hill Road and Liberty Farm Road. In this worst-case scenario viewshed map, which is based solely only on topography interrupting the view to the uppermost turbine blade tips, most of the sensitive sites listed above have a possible view to 7-8 and 9 turbines, except for areas of Windsor Mountain, Nubanusit Lake, and Highland Lake, which indicate views ranging from 1-2, 3-4, and a limited amount of 5-6 turbines. The sites with the greatest potential view to the turbines are generally located within the central area of the 5-miles study radius, and are often from wetlands, water bodies and hillsides that are facing the project area. The amount of potential turbine visibility decreases in the 10-mile study area, but there are still higher concentrations of potential visibility to 9 turbines in the northeast, east and southeast portion of the study area.

2. Topologic Viewshed; Blade Tip Visibility – Topography and Vegetation (Sheet 2 of 4)

The Blade Tip - Topography and Vegetation viewshed map indicates that in the 12-o'clock positioned, the proposed turbine blade tips are potentially visible within 3.6% (12.5-square miles) of the study area. Since this is a "topography and vegetation" viewshed map, the mapping uses a base vegetation layer based upon the 2011 USGS National Land Cover Dataset (NLCD) to identify the mapped location of forestland. The mapped locations of the forestland were then assigned an assumed, conservative height of 40-feet and added to the USGS digital elevation model (DEM) data to represent the screening effect of vegetation; however, the potential screening from built form and structures, and atmospheric conditions is not accommodated within the mapping. The potential visibility to the project area is reduced by the inclusion of vegetation in the viewshed map with the most heavily concentrated occurrences in the central and eastern portion of the 5-mile study area from low lying areas, water bodies and open valley floors. The number of SEC and supplemental visual resources indicated as having potential project visibility are also reduced by the worst case scenario of using topography and vegetation in the viewshed mapping. The sensitive resources that still have a potential view to the uppermost tip are a majority of 5-6, 7-8 and 9 wind turbines, with the screening effects of vegetation in place include; Willard Pond, Gregg Lake, Island Pond, Loverens Mill Cedar Swamp, Franklin Pierce Lake and the White Birch Point Historic District. To a lesser degree, the sensitive resources of Meadow Marsh Preserve, Robb Reservoir, Highland Lake, Black Pond, and Nubanusit Lake have potential views to 1-2, 3-4 and some 5-6 wind turbines but from very selective locations. Due to the conservative nature of the NLCD

40-foot tree heights, sensitive resources such as Bald Mountain, Goodhue Hill, Pitcher Mountain, Windsor Mountain, Crotched Mountain, Crotched Mountain Accessible Trail, Meetinghouse Hill Cemetery, Meeting House Hill Road and local roadway right-of-ways such as Stacy Hill Road and Liberty Farm Road are indicated as having a very low to no potential views to the wind turbines; however, these sites will be field evaluated in order to determine what the actual potential visibility is to the proposed wind turbines.

3. Topologic Viewshed; Turbine Hub Visibility – Topography Only (Sheet 3 of 4)

The Turbine Hub - Topography Only viewshed map indicates that the turbine hubs of the proposed project turbines are potentially visible within 40.7% (143.7-square miles) of the study area. Since this is a “topography only” viewshed map, it also disregards the screening effect of vegetation, built form and structures and atmospheric conditions. The potential visibility to the project area continues to be most heavily concentrated in the central, northeast and southeastern portions of the study area, and visibility diminishes in the southwestern portion, especially in the 10-mile study area radius. The visual resources that continue to have potential project visibility include Willard Pond, Bald Mountain, Goodhue Hill, Gregg Lake, Meadow Marsh Preserve, Robb Reservoir, Island Pond, Pitcher Mountain, the southern portion of Highland Lake, Nubanusit Lake, Black Pond, Franklin Pierce Lake, Crotched Mountain, Crotched Mountain Accessible Trail, White Birch Point Historic District, Loverens Mill Cedar Swamp, Windsor Mountain, Meetinghouse Hill Cemetery, Meeting House Hill Road and the local roadway right-of-ways such as Stacy Hill Road and Liberty Farm Road. In this worst-case scenario viewshed map, which is based solely only on topography interrupting the view to the turbine hub, most of the sensitive sites listed above have the greatest possible view to 7-8 turbines, with localized areas of 9 turbines visible. In the areas of Windsor Mountain, Nubanusit Lake, and Highland Lake, the mapping indicates views ranging from 1-2, 3-4, and a limited amount of 5-6 turbines. The sites with the greatest potential view to 9 turbines are generally located within the north-northwest portion of the 5-miles study radius, and are typically from wetlands, water bodies and hillsides that are facing the project area. The amount of potential visibility decreases in the 10-mile study area, but with higher concentrations of potential visibility to 9 turbines in the north-northeastern portion of the study area.

4. Topologic Viewshed; Turbine Hub Visibility – Topography and Vegetation (Sheet 4 of 4)

The Turbine Hub - Topography and Vegetation viewshed map indicates that the turbine hubs of the proposed project turbines are potentially visible within 2.7% (9.6-square miles) of the study area. Since this is a “topography and vegetation” viewshed map, it also uses the average 40-foot vegetation height to represent the screening effect of vegetation; however, as in Figure 7; Sheet 2 of 4, the potential screening from built form and structures and atmospheric

conditions is not accommodated within the mapping. The potential visibility to the project area is further reduced by the inclusion of vegetation in the viewshed map with the most heavily concentrated occurrences in the central and eastern portion of the 5-mile study, also from low lying areas, water bodies and open valley floors. The sensitive resources that still have a potential view to the turbine hub are a majority of 3-4, 5-6 and 7-8 wind turbines with the screening effects of vegetation in place include; Willard Pond, Gregg Lake, Island Pond, Loverens Mill Cedar Swamp, Franklin Pierce Lake and the White Birch Point Historic District. To a lesser degree, the sensitive resources of Meadow Marsh Preserve, Robb Reservoir, Highland Lake and Black Pond have potential views to 1-2, 3-4 and some 5-6 wind turbines but from very selective locations. Due to the conservative nature of the NLCD 40-foot tree heights, sensitive resources such as Bald Mountain, Goodhue Hill, Pitcher Mountain, Nubanusit Lake, Windsor Mountain, Crotched Mountain, Crotched Mountain Accessible Trail, Meetinghouse Hill Cemetery, Meeting House Hill Road and local roadway right-of-ways such as Stacy Hill Road and Liberty Farm Road are indicated as having a very low to no potential views to the wind turbines.

The actual visibility to the 353.2-square mile project area is anticipated to be more limited in some areas than the viewshed mapping series indicates, but also have opportunities for greater visibility on mountain tops, hillsides and ridges. Factors that limit visibility beyond what the viewshed mapping shows includes several factors; the screening that is provided by built form and structures; the variability of actual vegetation type and height; the varying atmospheric and weather conditions that affect potential visibility, as well as the slender profile and light color of the turbines themselves. However, greater visibility than what is shown on the viewshed mapping can occur due to inconsistencies between the 2011 USGS National Land Cover Dataset (NLCD) tree cover database and the physical realities of the site, which can include open ledges and stunted tree growth. Therefore, the viewshed mapping should not be considered an absolute for visibility, but rather an investigative tool that indicates where potential visibility may occur, especially as related to sensitive resource determination and field investigation.

B. Field Data Collection Results and Viewpoint Selection

Upon review of the viewshed analysis and the field data collection results, it was determined that not all of the (75) potential viewpoints (Figure 8) would have significant or open views to the project depending on the level of screening that occurred between the viewpoint and project area. The findings are described below.

1. Blocked or Limited Views – The field investigation indicated that the views from the towns and many of the major roadways within the study area would have blocked views to the project due

to topography, vegetation and the additional screening properties of tree canopy, buildings and structures. In addition, it was found that a selection of the westerly waterbodies would have extremely limited views to the project except from very specific viewpoints. In some cases, the potential viewpoints were difficult to field photograph due to limited accessibility; therefore, viewpoints that exhibited blocked or had extraordinarily limited views were not included in the visual simulation selections. The sensitive resources that have blocked or extremely limited views that were not used as part of the visual simulation package included Nubanusit Reservoir and Robb Reservoir since both had very limited visibility areas, and access to Robb Reservoir was difficult without an active and clear put in area off of State Route 123.

2. **Partially Screened Views and/or Private Property** – A collection of viewpoints that were requested during the SEC Site Tour and then further explored during the field investigation were found to have partially screened views to the project area in a foreground-midground viewing distance. However, the majority of these potential views were from private property and therefore not eligible for use in the VIA. It is our practice to include views from the study area that are publicly accessible lands and/or public right-of-ways in order to offer the largest number of potential public viewers within the study area from sensitive resources. While we are sympathetic to individual landholders, it is important that the VIA remain focused on the federal, state and regional sensitive resources that are accessible to the greatest number of individuals from within the study area. Sensitive resources that had partially screened views, and may have been from private land that were not used as part of the visual simulation package included: Meetinghouse Hill Cemetery, Meetinghouse Hill Summit, Windsor Mountain Summit and Stacy Hill Road.
3. **Duplicate Open or Partially Open Views** – Of the remaining sensitive resource viewpoints that were field verified as having open or partially open views to the project area, some locations had a duplicate quality of the view from different viewpoints that were in close proximity to each other; therefore, the “worse-case” view was selected as a potential viewpoint. Sensitive resources that had open/partially open views but were similar to other viewpoints included: Willard Pond Boat Launch, Gregg Lake Beach Pavilion and the Meadow Marsh Preserve Bench Overlook.
4. **Selected Viewpoints** – The remaining (14) sensitive resource viewpoints that were selected to be visual simulation/ photo renderings were chosen due to their documented importance to the SEC, the broad range of sensitive resources that are represented, and the varying viewing distances to the project from within the 10-mile study area. The (14) selected sensitive resource

viewpoints that were developed as visual simulations are listed in detail in section C. Visual Simulations | Photo Renderings, and are also listed in Table 3.

C. Visual Simulations | Photo Renderings

Each rating panel member received a rating package that included the (14) simulation views, a rating form developed by Terraink, reference sheets and viewpoint and sensitive site maps. The visual simulations are evaluated using a rating form that is based upon the Bureau of Land Management, Visual Resource Management System (VRM) methodology which utilizes a two-step approach to rating. The existing and proposed conditions rating form begins with a verbal description of both the existing view and the proposed view with the turbines shown in place. Then the rating panel provides numerical ratings for scenic quality, sensitivity level and resource contrast. The written description of each viewpoint as compiled from the rating panels comments are detailed below, in addition the descriptions include the factors as outlined in the NH Site 301.05 Effects on Aesthetics (b)(4)(d)(6) and the cumulative rating panel numerical results per each individual visual simulation.

1. Viewpoint #1 - Willard Pond (Boat View); Willard Pond Road, Antrim, NH (Figure 9)

Existing Conditions Description

The viewpoint from Willard Pond is looking north towards with Willard Mountain to the left of the view, and Tuttle Hill to the right. Willard Pond is a dominant water feature and the view is open and expansive to the skyline. The landform is low and rolling with the horizon line partially obstructed by woodland vegetation along the pond shoreline. The vegetation is a mix of deciduous and evergreen trees that appear as slipping planes in large swaths extending up from the water's edge to the hillside ridge. There are large boulders and smaller shrub vegetation that border the shoreline of the pond and form a distinctive edge. The expectations of the typical viewer in this setting are in keeping with the ROS Semiprimitive Nonmotorized (SPNM) Class, where locals and recreational users can anticipate that they will be enveloped in a naturalized area without motorized or mechanized uses, with a high probability of observing wildlife without the intensive interruption of other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a midground view to (8) visible turbines; (3) that are blade tips only and (5) that include a screened portion of the tower, hub and blades. The viewer also has visibility to the met tower in the center of the view. The installation of the wind turbines and met tower along the ridgeline is incongruent with the natural setting and bordering conservation land use that dominates the view. The (3) turbines that occur as "blade tips" only are visually awkward due to the disembodied state of the turbine, and the remaining turbines are visually disorganized due to their varying heights, spacing and

distance above the horizon line. In addition, the white color of the turbines contrasts against the open sky. The distance to the nearest turbine from the sensitive resource is 1.6-miles, with a visual arc of 21.03-degrees and a field of view of 37.85-degrees. The viewer is looking in a northerly direction to the wind turbines and has an anticipated extended viewing time of the project while recreating on the pond. The experience of the typical user will likely change with the installation of the project from the ROS Semiprimitive Nonmotorized (SPNM) Class to the ROS Semideveloped Natural (SDN) Class as a result of the sights and sounds of the motorized and mechanized intervention within the landscape that eliminates the semiprimitive quality.

2. Viewpoint #5 - Meadow Marsh Preserve; Craig Road and Hattie Brown Road Intersection, Antrim, NH (Figure 10)

Existing Conditions Description

The viewpoint at the edge of the Meadow Marsh Preserve is looking west-northwest to the low rolling topography of Willard Mountain with Tuttle Hill. The ridge contributes to a strong horizon line with midground deciduous and evergreen vegetation partially obstructing it. The marsh itself is a dominant visual feature in the view with wetland vegetation and scattered boulders dotting the water's edge. The vegetation is predominately deciduous with bands of evergreen trees along the lower slopes of the hillside. The open view includes a large selection of plant materials in a variety of colors and textures that would change with the seasons. The expectations of the typical viewer in this setting are in keeping with the ROS Semiprimitive Motorized (SPM) Class, where locals and recreational users can anticipate that they will view into a naturalized area that has some motorized or mechanized elements in proximity, with a high probability of observing wildlife and interesting plant communities with a moderate to low chance of interruption by other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a midground view to (4) visible turbines; (2) that are in full view of the tower, hub and blades and (2) that are screened by the bordering midground vegetation. The proposed installation and associated land clearing that is required during construction and ongoing maintenance interrupts the clean line of the ridge against the horizon, and creates an undulating pattern of tree vegetation against the sky. The turbines dominate in scale and alter the focal point upward, which makes the existing view seem smaller and less expansive. The regularized height of the turbines helps to relax the eye due to the simple pattern of the proposed turbines, as well as the framing vegetation that helps to mitigate the impacts since it conceals and also penetrates the skyline. The distance to the nearest turbine from the sensitive resource is 1.5-miles, with a visual arc of 24.63-degrees and a field of view of 37.85-degrees. The viewer is looking in a west-northwest direction to the wind

turbines with an anticipated semi-extended to limited viewing time of the project depending on the user activity of either walking, riding or driving through this viewpoint area. The experience of the typical user will likely change with the installation of the project from the ROS Semiprimitive Motorized (SPM) Class to the ROS Semideveloped Natural (SDN) Class as there will now be the sight of a permanent, stationary motorized intervention within the landscape.

3. Viewpoint #7 - White Birch Point Historic District; Gregg Lake (Boat View); White Birch Point, Antrim, NH (Figure 11)

Existing Conditions Description

The viewpoint from the beach area of the White Birch Point Historic District at Gregg Lake is looking northwest towards the undulating topography of Tuttle Hill with Willard Mountain partially obscured by trees to the left. The horizon line is crisp with a slight obstruction caused by the midground vegetation that slips in along the water's edge. There is a heavy mix of deciduous and evergreen vegetation that is more integrated than occurring in defined swaths. The deep blue color of the water is a dominant feature in the view, with a strong shoreline edge bordering it. The shore is edged with low vegetation, beach and the roadway leading to the picnic facility in the center of the view. Built structures include powerlines and poles, picnic shelter, fencing and a low roadway culvert/bridge. The expectations of the typical viewer in this setting are in keeping with the ROS Developed Natural (DN) Class, where locals and recreational users can anticipate that they will view into a substantially modified natural area, where motorized uses and parking are allowed, and there will be a moderate probability of observing wildlife and interacting with other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a midground view to (6) visible turbines; (4) that are in full view of the tower, hub and blades and (2) that are screened by the bordering midground vegetation. There is also visibility to the met tower in the center of the view. The addition of the turbines and met tower will forever alter the view from the historic district and could compromise the present and future integrity of receiving an official historic designation. The turbines and met tower dominate the ridgeline, interrupt the horizon line and compress the scale of the low, rolling topography. The view is directed away from the water and associated recreational opportunities up towards the installed project; however the regularized spacing and height of the turbines help to relax the eye through the simple and consistent pattern. The distance to the nearest turbine from the sensitive resource is 2.0-miles, with a visual arc of 30.82-degrees and a field of view of 37.68-degrees. The viewer is looking in a northwest direction to the wind turbines with an anticipated extended viewing time from the

private beach and historic district residences along the shoreline. The experience of the typical user will not change with the installation of the project from the ROS Developed Natural (DN) Class; however, the mechanized and motorized uses will no longer be confined to just the waterbody and shoreline condition, but will be visible against the backdrop of the sky and will be a permanent view for the residents and guests of the White Birch Point Historic District.

4. Viewpoint #9 - Franklin Pierce Lake (Boat View); State Route 9, Antrim and Hillsborough, NH
Existing Conditions Description (Figure 12)

The view from Franklin Pierce Lake is a spacious, open view looking southwest towards Tuttle Hill with the undulating topography of Willard Mountain in the background. The shoreline is compressed behind a strip of vegetation along the water's edge with the rolling topography swelling above it. The horizon line is partially concealed with a mixture of deciduous and evergreen vegetation in the midground view, and the mixture of residential cottages and open sand beaches along the lake shoreline is a classic cottage setting with a blend of woodland vegetation that partially conceals the built environment. Built forms include buildings, docks, retaining walls, flag pole and managed beaches. The expectations of the typical viewer in this setting are in keeping with the ROS High Developed Large Natural (HDLN) Class, where locals and recreational users can anticipate that they will view into a substantially modified natural area, where motorized uses, public gathering and parking are encouraged and allowed, and there will be a high probability of observing or interacting wildlife with other users nearby. There is little evidence that commuters along State Highway 31 would have views to the project.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a midground view to (8) visible turbines; (2) that are in full view of the tower, hub and blades and (5) that are partially screened, and (1) that is blade tips only. There is also visibility to the met tower in the center of the view. The turbines are noticeable but do not excessively dominate the view due to their distance. However, the varying heights and overlap of the turbines creates a disorganized arrangement that is visually cluttered, which is further emphasized by the contrast of the turbines color and silhouette against the open sky. In addition, the top of the ridgeline is sheared off as per the land clearing and manipulations required for the installation of the project. The distance to the nearest turbine from the sensitive resource is 4.1-miles, with a visual arc of 7.88-degrees and a field of view of 37.58-degrees. The viewer is looking in a southwest direction to the wind turbines with an anticipated extended viewing time from the private residences along the northern shoreline, and extended to semi-extended viewing time from the water depending on the users location and activity that could include motorized boats, personal water craft, sailing, canoe and kayak, etc. The experience of the typical user will not change with the installation of

the project from the ROS High Developed Large Natural (HDLN) Class; however, the mechanized and motorized uses will no longer be just confined to just the waterbody and shoreline condition, but will also be visible against the backdrop of the sky as a permanent view for the residents and guests of the Franklin Pierce Lake area.

5. Viewpoint #11 - Pitcher Mountain; State Route 123, Stoddard, NH (Figure 13)

Existing Conditions Description

The view from the summit of Pitcher Mountain is looking east-southeast towards Tuttle Hill to the left of the view and Willard Mountain to the right. Highland Lake is visible in the lower right of the view and the far view terminates at Crotched Mountain. The expansive panoramic view of the regional landscape is open and broad with very little vegetative obstruction. The undulating topography is crisp against the horizon line with a mix of deciduous and evergreen vegetation. The evergreen trees are dominant along the lower lying portions of the view and adjacent to Highland Lake, while the deciduous woodland blanket the hillside slopes. A local roadway in the left of the view creates a secondary point of interest that seemingly terminates at a structure. The summit has a working fire tower that is accessed by a hiking trail and an active farm road. The expectations of the typical viewer in this setting are in keeping with the ROS Developed Natural (DN) Class, where locals and recreational users can anticipate that they will view into a substantially modified natural area, where motorized uses and parking are allowed, and there will be a high probability of observing wildlife while interacting with other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a background view to (9) visible turbines; (8) that are in full view of the tower, hub and blades and (1) that is partially screened, as well as having visibility to the met tower in the center of the view. The introduction of the turbines is less obvious than in other proposed locations despite the expansive view due to the viewing distance; however, the addition of the wind turbines compresses the landform and creates a visual barrier to the far view. Outside of the (1) partially screened turbine, the regularized pattern, spacing and height of the other turbines above the ridgeline relaxes the eye; however, the turbine positioning interrupts the horizon line and affects the grand scale of the view. Atmospheric conditions, i.e., cloudiness, haze, etc. will reduce the visibility to the turbines given their light color and slender profile. The distance to the nearest turbine from the sensitive resource is 6.4-miles, with a visual arc of 16.13-degrees and a field of view of 37.19-degrees. The viewer is looking in an east-southeast direction to the wind turbines with an anticipated extended to semi-extended viewing time from the mountain depending on the user's attention to the various 360-degree views from the summit and fire tower. The

experience of the typical user will not change with the installation of the project from the ROS Developed Natural (DN) Class; however, the mechanized and motorized uses will be visible against the backdrop of the sky and will be a permanent addition to the 360-degree views from the mountain that already includes views to the Lempster wind farm.

6. Viewpoint #13 - Island Pond; NH State Route 123, Stoddard, NH (Figure 14)

Existing Conditions Description

The view from the Island Pond boat launch and parking area is looking east-southeast towards Tuttle Hill and Willard Mountain with the foreground rolling topography obscuring most of the background view to the peaks. The shoreline of the pond is bordered by dense evergreen tree vegetation creating a strong visual edge. The deep blue color of the water is dominant in the view with a selection of wetland vegetation and boulders dotted along the water's edge. There are small cottages tucked into the existing vegetation, and water buoys indicate the shallow depths to submerged boulders. The composition of cottages and nature characterize the "spirit of place" within the recreational view. The expectations of the typical viewer in this setting are in keeping with the ROS Developed Natural (DN) Class, where local, recreational and commuter users can anticipate that they will view into a substantially modified natural area, where motorized uses and parking are encouraged and allowed, and there will be a high probability of observing and interacting with wildlife in the presence of other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a midground view to (3) visible turbines, in which all (3) are mostly concealed behind the foreground shoreline vegetation resulting in just the spinning, bisected blades being visible from this view. The introduction of turbines in this view is almost unperceivable and does not affect the overall sense of scale; however, the movement of the bisected blades could be visually distracting and seem odd when looking across the pond. As the user moves into the water and into the center of the water body, the turbines will no longer be visible. The distance to the nearest turbine from the sensitive resource is 3.7-miles, with a visual arc of 23.55-degrees and a field of view of 37.85-degrees. The viewer is looking in an east-southeast direction towards the wind turbines with an anticipated moderate to limited viewing time as much of the project turbines are concealed behind the tree vegetation; however the movement of the bisected turbine blades will catch the viewers' attention while on the beach and near the boat put in. The experience of the typical user will not change with the installation of the project from the ROS Developed Natural (DN) Class since the turbines mostly concealed and the focus will remain on recreation activities at Island Pond.

7. Viewpoint #27 - Bald Mountain Overlook; Willard Pond Road, Antrim, NH (Figure 15)

Existing Conditions Description

The view from the Bald Mountain ledges is looking north along the Willard Mountain ridge towards Tuttle Hill, with the rolling topography obstructing the background view. Mature deciduous and evergreen vegetation is scattered along the hillside with the deciduous trees being the dominant forest cover except in areas where there are open ledges and along the ridge top, which tend to be evergreen. The view is highly detailed with focused attention on the Willard Mountain ridge and then on to the greater regional landscape. There are no apparent built structures or forms in the view, and the foreground birch trees and groundcover plantings on the ledge provide textural interest and framing to the view. The expectations of the typical viewer in this setting are in keeping with the ROS Semiprimitive Nonmotorized (SPNM) Class, where locals and recreational users can anticipate that they will view into a naturalized area without motorized or mechanized uses, with a high probability of observing wildlife without the intensive interruption of other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a midground view to (8) visible turbines; (2) that are in full view of the tower, hub and blades, (4) that are partially screened and (2) that show the blade tips only. The view also has visibility to the met tower in the right side of the view. The addition of the turbines in the view is incongruent with the natural setting and with the expectations that the viewer would have from the open ledges to the greater regional landscape and adjacent conservation lands. The contrast in color, texture and form is noticeable and the variety of turbine height, spacing and overlap creates a disorganized, cluttered arrangement that is visually distracting and unappealing. In addition the clearing activities required for the roads and turbine installation are visually apparent due to the ridge top being flattened. The distance to the nearest turbine from the sensitive resource is 1.5-miles, with a visual arc of 17.2-degrees and a field of view of 37.83-degrees. The viewer is looking in a northerly direction towards the wind turbines with an anticipated extended to semi-extended viewing time from the mountain ledges depending on the user's attention and stoppage time on the open ledges that overlook the regional landscape and Willard Pond below. The experience of the typical user will likely change with the installation of the project from the ROS Semiprimitive Nonmotorized (SPNM) Class to the ROS Semideveloped Natural (SDN) Class as a result of the sights and sounds of the motorized and mechanized elements within the landscape, and the loss of the semiprimitive quality while hiking and relaxing on the open ledges of Bald Mountain.

8. Viewpoint #33 - Goodhue Hill; Willard Pond Road, Antrim, NH (Figure 16)

Existing Conditions Description

The view from the Goodhue Hill Trail is looking north-northwest towards the Willard Mountain ridge to the left and Tuttle Hill to the right of the view. The Goodhue Hill Trail offers an open view to the entire ridge, which has a strong horizon line with the undulating nature of the topography highly visible. The foreground view has a variety of successional vegetation that provides visual interest through the color and texture of the materials, with an occasional evergreen tree punctuating the view. The area is a pleasant natural environment with a high probability of wildlife viewing and interaction, with no apparent built structures or forms in the view. The expectations of the typical viewer in this setting are in keeping with the ROS Semiprimitive nonmotorized (SPNM) Class, where locals and recreational users can anticipate that they will view into a naturalized area without motorized or mechanized uses, with a high probability of observing wildlife without the intensive interruption of other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint is a midground view to (6) visible turbines; (7) that are in full view of the tower, hub and blades and (1) that is blade tips only, with the met tower visible to the right of center in the view. The installation of the turbines on the ridgeline is not in keeping with the naturalized setting and adjacent conservation land use. The semi-regularized spacing and pattern of the (7) turbines that are in full view help to relax the eye as it travels along the ridgeline, but the variations in height create a haphazard quality to the overall installation. The color, scale and number of turbines create a significant contrast in the view and the clearing and re-contouring activities that are required for the roads and turbine platforms create pockets of grade change against the strong, consistent horizon line. The distance to the nearest turbine from the sensitive resource is 2.0-miles, with a visual arc of 26.59-degrees and a field of view of 38.39-degrees. The viewer is looking in a north-northwest direction towards the wind turbines with an anticipated semi-extended viewing time from the trail area and meadow clearing depending on how long the user spends in the open meadow and on the trail. The experience of the typical user will likely change with the installation of the project from the ROS Semiprimitive nonmotorized (SPNM) Class to the ROS Semideveloped Natural (SDN) Class as a result of the sights and sounds of the motorized and mechanized elements within the landscape, and the loss of the semiprimitive quality while hiking on the Goodhue Hill trail.

9. Viewpoint #47 - Loverens Mill Cedar Swamp (Trail Head); Lovern Mill Road, Antrim, NH
(Figure 17)

Existing Conditions Description

The view from the Loverens Mill Cedar Swamp Trail Head is looking south-southeast towards Tuttle Hill. The rise of the topography captures the view and limits the ability to see to the background distance. The view is compressed and inward focused with the rolling topography providing the dominant backdrop, blanketed with evergreen and deciduous trees densely covering the hillside. The view is highly developed and built forms dominate and bisect the view from the trailhead. Built forms and structures include the road, guardrails, mailboxes, powerlines and poles and street signage. The view is cluttered and the eye is drawn to the dark green of the evergreen trees in the center of the view. The expectations of the typical viewer in this setting are in keeping with the ROS Developed Natural (DN) Class, where locals and recreational users can anticipate that they will view into a substantially modified natural area, where motorized uses and parking are encouraged and allowed, and there will be a high probability of observing and interacting with other users while at the trail head.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a foreground-midground view to (2) visible turbines; (1) that is in full view of the tower, hub and blades and (1) that is partially screened by the bordering midground vegetation. There is also visibility to the met tower in the center of the view. The addition of the turbines slightly increases the visual clutter in the view; however, the turbine to the left of the view will be mostly concealed during full vegetative leaf cover. The introduction of the turbines does not dominate the view due to the dominance of the existing man-made environment and structures, as well as the eye being drawn downward to the terminus of the road at the stop sign. The distance to the nearest turbine from the sensitive resource is .70-miles, with a visual arc of 26.03-degrees and a field of view of 37.85-degrees. The viewer is looking in a south-southeast direction towards the wind turbines with an anticipated limited viewing time depending on the user activity that will include local driving and recreational access to the trailhead parking area. The experience of the typical user will not change with the installation of the project from the ROS Developed Natural (DN) Class; however, the mechanized and motorized uses will be visible against the backdrop of the sky and will be a permanent view for visitors to Loverens Mill Cedar Swamp Trail Head.

10. Viewpoint #61 - Liberty Farm Road (ATV Trail Entrance); Antrim, NH (Figure 18)

Existing Conditions Description

The view from Liberty Farm Road is looking south-southwest to Tuttle Hill. The view is limited by heavy foreground deciduous vegetation at the public road right-of-way that will screen the view to the residence and ridgeline when in full leaf cover; however, the residential property could continue to have an extended view to the turbines from that vantage point. The view is a typical view from the road right-of-way and residential properties along the southern face of Windsor Mountain looking towards the project area. The background ridgeline is in clean contrast to the horizon and open sky, and the overall rolling topography and slipping vertical planes of vegetation contribute to the visual interest. There is heavy evergreen vegetation along the lower portions of the hillside with more deciduous cover in the residential areas. The dominant built form in the view includes a house, barn and manicured landscape area. The expectations of the typical local and commuter user in this setting are in keeping someone who is passing through the area in a motor vehicle; however, the expectations of the resident are more likely focused on the natural character and perceived wildness of the view.

Proposed Conditions Description

With the proposed project in place, the viewpoint is a midground view to (3) visible turbines; (3) that are in full view of the tower, hub and blades except for when they are screened at the road right-of-way by the bordering foreground deciduous vegetation during the leaf-on season. The addition of the turbines will not actively draw attention from viewers along the roadway right-of-way, especially when the screening vegetation is in leaf; however, the turbines will have a dramatic effect on the open views from the residential property. The distance to the nearest turbine from the sensitive resource is 1.3-miles, with a visual arc of 8.07-degrees and a field of view of 38.88-degrees. The viewer is looking in a south-southwest direction towards the wind turbines with an anticipated limited to no viewing duration time for the public right-of-way users that will drive by at a moderate speed and with obstruction during the leaf-on season; however, the home owner's with such views could have extended duration views to the Project, possibly during all seasons. The experience of the typical roadway user will not change with the installation of the project, but the homeowners experience will be forever altered by the installation of the turbines.

11. Viewpoint #63 - Crotched Mountain (Viewing Platform); Mountain Road, Bennington, NH (Figure 19)

Existing Conditions Description

The view from the Crotched Mountain Gregg ADA Accessible Trail that leads to the formal viewing platform is looking northwest towards the greater regional landscape and the valley floor. The long view to the valley and rolling topography beyond is partially obscured by the foreground deciduous vegetation both when in and out of leaf. The textured vegetation cover is varied in scale, color and texture in the view, and there is an environmental richness along the accessible route for both able bodied and disabled users. The built structures in the view are limited to the occasional structure in the valley, emphasizing the magnificent scale of the region. This viewpoint is a unique and important resource as a universal (ADA) access point. The expectations of the typical viewer in this setting are in keeping with the ROS Semiprimitive Motorized (SPM) Class, where locals and recreational users can anticipate that they will view into a naturalized area that has some motorized or mechanized elements in proximity, with a high probability of observing wildlife and interesting plant communities with the low to moderate chance of interruption by other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint is a background view to (2) visible turbines that are in full view of the tower, hub and blades where the bordering vegetation has an opening. The addition of the turbines will not actively draw attention away from the accessible route users, especially when the trees are in full leaf. It is reasonable to think that many users may miss the view to the turbines as they head to the viewing platform, which also has an obstructed view to the wind farm. The potential impacts with the turbine in place are mitigated by the viewing distance, short length of viewing opportunity, leaf-on screening and the potential for atmospheric screening due to haze and cloudiness. The distance to the nearest turbine from the sensitive resource is 8.4-miles, with a visual arc of 11.52-degrees and a field of view of 37.85-degrees. The viewer is looking in a northwest direction towards the wind turbines with an anticipated limited viewing time from this viewpoint due to the level of vegetation cover, especially during leaf-on season and the expectation that the typical user is moving towards the viewing platform and not stopping on the trail in this area. The experience of the typical user will not change with the installation of the project from the ROS Semiprimitive Motorized (SPM) Class; however, if additional tree vegetation was removed or lost naturally from within the view and the turbines became more visible, it is likely that the ROS class would change accordingly.

12. Viewpoint #64 - Crotched Mountain (Overlook); Mountain Road, Bennington, NH (Figure 20)

Existing Conditions Description

The view from the Crotched Mountain Overlook is an open and expansive view looking west-northwest towards the greater regional landscape and Pitcher Mountain, which is visually located in the center of the turbine installation. The undulating topography is reinforced by a strong horizon line and the dense vegetation cover that is a mix of deciduous and evergreen trees with some small open fields, roads and residential development are scattered through the lowest portions of the valley floor. The foreground evergreen tree vegetation slightly obstructs and frames along the bottom of the view and provides a stark visual contrast to the expansive outlying landscape. The expectations of the typical viewer in this setting are in keeping with the ROS Semiprimitive Motorized (SPM) Class, where locals and recreational users can anticipate that they will view into a naturalized area that has some motorized or mechanized elements in proximity, with a high probability of observing wildlife and interesting plant communities with a low to moderate chance of interruption by other users.

Proposed Conditions Description

With the proposed project in place, the viewpoint will have a background view to (9) visible turbines; (7) that are in full view of the tower, hub and blades, (1) that is partially visible, and (1) that is blade tips only. The met tower is also visible in the right of the view. The addition of the (9) turbines and met tower creates a light colored visual barrier against the darker colored background view, and the expansiveness of the view is impacted as the turbines become a visual focal point versus the view on to the greater regional landscape. However, the viewing distance and potential atmospheric conditions could lessen the visual impacts of the installation, and outside of the (1) partial and (1) tips only, the regularized pattern, height and spacing of the turbines is appealing. The distance to the nearest turbine from the sensitive resource is 8.1-miles, with a visual arc of 13.25-degrees and a field of view of 38.49-degrees. The viewer is looking in a west-northwest direction towards the wind turbines with an anticipated extended to semi-extended viewing time from the open ledges depending on the user activity that could include sitting on the ledges for a prolonged period of time, or merely stopping momentarily while continuing to move along the trail to and from the summit. The experience of the typical user will not change with the installation of the project from the ROS Semiprimitive Motorized (SPM) Class due to the extended viewing distance to the wind turbines.

13. Viewpoint #67 - Black Pond; Black Pond Road, Windsor, NH (Figure 21)

Existing Conditions Description

The view from Black Pond is looking south-southeast to Tuttle Hill and Willard Mountain. The highly compressed and undulating topography has a strong, background horizon line that is partially obscured by dense evergreen trees in the midground view that border the pond edge. The deep blue pond is a dominant element in the view, which is partially screened by foreground deciduous vegetation, which will further obstruct the far view during full leaf cover. There is a lack of perceived development along the far shoreline which reinforces the wilderness setting of the youth and adult camps and schools that are located along the south facing slopes of the Black Pond area. The expectations of the typical viewer in this setting are in keeping with the ROS Developed Natural (DN) Class, where locals and recreational users can anticipate that they will view into a substantially modified natural area, where motorized uses are encouraged and allowed, and there will be a high probability of observing and interacting with other users while enjoying the natural setting of the pond.

Proposed Conditions Description

With the proposed project in place, the viewpoint is a midground view to (8) visible turbines; (4) that are in full view of the tower, hub and blades, (2) that are partially screened and (2) that are tips only. There is also visibility to the met tower in the center of the view. The addition of the (8) turbines and met tower on the ridge distracts from the woodland experience and expansive quality of the pond. Due to the turbines and tower breaking the horizon line, and having varying height, spacing and overlap, they visually clutter and congest the clean line of the ridge, which is visually unappealing, especially the bisected blades that will rotate against the dark visual edge of the evergreen screening. The high number of wilderness recreation camps and specialized schools at Black Pond could view the introduction of the turbines as a positive environmental intervention, or as an incompatible industrial use depending on the perception of the individual schools and users. The distance to the nearest turbine from the sensitive resource is 3.2-miles, with a visual arc of 12.6-degrees and a field of view of 38.88-degrees. The viewer is looking in a south-southeast direction towards the wind turbines with an anticipated extended viewing time. The experience of the typical user will not change with the installation of the project from the ROS Developed Natural (DN) Class; however, the mechanized and motorized uses will be visible against the backdrop of the sky and will be a permanent view for camp visitors and students at the specialized schools in the area.

14. Viewpoint #74 - Highland Lake; State Route 123, Stoddard and Washington, NH (Figure 22)

Existing Conditions Description

The view from the public road right-of-way is looking east-southeast to Highland Lake. The highly concentrated and encompassing view is focused inward, and the eye is drawn back and forth along the serpentine movement of the water body. The foreground cottage is a visual obstruction to the greater view of the lake, and also partially obstructs the vegetative narrowing in the mid-ground. Dense stands of evergreen vegetation border and define the water's edge; leading to another cottage at the terminus of the water view before the eye moves up the wooded hillside to the background horizon line. The vegetation is a mix of deciduous and evergreen, with a high level of color, texture and scale that creates visual interest despite the density of built structures that include cottages, roads, driveways and utility poles and lines. The expectations of the typical viewer in this setting are in keeping with the ROS Highly Developed-Large Natural (HDLN) Class, where locals and recreational users can anticipate that they will view into a substantially modified natural area, where motorized uses, public gathering and parking are encouraged and allowed, and there will be a high probability of observing or interacting wildlife with other users nearby.

Proposed Conditions Description

With the proposed project in place, the viewpoint is a midground-background view to (3) visible turbines; (2) that are in partial screened and (1) that is blade tips only. The addition of the turbines is a minimal impact on the view and the turbines do not dominate in appearance and scale, nor do they compromise the visual quality of the view. The (2) partially screened turbines will have less visual prominence when the deciduous trees are in full leaf; however, the bisected blade will continue to show on the horizon and appear visually odd it rotates against the dense screening vegetation. The distance to the nearest turbine from the sensitive resource is 4.7-miles, with a visual arc of 10.69-degrees and a field of view of 38.39-degrees. The viewer is looking in an east-southeast direction towards the wind turbines with an anticipated limited to none duration of viewing time depending of if the viewer is stationary or passing by in a vehicle. The experience of the typical user will not change with the installation of the project from the ROS Highly Developed-Large Natural (HDLN) Class.

D. Rating Panel Results

A rating panel of three Registered Landscape Architects (LA); two in-house landscape architects and one consultant landscape architect, experienced in the visual rating process and familiar with wind power projects, was utilized in this VIA to determine the levels of scenic quality and sensitivity within the existing viewpoint conditions, as well as the level of contrast with the proposed project in place. Each rating panel member received a package of 10.2" by 15.3" digital visual simulations for

the (14) selected viewpoints that are intended to be reviewed on a 13" by 20" computer monitor screen or color printed at a high resolution 11" by 17" paper size. The panel member also received a set of (14) existing and (14) proposed conditions rating forms to be filled out by hand, in addition to a set of sensitive site and viewpoint location maps for their use and reference during the rating process.

Each rating form contained a space for the evaluator to write a verbal description of the existing and proposed views, and then numerically rated the existing viewpoint's scenic quality and sensitivity levels from Low (1) to High (5), and the proposed project contrast from None (0) to Strong (5). The opportunity to note any variable effects and recommended mitigation measures were also provided on the proposed rating form. In addition, the evaluators were asked to indicate the level of existing condition ROS change that might be experienced with the proposed project in place. A detailed description of the rating panel methodology is located in the III. Visual Assessment Methodology section of this VIA, and the VRM Scenic Quality and Contrast rating criteria is outlined in Appendix A; Reference 2, 3 and 4. The ranking for each viewpoint as compiled from the evaluators rating forms are outlined in detail in Table 4a, 4b, 4c and 4d, and the comprehensive rating panel forms with written descriptions are included in Appendix G.

The Existing Conditions Rating Summary Tables; 4a - Scenic Quality and Evaluation Rating and 4b – Sensitivity Level Rating indicate that the individual scenic quality and sensitivity level ratings were generally constant between the three panel members with the most dramatic variability occurring in VP# 33 - Goodhue Hill, VP# 63 – Crotched Mountain (Viewing Platform) and VP# 64 – Crotched Hill (Overlook). It is important to note that the greatest variations in the scenic quality ratings and sensitivity level ratings occurred within the same set of three viewpoints; however neither rating opinion is "right" or "wrong," but rather presents a varying perception of the elements or settings that evoke scenic quality from within a view, and the associated level of user sensitivity that can be expected from that view. The viewpoints that were found to have the highest level of scenic quality by the rating panel include; VP# 1 – Willard Pond, VP# 5 – Meadow Marsh Preserve, VP# 11 – Pitcher Mountain, and VP# 67 – Black Pond. The high scenic quality rating can be attributed to several factors that are consistent in each of the viewpoint images; open water or open vista, intact forestland with a high level of color and/or textural variety, and a perceived level of wildness. In the sensitivity level rating category, over half of the viewpoints (VP#'s 1, 5, 7, 27, 33, 63, 64, 67, and 74) were found to have a high sensitivity level based upon the collective user groups that may be using or passing through the individual viewpoints.

The Proposed Conditions Rating Summary Table 4c – Resource Contrast Rating indicates that the individual resource contrast ratings were also generally constant between the three panel members with the greatest level of variability occurring in VP# 9 – Franklin Pierce Lake (Boat View) and VP#

61 – Liberty Farm Road. The differences between the rating member’s perceptions are generally related to the effects of scale, distance, pattern, visual clutter and the anticipated effects of vegetative screening on seasonal views. The viewpoints that were found to have the highest level of resource contrast rating include VP# 1 – Willard Pond, VP# 5 – Meadow Marsh preserve, VP# 7 – White Birch Point Historic District; Gregg Lake, VP# 27 – Bald Mountain and VP#33 – Goodhue Hill (Trail). The high contrast ratings can be attributed to several factors that are consistent in each of the viewpoint images; turbine scale and dominate position in the view, the penetration of the skyline, cluttered and disorganized turbine positioning, and the anticipated impacts to the existing character of place. The proposed ROS designations were also evaluated and noted on the Proposed Conditions Rating Form as either remaining the same or modifying. A summary of the cumulative rating panel results for each category of Scenic Quality, Sensitivity Level, Resource Contrast and Proposed ROS are shown in Table 5 below.

Table 5 - Summary of Terraink Rating Panel Results

| VP # | Viewpoint Name | Terraink Rating Panel Results | | | | | | | |
|---|------------------------------------|-------------------------------|-----|-------------------|-----|-------------------|-------|--------------|-----|
| | Resource with Potential Visibility | Scenic Quality | | Sensitivity Level | | Resource Contrast | | Proposed ROS | |
| 1 | Willard Pond | 19.7 | (H) | 19.7 | (H) | 20.3 | (H) | SDN | (M) |
| 5 | Meadow Marsh Preserve | 20.3 | (H) | 17.2 | (H) | 21.7 | (H) | SDN | (M) |
| 7 | White Birch Point HD | 18.5 | (M) | 18.5 | (H) | 22.0 | (H) | DN | (L) |
| 9 | Franklin Pierce Lake | 16.8 | (M) | 14.8 | (M) | 15.3 | (h-M) | HDLN | (L) |
| 11 | Pitcher Mountain | 20.0 | (H) | 14.5 | (M) | 12.3 | (h-M) | DN | (L) |
| 13 | Island Pond | 17.0 | (M) | 14.2 | (M) | 7.8 | (I-M) | DN | (L) |
| 27 | Bald Mountain | 17.3 | (M) | 17.8 | (H) | 20.0 | (H) | SDN | (M) |
| 33 | Goodhue Hill | 13.3 | (M) | 17.5 | (H) | 19.0 | (H) | SDN | (M) |
| 47 | Loverens Mill Cedar Swamp | 7.7 | (L) | 12.2 | (M) | 12.3 | (h-M) | DN | (L) |
| 61 | Liberty Farm Road | 9.7 | (L) | 14.3 | (M) | 9.5 | (I-M) | N/A | - |
| 63 | Crotched Mountain (ADA) | 18.8 | (M) | 18.0 | (H) | 8.7 | (I-M) | SPM | (L) |
| 64 | Crotched Mountain | 13.5 | (M) | 18.5 | (H) | 12.2 | (h-M) | SPM | (L) |
| 67 | Black Pond | 19.5 | (H) | 18.8 | (H) | 16.7 | (h-M) | DN | (L) |
| 74 | Highland Lake | 16.8 | (M) | 18.7 | (H) | 3.2 | (L) | HDLN | (L) |
| Result Scale: High (H) High-Moderate (h-M) Moderate (M) Low-Moderate (I-M) Low (L) N/A – Not Applicable | | | | | | | | | |

Using the rating panel results from the categories of Scenic Quality, Sensitivity Level, Resource Contrast and Proposed ROS a determination of the potential impact from the wind turbine installation can be estimated for each viewpoint. The viewpoints that are anticipated to have the

highest potential visual impact due to the installation of the wind turbine project are; VP#1 – Willard Pond, VP#5 – Meadow Marsh Preserve, VP#7 – White Birch Point Historic District; Gregg Lake, VP#27 – Bald Mountain, VP# 33 – Goodhue Hill (Trail) and VP#67 – Black Pond. A summary of the overall rating panel results for Potential Visual Impact is shown in the table below:

Table 6 - Summary of Terraink Potential Visual Impact Results

| VP # | Viewpoint Name | Terraink Rating Panel Results | | | | Visual Impact |
|------|------------------------------------|-------------------------------|-------------------|-------------------|--------------|---------------|
| | Resource with Potential Visibility | Scenic Quality | Sensitivity Level | Resource Contrast | Proposed ROS | |
| 1 | Willard Pond | High | High | High | Moderate | HIGH |
| 5 | Meadow Marsh Preserve | High | High | High | Moderate | HIGH |
| 7 | White Birch Point HD | Moderate | High | High | Low | HIGH |
| 9 | Franklin Pierce Lake | Moderate | Moderate | High-Mod | Low | MOD |
| 11 | Pitcher Mountain | High | Moderate | High-Mod | Low | MOD |
| 13 | Island Pond | Moderate | Moderate | Low-Mod | Low | MOD |
| 27 | Bald Mountain | Moderate | High | High | Moderate | HIGH |
| 33 | Goodhue Hill | Moderate | High | High | Moderate | HIGH |
| 47 | Loverens Mill Cedar Swamp | Low | Moderate | High-Mod | Low | MOD |
| 61 | Liberty Farm Road | Low | Moderate | Low-Mod | N/A | MOD |
| 63 | Crotched Mountain (ADA) | Moderate | High | Low-Mod | Low | MOD |
| 64 | Crotched Mountain | Moderate | High | High-Mod | Low | MOD |
| 67 | Black Pond | High | High | High-Mod | Low | HIGH |
| 74 | Highland Lake | Moderate | High | Low | Low | LOW |

VII. VISUAL MITIGATION

A. Mitigation Options

The visual mitigation options are limited given the nature of the wind turbine project and their required siting criteria on open ridges without vegetative obstruction. Mitigation options based upon the BLM VRM methodology were included on the Proposed Conditions Rating Form and the rating panel members were asked to consider and indicate any that were appropriate to the project. The mitigation options include the following:

1. Reduce Density

Reducing the number of turbines would minimize some of the visual impacts; however, many of the most sensitive views have views to multiple turbines and therefore the visual impact would only be slightly mitigated. This option was suggested by a Terraink rating panel member on (2) occasions.

2. Reduce Height

Reducing the height of the turbines will assist with some of the scale concerns; however in areas where the turbines have a disorganized and variable appearance, the lower profile turbines will not resolve that conditions. In addition, the effect of downsizing the turbine size as it relates to power generation would need to be understood to confirm that it is a feasible option. This option was suggested by a Terraink rating panel member on (2) occasions.

3. Reduce Clearing

Reducing the amount of existing woodland that needs to be cleared and the landform re-contoured to install the turbines will help to mitigate the flattening of ridge tops and swaths of removed vegetation. This option was suggested by a Terraink rating panel member on 1 occasion.

4. Reduce Light Pollution

For the purpose of this VIA, the effects of nighttime lighting are not included in this study due to the ongoing coordination between AWE and the FAA regarding the use of radar technology to engage the aviation safety lights when there is an aircraft in the vicinity thereby eliminating the need for a constant strobing red light. All efforts should be made to limit the amount, direction and duration of aviation safety lights that are required. In addition, all lighting that is required at the support facilities, O&M building and substation should be kept to a minimum and only engaged when needed by switch or motion detector.

5. Add Screening

The addition of constructed screening and vegetative screening is effective in the area of the O&M Building and Substation; however, the use of earthen berms, fences or screen plantings will not be effective in screening the wind turbines. Terraink would recommend that the use of *Pinus strobus*, white pine as indicated on the LandWorks Exhibit 19: Sub Station Mitigation Plan should not be used as a screening species due to the issues that white pines have with losing their lower limbs, wind shearing their tops, and providing little screening value at the ground level. Terraink would recommend the use of other native trees such as *Abies balsamea*, Balsam Fir; *Abies concolor*, Concolor Fir; and *Picea glauca*, White Spruce; all evergreen tree species that are native and maintain their lower branches.

6. Add Camouflage

The use of white or off-white coloring on the turbines will typically blend best with the sky. Given the nature of the wind turbine, it does not lend itself to having supplemental camouflaging materials added to, or near, the turbine.

7. Modify Color

The use of white or off-white coloring on the turbines typically helps to blend the turbines into the sky. The Antrim project is already utilizing this approach; therefore, this mitigation option was not noted by the rating panel.

8. Alternate Location

This was the mitigation strategy that was most often selected by the Terraink rating panel member (33) times; however, given the location of the Antrim project an alternate location would mean abandoning the project site for another regional location.

9. Alternate Technology

Using an alternate technology such as coal, nuclear, solar, etc. have their own set of constraints and opportunities, some of which are more impactful to the environment as well as the visual landscape.

10. Alternate Design

Unfortunately, at this time wind turbine technologies that would reduce visual impacts but still accommodate the utility power requirements do not exist.

11. Alternate Material

At this time, there is not an alternate material available for wind turbines.

VIII.COMPLIANCE WITH SITE 301.50; EFFECTS ON AESTHETICS

This visual impact assessment made efforts to incorporate the New Hampshire, SEC visual impact assessment requirements as outlined in the *Site 301.50 Effects on Aesthetics*, including but not limited to, Project Description, VIA Methodology, Physiographic Description, 10-mile Study Radius, Identification of Sensitive Resources, Development of Visual Simulations, Inclusion of private property (as allowed) and at least one in winter season in visual simulations, Recording of Field Conditions, FAA Lighting and a Description of Potential Mitigation Options.

In addition, this VIA uses the SEC definition of “Scenic Resources” as per *Site 102.45 “Scenic Resources”* to mean resources to which the public has a legal right of access that are:

- (a) Designated pursuant to applicable statutory authority by national, state or municipal authorities for their scenic quality;
- (b) Conservation land or easement areas that possess a scenic quality;

- (c) Lakes, ponds, rivers, parks, scenic drives and rides and other tourism destinations that possess a scenic quality;
 - (d) Recreational trails, parks, or areas established, protected or maintained in whole or in part with public funds;
 - (e) Historic sites that possess a scenic quality; or
 - (f) Town and village centers that possess a scenic quality.
- (Source. #10993, eff 12-16-15)

IX. COMPARISON TO PREVIOUS VISUAL IMPACT ASSESSMENT RESULTS

A. LandWorks Visual Assessment Review

In addition to conducting the VIA on behalf of the New Hampshire Counsel for the Public for the Antrim Wind Power Project, Terraink was also asked to review the Applicant's VIA that was completed by LandWorks (LW), a landscape architecture firm in Middlebury, Vermont. LandWorks is a well-respected firm with extensive experience in the development of visual impact assessments. The 191-page Visual Assessment for the Antrim Wind Project is dense with project specific information, VIA methodology, results and references to other wind power projects throughout the New England Region. While the breadth and detail of the information within the visual assessment is commendable and almost textbook in nature, it made for a large document that was often difficult to navigate and hone in on the specific Antrim VIA methodology and results. In addition, it is unusual to have a visual assessment contain a large section of supplemental wind farm photos and descriptions that are not directly related to the wind power project that is being assessed. Typically, the VIA wind power project is analyzed and compared on its own, except when it is in proximity to an existing wind farm, which could be considered as part of a cumulative assessment or regional description.

LandWorks' conclusion for the Antrim Wind Power Project, as indicated on page 131 of the VA report, is that the Antrim wind power location is an "excellent site for a wind project". LandWorks determined that the "visual effects are extraordinarily limited given the number of resources in the project area, and the lack of resources of State or National scenic significance." It was also stated on page 132, that "there will be a limited effect on local resources, including the fact that the use of Willard Pond and its environs will not be substantially diminished if this project is constructed." Given these statements, it was LandWorks opinion that "the project as proposed will not have an unreasonable adverse effect on aesthetics."

However, it is the finding of Terraink that the (5) sensitive resources would have a high potential for visual impact and, therefore, an unreasonable aesthetic impact would be incurred by the construction of the project. These sites include Willard Pond, Meadow Marsh Preserve, White Birch Point Historic District, Bald Mountain and Goodhue Hill. In reviewing Jean Vissering's VIA, she also

concluded that (4) of the (5) sensitive resources as listed by Terraink would also have significant aesthetic impacts, which included Willard Pond, White Birch Point Historic District, Bald Mountain and Goodhue Hill. In contrast, LandWorks determined that only Willard Pond had a “Moderate-High” overall visual effect rating (Table 14, page 87), and a “Moderate” overall viewer effect rating (Table 19; page 90) and therefore, “the effect to a reasonable viewer is not considered significant,” thus supporting the LandWorks conclusion that there would be no unreasonable adverse effect on aesthetics with the wind power project in place.

In addition, the LandWorks rating of the (4) remaining sensitive resources that were found to be visually impacted within the Terraink VIA were eliminated from impact assessment during the LandWorks rating process. For example, the Bald Mountain earned a “Low-Moderate” visual effect rating in Table 14, Meadow Marsh Preserve and Goodhue Hill did not make the initial “Moderate-High” overall sensitivity threshold cutoff in Table 7, and the White Birch Point Historic District; Gregg Lake was not included as part of the 290 sensitive resources listed in Table 2. In addition, it was noted in the LandWorks VA that Highland Lake was determined to have “No Project Visibility” in Table 2 and no further evaluation was provided for this resource; however, Terraink found there were views and included the Highland Lake sensitive resource as part of our visual simulation and rating package.

While it can be argued that each visual expert will have a varying sense of what the scenic quality and sensitivity level is for a viewpoint, and the resulting level of the potential visual contrast with the project in place due to personal bias and preference, Terraink’s employment of the (3) person rating panel is intentional to provide a defensible process of determining scenic quality, sensitivity, contrast and the resulting visual impact that goes beyond a single individuals judgement and determination. It is impossible for Terraink to fully interpret the LandWorks ratings in each of the Tables since the empirical data associated with the resulting High, Moderate, and Low rating, by an undetermined one or more raters, is not included in the report or appendices. Therefore, the rating system is assumed to be a “letter” system without the numerical backup despite rating numbers being offered in the LandWorks Table footnotes.

A full comparison of the Terraink, LandWorks and Vissering VIA Visual Impact/Effect Results is shown in the table below:

Table 7 - Comparison of Previous Visual Impact Rating Results

| VP # | Resource with Potential Visibility | Terraink Visual Impact | LandWorks Visual Effect | Vissering Aesthetic Impact |
|------|---|------------------------|---|----------------------------|
| 1 | Willard Pond (Boat View) | High | Moderate; Table 19 | Significant |
| 5 | Meadow Marsh Preserve | High | <i>Below Threshold;</i> <i>Table 7</i> | Moderate |
| 7 | White Birch Point HD; Gregg Lake (Boat View) | High | <i>Not included in</i> <i>Table 2</i> | Moderate- Significant |
| 9 | Franklin Pierce Lake (Boat View) | Moderate | <i>Below Threshold;</i> <i>Table 7</i> | Moderate |
| 11 | Pitcher Mountain | Moderate | Low-Moderate; Table 14 | Moderate |
| 13 | Island Pond | Moderate | <i>Below Threshold;</i> <i>Table 7</i> | Moderate |
| 27 | Bald Mountain Overlook | High | Low-Moderate; Table 14 | Significant |
| 33 | Goodhue Hill | High | <i>Below Threshold;</i> <i>Table 7</i> | Moderate- Significant |
| 47 | Loverens Mill Cedar Swamp (Trail Head) | Moderate | <i>Below Threshold;</i> <i>Table 7</i> | Minimal-Moderate |
| 61 | Liberty Farm Road (ATV Trail Entrance) | Moderate | - | - |
| 63 | Crotched Mountain (Viewing Platform) | Moderate | <i>Below Threshold;</i> <i>Table 7</i> | - |
| 64 | Crotched Mountain (Overlook) | Moderate | Low; Table 14 | - |
| 67 | Black Pond | High | <i>Below Threshold;</i> <i>Table 7</i> | Moderate |
| 74 | Highland Lake | Low | <i>"No Visibility";</i> <i>Table 2</i> | Moderate |

Table 7 sources:

LandWorks; VA; Dated September 3, 2015; Table 2. Scenic Resources Inventory List; page 57
 LandWorks; VA; Dated September 3, 2015; Table 7. Overall Sensitivity Ratings; page 71
 LandWorks; VA; Dated September 3, 2015; Table 14. Overall Visual Effect Ratings; page 87
 LandWorks; VA; Dated September 3, 2015; Table 19. Overall Viewer Effect Ratings; page 90
 Jean Vissering; VIA; Dated July 30, 2012; H. Aesthetic Impacts from Vantage Points, page 5-14

In addition to the review of the rating system, Terraink also reviewed the proposed visual simulations offered by LandWorks for the Antrim Project. The visual simulations submitted as part of the February 19, 2016 Supplemental Application Information are generally in keeping with the updated Site 301.05(b)(7) requirements and supersede the original visual simulations contained within the LandWorks Visual Assessment dated 09/03/2015. The LandWorks VA offers that the visual simulations contain a “range of weather and light conditions that are typical of the area” (page 11); however, it is the preferred standard practice to develop visual simulations that show the “worse-case” scenario of clear visibility, blue sky, and leaf-off conditions when photographing the proposed project area. The majority of the LandWorks simulations, even the leaf-off winter views, contain an atmospheric haze and cloudiness that can affect the viewer’s perception of potential visual contrast and aesthetic impact. In addition, we have the following comments on the individual LandWorks visual simulations and associated text descriptions:

1. Exhibit 6 – Bald Mountain. The LandWorks VA text description on page 120 indicates that “the hubs of six turbines will be visible, but will not dominate or appear out of scale with the landscape.” The Terraink rating panel results are in direct contradiction to this determination.
2. Exhibit 7 – Franklin Pierce Lake. The LandWorks VA Appendices contains a visual simulation exhibit; however, there is no supporting text within the VA that discusses the scenic quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place; thereby justifying the lack of LandWorks visual effect rating.
3. Exhibit 8 – Gregg Lake. The LandWorks VA text description on page 122 indicates “the turbines do not appear awkwardly out of scale with the setting and they do not dominate the slope of the landform or landform itself.” The Terraink rating panel results are in direct contradiction to this determination.
4. Exhibit 9 – Island Pond. The LandWorks VA text description on page 124 indicates that the turbines “will not appear as a prominent feature in the landscape.” The Terraink rating panel results are in alignment with this determination.
5. Exhibit 10 – Pitcher Mountain Fire Tower. The LandWorks VA Appendices contains a visual simulation exhibit; however, there is no supporting text within the VA that discusses the scenic quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place; thereby justifying the lack of LandWorks visual effect rating.
6. Exhibit 11 – Summit Trail Crotched Mountain. The LandWorks VA Appendices contains a visual simulation exhibit; however, there is no supporting text within the VA that discusses the scenic

quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place; thereby justifying the lack of LandWorks visual effect rating.

7. Exhibit 12 – Willard Pond Boat Launch. The LandWorks VA text description on page 126 indicates “only the portions of two turbines will be visible above the tree line, and will not dominate the view given their distance (over 3 miles away), angle of view, overall visual scale and the fact that there is no key scenic focal point that the turbines interrupt.” However, the description goes on to say that LandWorks agrees that “Willard Pond is a visually sensitive resources”; therefore one could determine that the entire pond is a key scenic focal point and the visual quality is affected by the installation. In addition, Exhibit 12 is not the worst-case scenario view to the proposed project, whereas Exhibit 13 has a greater potential for visual effect with the project in place.
8. Exhibit 13 – Northeast Corner of Willard Pond. The LandWorks VA Appendices contains a visual simulation exhibit; however, there is no supporting text directly referring to Exhibit 13 within the VA that discusses the scenic quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place in that view; thereby justifying the determination that Willard Pond has a “Moderate” overall viewer effect rating and that there would be no unreasonable adverse effect on aesthetics with the wind power project in place. The Terraink rating panel results are in direct contradiction to this determination.
9. Exhibit 23 – Change in View from Meadow Marsh. The LandWorks VA text description on page 114 indicates that “Since this (#10) turbine and its access road are no longer there, the primary view will not be altered.” However, the Terraink visual simulations and contrast results are in direct contradiction to this determination, both at the bench and bridge locations, which were both evaluated and the bridge simulation chosen because it was the worse-case scenario for visual effect.
10. Exhibit 24 – Public R.O.W. Gregg Lake. The LandWorks VA Appendices contains a visual simulation exhibit; however, there is no supporting text within the VA that discusses the scenic quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place.
11. Exhibit 25 – Private Residence, E. Washington Road. The LandWorks VA Appendices contains the visual simulation exhibit; however, there is no supporting text within the VA that discusses the scenic quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place.

12. Exhibit 26 – Private Camp, Waterfront Road. The LandWorks VA Appendices contains the visual simulation exhibit; however, there is no supporting text within the VA that discusses the scenic quality of the existing conditions, and the potential visual contrast and subsequent visual impact with the project in place.
13. Goodhue Hill. The LandWorks VA text description on page 118 indicates that “the best view is to the northeast when you come into the open, cleared area – which does not include a view of much of the project site.” However, the Terraink visual simulation findings and rating panel results are in direct contradiction with this determination as the view to the project was determined to have high visibility to (8) turbines, (7) of which are in full view of the tower, hub and blade.

Finally, Terraink noted several additional inconsistencies within the LandWorks Visual Assessment. First, within the LW VA, page 35, it states that the turbines and rotors will be painted “a light or white color:” however, the Siemen’s technical specification states that the wind turbine components will be painted light grey in color. More importantly, the FAA regulations; Chapter 12 indicates that all (9) turbines are to be painted white (#17875) in color: therefore, it is unclear at this time what the actual color of the turbines are anticipated to be.

Secondly, the discussion of the Recreation Opportunity Spectrum (ROS) was provide on page 31; however, there was never a clear application of the ROS classes to the Willard Pond resource, but rather a listing of “Moderate” in Table 18, Remoteness (page 90). It should be noted that the designation of “Moderate” contains three different ROS classes, as per the language on page 33, but it is not clear which class Willard Pond falls into pre and post project installation.

Thirdly, the maximum height of turbine 9 is incorrectly noted in meters on page 35 of the LandWorks VIA. Turbines 1-8 are noted as having a maximum height of 149 meters (488.8 feet) and Turbine 9 is also indicated as having a maximum height of 149 meters (446.2 feet) in height.

Lastly, there appears to be an error on page 72 of the LandWorks VA in the “Photographs of Sensitive Scenic Resources with Potential Visibility” in photo “1. Pitcher Mountain Fire Tower (#24): View towards Project.” The photo caption indicates the Project Location, Tuttle Hill, Willard Mountain, and a note that the mountain in the center of the view is “North Pack Monadnock;” however, the mountain at the center of the view is Crotched Mountain. This is verified by aligning the viewpoint and the known turbines and drawing a straight line to Crotched Mountain.

X. CONCLUSION

A. Viewshed Mapping

This Terraink VIA viewshed mapping exercise indicated that the project will have limited views from within the 353.2-square mile study area with the screening properties of topography, vegetation and structures considered. The most significant opportunities for visibility occur within the eastern side of the 5-mile study radius, as well as the eastern quadrant of the 10-mile study radius. According to the viewshed mapping, the sensitive resources that have the greatest potential views to the wind turbines, with the screening effects of vegetation in place include; Willard Pond, Gregg Lake, Island Pond, Loverens Mill Cedar Swamp, Franklin Pierce Lake and White Birch Point Historic District. To a lesser degree, the sensitive resources of Meadow Marsh Preserve, Robb Reservoir, Highland Lake, Black Pond, and Nubanusit Lake also have potential views. It is generally accepted that most significant levels of visual effect from wind turbine installations are generally concentrated within the first 3.5-miles of the study area, (Eyre, 1995) which is in keeping with the Antrim viewshed mapping findings. The areas that are generally screened by the vegetation and structures include the Towns of Antrim, Bennington, Hillsborough, Windsor, Washington, Stoddard, Nelson, Harrisville, and Hancock. In addition, the major roadways and major waterbodies to the west of the project site did not have views to the project given the dense woodland cover and hilly terrain.

B. Field Verification

The field verification conducted by Terraink and EDR on 19-20 March 2016 involved the staff members driving public roads and visiting potential scenic resources within the 10-mile radius study area to document locations from which the proposed wind turbines would likely be visible, partially screened, or fully screened under “leaf-off” conditions. It was determined during the field verification process that both Nubanusit Lake and Robb Reservoir had extremely limited views to the proposed project and therefore, they were not included as part of the visual simulation package. In addition, the field crew found that there were several potential sensitive receptors points along the Windsor Mountain and Meetinghouse Hill, north of the project study area that had partial visibility to the proposed project; however because they occurred on private land, with no public access, they were not included as part of the visual simulations. These sites included Meetinghouse Hill Cemetery, Meetinghouse Hill Summit, Windsor Mountain Summit and Stacy Hill Road. Out of the remaining sensitive sites that were field verified, there were a handful that had duplicate views to the project site, therefore, the best (worst-case scenario) view was used for simulations purposes. The duplicate sites included Willard Pond Boat Launch, Gregg Lake Beach Pavilion and the Meadow Marsh Preserve Bench Overlook. The remaining (14) sensitive resource viewpoints that were selected to be visual simulations/photo renderings were chosen due to their documented

importance to the SEC, the broad range of sensitive resources that they represent, and the varying distances to the project form within the 10-miles study area. The final field verified sites to be used as visual simulation/photo renderings include Willard Pond (Boat View), Meadow Marsh Preserve, White Birch Point Historic District; Gregg Lake (Boat View), Franklin Pierce Lake (Boat View), Pitcher Mountain, Island Pond, Goodhue Hill (Trail View), Loverens Mill Cedar Swamp (Trail Head), Liberty Farm Road (ATV Trail Entrance), Crotched Mountain; Accessible Trail (ADA Viewing Platform), Crotched Mountain (Overlook), Black Pond, Highland Lake.

C. Visual Simulations | Photo Renderings

This visual simulations/photo renderings that were developed for the (14) sensitive sites indicate that the level of visibility and visual impact from within the study area will be variable depending on viewing distance, viewer sensitivity, topography, natural and man-made screening, the landscape setting, and the intervening built structures and forms that will intercept the view. Generally, the simulations that show a viewing distance of less than 3.5-mile to the nearest turbine are the worst-case scenarios and have the greatest visual impact, whereas the long distance views are diluted by the expansive scale and aesthetically appealing visual texture and interest available within this region.

D. Rating Panel Evaluation

The three person rating panel (2-in-house and 1-consultant) determined that with the proposed project in place there were (5) sensitive resources with a high resource contrast rating, (5) that had a high-moderate resource contrast rating, (3) that had a low-moderate resource contrast rating and (1) that had a low resource contrast rating. The (5) sensitive resources that were rated as high visual contrast include: Willard Pond, Meadow Marsh Preserve, White Birch Historic District; Gregg Lake, Bald Mountain and Goodhue Hill. The high visual contrast ratings are consistent with the views being less than 3.5-miles, which will typically trigger a higher contrast rating and increased public reaction to the wind turbines.

The individual resource contrast ratings are then averaged to provide an overall resource contrast rating that the project will have throughout the entire study area. This is determined by averaging the individual viewpoint visual contrast ratings, eliminating the high and low contrast rating scores, and dividing the total by the remaining number of contrast ratings. For the Antrim VIA the individual viewpoint contrast rating scores included (20.3), (21.7), (22.0), (15.3), (12.3), (7.8), (20.0), (19.0), (12.3), (9.5), (8.7), (12.2), (16.7) and (3.2). The highest ranking of (22.0) and lowest ranking of (3.2) were removed from the (14) ranking scores and the remaining (12) ranking scores were then added together and averaged resulting in an overall project contrast rating score of 14.65, which is a high-moderate contrast rating, nearing high contrast status at 16.0. See Table 8.

Table 8 - Overall Project Study Area Resource Contrast Rating

| RESOURCE CONTRAST RATING | | | | | |
|--|---|--------------|---------------|--------|----|
| 0 | 5 | 6 | 10.5 | 15 | 25 |
| LOW | | LOW-MODERATE | HIGH-MODERATE | STRONG | |
| | | | 14.65 | | |
| 10-MILE ANTRIM STUDY AREA CONTRAST RATING | | | | | |

As indicated in the Visual Impact Analysis the Project Study Area Resource Contrast Rating average of 14.65 is reviewed in tandem with Table 7 - Summary of Terraink Potential Visual Impact Results, which indicates that there are (6) sensitive resources that are anticipated to have the highest potential visual impact due to the installation of the wind turbine project. These viewpoints include VP#1 – Willard Pond; VP#5 – Meadow Marsh Preserve; VP#7 – White Birch Point Historic District, Gregg Lake; VP#27 – Bald Mountain; VP# 33 – Goodhue Hill (Trail) and VP#67 – Black Pond. The only means to reduce or mitigate the potential visual impact on these (6) sensitive resources of regional significance is to relocate the project since further reducing the turbine heights will potentially create an increased visual disturbance situation due to the occurrence of bisected blades on the horizon, and reorganizing the wind turbines on the existing ridge will not result in obscured views.

E. Cumulative Effect | Sequential Observation or Successive Observation

As per Site 102.46 the SEC definition of “Sequential Observation” means “a viewer is capable of seeing multiple energy facilities from different viewpoints as the viewer travels along a particular route such as a trail, river, scenic byway, or on a lake.” In addition, as per Site 102.52 “Successive Observation” means, “a viewer sees multiple energy facilities from a particular viewpoint, but not within the same viewing arc, by changing the viewer’s cone of vision.” (Source. #10993, eff 12-16-15) Therefore, in applying these definitions to the Antrim Wind Project, there is no cumulative visual impact; combined, sequential or successive, that result from the Antrim wind power project. The existing Lempster Wind Power project in Lempster, New Hampshire has no visibility from (13) of the (14) sensitive sites, and is only visible from Pitcher Mountain when looking north-northwest, which is away from the view of the Antrim wind power project location. The undulating topography and dense vegetation of the region will limit the potential visibility of both wind power installations except for summit locations with 360-degree view such as Pitcher Mountain.

F. Overall Conclusion

The Terraink visual impact assessment for the Antrim Wind Power project finds that the project, as currently designed, would result in an overall high-moderate study area visual contrast rating and an adverse visual impact to (6) sensitive resources within the study area. While the various

sensitive resources studied in this VIA indicate varying levels of potential visual impact, it is the DePierrefeu-Willard Pond Wildlife Sanctuary as a whole that is most significantly impacted by the installation of the wind turbines. The conservation land and associated educational facilities in the wildlife sanctuary are permanently affected by the proposed industrial installation. Terraink acknowledges and agrees with both LandWorks and Jean Vissering's evaluation that the Antrim site appears to be a "good" location for a wind project on paper due to the topography, "moderate" visual effects on many of the SEC determined sensitive resources, limited views from towns, major roadways, water bodies, and wooded lands; however, what cannot be accounted for by the "on paper" assessment is the vigor and commitment of the local population's passion and investment in purchasing, connecting, protecting, and preserving local conservation lands as a means to protect the regional landscape, which goes beyond National and State significance.

Therefore, it is the professional opinion of Terraink, based upon this comprehensive visual impact analysis, that the Antrim Wind Project as proposed has an unreasonable adverse effect on aesthetics within the study area.

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