NEW HAMPSHIRE SITE EVALUATION COMMITTEE

Docket No. 2008 —

APPLICATION OF GRANITE RELIABLE POWER, LLC FOR CERTIFICATE OF SITE AND FACILITY

Granite Reliable Power Windpark
Coos County, New Hampshire
JULY 2008

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LIST OF **ACRONYMS**

A/S:	Aktieselskab (Danish name for a stock-based corporation)
AC:	Alternating current
APE:	Area of Potential Effect
ATV:	All-terrain vehicle
AWEA:	American Wind Energy Association
AWS:	AWS True Wind
BMP:	Best Management Practices
C:	Celsius
CGP	EPA's National Pollution Discharge Elimination System Construction General Permit
cm:	centimeter
CO2:	Carbon Dioxide
COE:	U.S. Army Corps of Engineers
cu m:	cubic meter
dBA:	decibels A-weighted
DES:	Department of Environmental Services
DHR:	Division of Historical Resources
DOD:	U.S. Department of Defense
DSM:	Demand Side Management
F:	Fahrenheit
FAA:	Federal Aviation Administration
FERC:	Federal Energy Regulatory Commission
ft:	foot
GIS:	Geographic Information System
GPS:	Global Positioning System
GRP:	Granite Reliable Power, LLC
HB:	House Bill
IEA:	International Energy Agency
IEC:	International Electrotechnical Commission
IPCC:	Intergovernmental Panel on Climate Change
ISO:	Independent System Operator
JEDI:	Jobs and Economic Development Impact
kg:	kilogram

km:	kilometer
kV:	kilovolt
kW:	kilowatt
kwh:	kilowatt-hour
lbs:	pounds
LIDAR:	Laser Imaging Detection and Ranging
LLC:	Limited Liability Company
m:	meter
mi:	mile
mm:	millimeter
mph:	miles per hour
m/s:	meters per second
MW:	megawatt
MWH:	megawatt-hour
NAIP:	National Agricultural Imagery Program
NCC:	North Country Council, Inc.
NE-ISO:	The New England Independent System Operator
NEP:	Noble Environmental Power, Inc.
NH DES:	New Hampshire Department of Environmental Services
NHDHR:	New Hampshire Division of Historical Resources
NH DOT:	New Hampshire Department of Transportation
NHFG:	New Hampshire Fish and Game Department
NHNHB:	New Hampshire Natural Heritage Bureau
NH OEP:	New Hampshire Office of Energy and Planning
NH PUC:	New Hampshire Public Utilities Commission
NHRHP:	New Hampshire Register of Historic Places
NH SEC:	New Hampshire Site Evaluation Committee
NOX:	Nitrogen Oxides
NPDES:	National Pollutant Discharge Elimination System
NREL:	National Renewable Energy Laboratory
NRHP:	National Register of Historic Places
O&M:	Operations and Maintenance
OEP:	Office of Energy and Planning
OSHA:	Occupational Safety and Health Administration
PILOT:	Payment in lieu of taxes
PLLC:	Partners of Limited Liability Company

PSNH:	Public Service Company of New Hampshire
PTC:	Production Tax Credit
REC:	Renewable Energy Credits
REPP:	Renewable Energy Policy Project
GGI:	Regional Greenhouse Gas Initiative
ROW:	Right of way
rpm:	revolutions per minute
RPS:	Renewable Portfolio Standards
RV:	recreational vehicle
RSA:	Revised Statutes Annotated
SB:	Senate Bill
SCADA	supervisory control and data acquisition
SEC:	Site Evaluation Committee
SO2:	Sulfur Dioxide
SODAR:	Sonic Detection and Ranging
SPNHF:	Society for the Protection of New Hampshire Forests
SWPPP:	Storm Water Pollution Protection Plan
TKA:	Thomas Kokx Associates
UN:	United Nations
USDA:	U.S. Department of Agriculture
USEPA:	U.S. Environmental Protection Agency
USGS:	U.S. Geological Survey
UWIG:	Utility Wind Integration Group
VERA:	Vermont Environmental Research Associates, Inc.
WHO:	World Health Organization
WMNF:	White Mountain National Forest

EXECUTIVE SUMMARY

Granite Reliable Power, LLC ("GRP" or the "Applicant") submits this Application to the New Hampshire Site Evaluation Committee ("SEC" or the "Committee") and requests a Certificate of Site and Facility to construct and operate the Granite Reliable Power Windpark, in one town and four unincorporated places in the central portion of Coos County, New Hampshire. This Executive Summary summarizes the contents of the Application and the purpose for proposing this Windpark.

APPLICANT INFORMATION/ FINANCIAL, TECHNICAL & MANAGERIAL CAPABILITY

Granite Reliable Power, LLC is a Delaware Limited Liability Company and is registered with the New Hampshire Secretary of State to do business in New Hampshire. GRP proposes to develop the Granite Reliable Power Windpark (the "Project") in central Coos County in northern New Hampshire. Wind turbines and/or electrical interconnection facilities will be located in the unincorporated places of Millsfield, Ervings Location, Dixville and Odell, and in the town of Dummer. GRP is majority-owned by Noble Environmental Power, LLC ("NEP" or "Noble"), a Delaware Corporation based in Essex, Connecticut, a leading wind power development company in the United States with over 150 employees throughout the U.S. and over 1,000 megawatts of wind generation that are in the later stages of development or construction, or are in operation. NEP also has projects in various stages of development in New England. Noble's management team has extensive knowledge of every aspect of the development, financing, construction and operation of windparks, as well as many years of experience in traditional independent electricity generation. Noble has a fully-integrated, cross-functional organizational structure that enables the company to develop, finance, construct, own and operate each of the projects, including GRP, with a long-term ownership perspective.

SITE INFORMATION

The Granite Reliable Power Windpark is proposed to be built on private land in an upland region of central Coos County. The wind turbines will be located on three tracts of commercial timber land, the Phillips Brook, the Bayroot land, and a smaller portion of privately owned land on Dixville Peak, as shown in **Figure 3**.

The Project includes the construction of approximately 12 miles (19.3 km) of new access road and upgrading of about 19 miles (30.6km) of existing private logging roads. A 34.5 kV electrical collection line will gather the power from the wind turbines and deliver it to a substation to be built approximately 1.5 miles (2.4km) south of the Wind turbine strings. A 115kV electrical interconnection line will be constructed to deliver the power from the substation to the interconnection switching station located adjacent to the existing 115 kV electric transmission line owned by Public Service Company of New Hampshire ("PSNH"). This electrical interconnection line will span approximately 5.8 miles (9.3 km) along the existing Dummer Pond Road. A maintenance building and laydown yard will be constructed in the vicinity of the substation to accommodate construction and operation of the Project.

RENEWABLE ENERGY FACILITY INFORMATION

The facility layout incorporates environmental and meteorological studies conducted on the property. The Project will be powered by 33 wind turbines with a name plate capacity of 3.0 megawatts (MW) each, for a total installed capacity of 99 MW. The Project is estimated to

produce approximately 300,000 MWH per year, or enough power to serve 40,000 households with clean renewable energy. The wind turbines to be used are the "V90" series manufactured by Vestas Wind Systems A/S.

CONSTRUCTION SCHEDULE

The proposed construction start date is in mid 2009, assuming Committee approval and weather conditions permitting. Turbine and component delivery should begin in mid summer and continue well into the fall months. The Project is expected to be completed and in service in Summer 2010.

Construction of the Granite Reliable Power Windpark, including all ancillary facilities, is anticipated to take place in 2009 and 2010 straddling the winter months of 2009. Precursors to construction activities include the acquisition of all state and federal approvals for the construction of the Project and related transportation.

SITE LOCATION AND ALTERNATIVES

An extensive wind site prospecting and screening process was conducted to determine the location for the Granite Reliable Power Windpark. First, on a regional level, using mostly publicly available wind resource mapping technologies, knowledge of existing electrical infrastructure, and obtaining background on various environmental attributes, the most promising geographical locations were selected. Second, site specific screening was conducted to better assess wind characteristics, community support for a Windpark and potential ecological issues.

The present design minimizes the impacts to ecological resources while achieving the Project's goal of providing 99MW of clean renewable energy through the harnessing of wind. Further explanation of how the final design for the Windpark came to be is found in Section (h)(2).

POTENTIAL HEALTH AND ENVIRONMENTAL EFFECTS AND MITIGATION PLANS

AESTHETICS & VISUAL IMPACTS

No environmental, health, or safety impacts are expected to occur due to the visual impacts of the Project, but the prospect of seeing wind turbines in a previously undeveloped area is of concern to some people. However, visibility by itself does not necessarily mean there will be unreasonably adverse effects on the site or surrounding landscape. The visual assessment of the Project evaluated views from federal, state and local roads, recreation areas, village centers and historic sites and concluded that the visual impacts would not rise to the level of unreasonably adverse and that the visibility of the Project is relatively low. The Project was not found to obstruct views from any high scale value sites.

SHADOW FLICKER: A separate analysis was undertaken for another potential visual impact known as shadow flicker. Shadow flicker is the periodic change in light intensity or shadows created by the rotating blades of the wind turbines. The analysis calculated the potential for this occurrence from each turbine for every sun position for every minute of the year.

Due to the remote nature of the Project, even when excluding all interference from vegetation, no residences or businesses are expected to experience shadow flicker at any time of the year.

TURBINE SAFETY LIGHTING: The turbines will require safety lighting as determined by the Federal Aviation Administration ("FAA").

CULTURAL AND HISTORIC RESOURCES

A Phase IA archeological survey was conducted to identify and assess areas of archeological sensitivity within 3 miles (4.8 km) of the Project site. Based on the preliminary results of this survey, and in consultation with the New Hampshire Division of Historical Resources ("NHDHR"), a Phase IB archeological survey has been recommended and will provide the basis for determining the need for further work.

Based on the work conducted to date, the Project is unlikely to have an unreasonable adverse effect on any known historic resources. No historic structures will be physically impacted and at present it appears unlikely that the Project would demonstrably diminish any aspects of a setting that might contribute to the significance of such historic properties.

It is anticipated that the Project is unlikely to have an unreasonable adverse effect on significant archeological resources due largely to the remoteness of the Project site. In on-going consultation with the NHDHR, effects on archeological resources will be characterized and evaluated.

AIR QUALITY AND CLIMATE CHANGE

Granite Reliable Power Windpark, in its long-term operation, will produce no air emissions; it will not have adverse impacts on local air quality. Moreover, as a source of clean, renewable energy the Project will positively contribute to regional air quality by offsetting fossil unit generation on the ISO New England Grid. Using the marginal emission rates developed by ISO-NE in July, 2007, the Project is estimated to offset over 332,000,000 pounds of carbon dioxide emissions annually. These offsets will improve local and regional air quality and help mitigate the worldwide impacts of global warming and climate change.

WATER QUALITY

The Project will generate power without any water intake or discharge that requires study, mitigation or permitting. The Project will avoid all environmental problems associated with the intake and discharge of cooling water (which is typically required for other types of electric generating facilities).

Due to the alteration of terrain required for the construction of access roads and other Project facilities, the Project will have temporary impacts related to stormwater, soil erosion and sediment control. These issues have been addressed in the detailed plans and mitigation measures as submitted in the Standard Dredge & Fill Permit Application and Site Specific Application submitted as part of this Application. Civil engineering design of the Project was based on extensive on-site investigations of wetlands and other surface waters, soils, natural communities and wildlife, research with environmental agencies, and best practices used in constructing similar roads and facilities.

With minimal impact to wetlands and other surface water bodies, no water intake or pollution discharge, and detailed soil erosion and sediment control measures in place to mitigate stormwater discharge, the Project's impact on water quality is expected to be very minimal.

PLANT LIFE

The Granite Reliable Power Windpark worked in collaboration with the New Hampshire Natural Heritage Bureau to document specific findings and assess potential impacts to plant life. Based on studies completed to date, no impact to rare or exemplary plant species is anticipated as a result of this Project.

TREE CLEARING

The Project is sited on privately-owned land and maintained by forest management companies that allow various degrees of public access. As a result of longstanding, pre-existing forestry activities, a network of logging roads and skid trails has been developed over the years.

In terms of forest types, higher elevations (above 2700 feet or 823 m) are dominated by balsam fir (Abies balsamea) and red spruce (Picea rubens) forests and are mainly undisturbed by commercial forestry practices. However, the surrounding side slopes and valleys have experienced large scale forest harvesting activities resulting in an unevenly aged forest community consisting primarily of yellow-birch (Betula alleghaniensis), American beech (Fagus grandifolia), balsam fir, red spruce, and sugar maple (Acer saccharum), species typically found in northern hardwood–conifer forests. Tree clearing activities will utilize "Best Management Practices for Forestry: Protecting New Hampshire's Water Quality" during clearing activities

WILDLIFE

The ongoing forestry activities at the proposed Project site have resulted in a patchwork mosaic of unevenly aged forest stands resulting in a diversity of habitats that are utilized by a variety of wildlife species. Some species are present in the area as resident individuals or populations while others use the area during migration or a specific portion of their life cycle. Not all species present will be affected by the Project.

Wildlife surveys were conducted to address concerns for state-listed threatened and endangered wildlife species. These surveys were designed in coordination with the New Hampshire Fish and Game Department ("NHFGD") and include information about mammals, birds, bats, wetlands and vernal pools.

Specific findings of the wildlife surveys are summarized below along with proposed mitigation measures when appropriate.

BIRDS

MIGRATING BIRDS: The Project has the potential to have direct and indirect impacts to birds that are either resident at or migrating through the Project site. Direct impacts are fatalities caused by collision with wind turbines and potential indirect impacts refer to habitat loss and fragmentation, disruptions in foraging or breeding behavior caused by access roads, the wind turbines' physical presence and operation, and lighting of some wind turbines.

Consultations with NHFGD and United States Fish and Wildlife Service ("USFWS") were held in order to identify state or federally-listed species that may be of concern. State-listed species include the peregrine falcon (state-listed endangered), and three-toed woodpecker (state-listed threatened) and Bicknell's thrush (Catharus bicknelli) and the Rusty blackbird (Euphagus carolinus) (state-listed species of special concern). No federally-listed threatened or endangered birds were identified as likely to breed within the surveyed area.

To assess the relative abundance and presence of migrating and nesting species, radar nocturnal migration and breeding bird studies were conducted. During the three consecutive seasons of radar surveys, relative flight height and direction of migrating birds were assessed starting in the fall of 2006. The results of these studies were consistent with each other. In all three studies the mean flight height was over 1089 feet (332 meters) with less than 15 percent of the targets flying below the maximum height of the turbines. The results suggest that the migration is occurring on a "broad front" basis where areas of concentrated nighttime

migration activity are not likely to occur. This implies that the risk of collision with the wind turbines is minimal. Therefore the Project is not expected to have an unreasonable adverse impact on migrating birds species.

NESTING BIRDS: The New Hampshire Audubon Society conducted a breeding bird survey in the spring of 2007 for GRP. While the study confirmed no observations of state-listed threatened or endangered species, it did result in unconfirmed detections of the state-threatened three-toed woodpecker along the Mt. Kelsey ridgeline. The study also documented the presence of two state-listed species of special concern. Bicknell's thrush and Rusty blackbird were found in the higher elevation spruce/fir forests on Mt. Kelsey, Fishbrook Ridge, and Whitcomb Mountain.

Measures to reduce and mitigate impacts to these bird species were considered through careful site design in the initial stages of development. With this impact-reducing design and the implementation of the mitigation measures, the Project is not expected to have an unreasonable adverse impact on breeding bird populations.

RAPTORS: To address potential concerns for raptors in the Project site, a fall 2007 raptor migration study was conducted. The results of this study documented very low passage rates compared to other established hawk watch sites in the region. However, three state-listed species of concern were observed flying over the Project site during the raptor survey. These include the Cooper's hawk (Accipiter cooperii), Osprey (Pandion haliaetus), and Red-shouldered Hawk (Buteo lineatus). Although these species were detected during the survey, risk to these species is expected to be low. The state-listed endangered Peregrine Falcon was not observed during any of the on-site raptor migration surveys during the fall 2007, therefore impact to this species is not anticipated.

Additionally, modern wind projects consist of wider-spaced turbines, taller tubular towers (to limit perching or nesting), and blades that spin slowly enough to be visible by migrating raptors even at high wind speeds[1].

Because New Hampshire lies at the northern range of many species' breeding grounds, there are fewer birds passing through New Hampshire compared to other more southern locations in the North American hawk flyways.

No unreasonable adverse impacts are expected to any avian populations.

BATS: The potential of bat mortality is of concern with respect to wind energy projects, particularly because of the cumulative effects. Because bats are known to have a relatively slow reproductive rate, there would be long recovery periods if significant levels of cumulative impacts were to occur. However, northern New Hampshire is at the northern end of the range of most bat species in the northeast and thus has fewer bat species and lower populations.

Bats species of concern in New Hampshire are "tree-roosting" bats that migrate or have shown to be impacted by other modern wind facilities. In this state only one bat species is listed as endangered: the small-footed bat (Myotis leibii) from the genus Myotis. State-listed species of special concern include Eastern pipistrelle (pipistrellus subflavus), Eastern red bat (Lasiurus borealis), Hoary bat (Lasiurus cinerus), and silver-haired bat (Lasionycteris noctivagans). A federally-endangered species, the Indiana bat (Myotis sodalis), could also occur in the Project site, however the USFWS considers it unlikely. The Project has conducted three full seasons

[1] Johnson, Erickson, Strickland, et al. "Collision Mortality of Local and Migrant Birds at a Large-Scale Wind-Power Development on Buffalo Ridge, Minnesota." Wildlife Society Bulletin, Vol. 30, No. 3 (Autumn, 2002), pp. 879-887.

of acoustic bat detector surveys in a single year to document bat activity at the site and timing of activity throughout the year.

Bat activity documented within the Project site was found to be low and the species detected during the surveys are common to this part of New Hampshire. The northern latitude of Granite Reliable Power Windpark and the habitat present further suggest the presence of Indiana bats to be highly unlikely. For these reasons no unreasonable adverse impacts to bat populations are expected to result from the Granite Reliable Windpark.

OTHER WILDLIFE: Granite Reliable Power wildlife experts, in consultation with the NHFGD, deemed that fish and amphibians were not likely to be adversely impacted. Two mammals, pine marten and Canada lynx, however, were of concern. Pine marten is listed as endangered in New Hampshire and Canada lynx is federally-listed as threatened and state-listed as endangered. A winter tracking survey was conducted in 2007, as were area searches by vehicle and snowmobiles, to document the species present. Pine marten presence was found in the higher elevations of the Project area. No canada lynx presence was evident. The potential indirect impact to these species would most likely be due to habitat loss and area avoidance. Because, the total loss of wildlife habitat resulting from the Project will be relatively low (i.e.) approximately 203 acres and no unreasonable adverse impact is expected. In addition, possible indirect impacts to these species will be minimized by careful site design and mitigation. Overall, unreasonable adverse impacts are expected to occur to wildlife populations as a result of the construction of the Granite Reliable Power Windpark.

PUBLIC HEALTH AND SAFETY

In general, modern wind turbines are extremely safe, and have public health benefits due to their positive environmental attributes. However, issues have been raised about potential safety impacts such as ice shedding, risk from lightning strikes, tower collapse, or blade throw, stray voltage, fire, and risk to air navigation.

In northern climates such as New Hampshire, the potential for ice shedding from wind turbine blades needs to be considered in connection with public safety issues. Operational procedures will be developed because the Project is entirely on private land. Where access given to the general public will be controlled, the risks to the general public from ice shedding will be very minimal. Where existing recreational trails come within 1000 ft (305 m) of a wind turbine, reflective signage will be installed at trailheads and trail junctures, and frequently on trailside to warn recreational users of the potential danger.

The wind turbines will be equipped with a state-of-the-art “total lightning protection” system that conducts the lightning from both sides of the blade tip down to the hub, the nacelle, tower and into the grounding system. If an electrical problem is detected, the wind turbine will shut down automatically, or at a minimum, be inspected to assure that damage has not occurred. The wind turbines and associated electrical systems will not present any lightning hazards to the general public.

Technological improvements and mandatory safety standards during turbine design, manufacturing, and installation have largely reduced occurrences of catastrophic failures such as tower collapse or blade throw. State-of-the-art braking systems, pitch controls, sensors and speed controls on wind turbines have greatly reduced the risk of such occurrences. Siting the wind turbines a safe distance away from public areas, as Granite Reliable Power has done,

drastically reduces public safety concerns.

Stray voltage can occur in electrical equipment from a damaged or poorly connected wiring system, corrosion on either end of the wires, or weak/damaged wire insulation materials, and can present danger of electrocution to persons in close proximity to these defects. The electrical system and all components of the generation side of the Project will be electrically isolated from any offsite retail electric system and installed in accordance with recognized electrical codes and insulating and grounding practices. These procedures, together with measures to restrict public access, effectively eliminate stray voltage as a public safety concern.

Emergency/fire situations at a wind turbine site or substation that are beyond the capabilities of the local service providers will be the responsibility of the Project owner/operator. Fire or emergency incidents would generally not expose local emergency service providers or the general public to any public health or safety risks beyond those normally associated with such incidents. While fires associated with wind turbines are extremely rare, the remoteness of the Granite Reliable Power Windpark, together with the development of a Fire Protection and Emergency Response Plan, minimizes risks to the general public.

The FAA has established quantitative parameters to determine if a structure is going to be a hazard to air navigation and therefore will require mitigation. Granite Reliable Power has concluded in consultation with the FAA that the Project will not pose a hazard to air navigation if the wind turbines are lit in accordance with FAA regulations. The Project will comply with all FAA minimum requirements.

NOISE

Wind turbines are mechanical devices that emit sounds when operating. There are essentially three sources of sound: 1) the rotor blades moving through the air (a swishing aerodynamic sound); 2) the gearbox or transmission; and 3) the yaw drive, a device that allows the nacelle to rotate on the tower. In this case, because of the unusually large buffer distances between the Granite Reliable Power Windpark turbines and the nearest residences, no long-term impacts are expected from Project operating noise. The nearest residence will be over 2.9 miles (4.7 km) from any of the wind turbines and most other residences will be considerably farther. At such distances Project noise is likely to be well below the background level and therefore inconsequential.

The maximum construction sound levels are estimated to be less than 22 dBA at any permanent residence see Hessler Associates study found at **Appendix 28**. Such an extremely low sound level is far below the normal background sound level, even during calm and quiet conditions, and therefore highly unlikely to be audible. This report includes a field survey of existing sound levels within the Project region, along with a computer model of predicted sound levels from the Vestas V90 wind turbines. The report supports the conclusion that the Project will not have an unreasonable adverse impact on health or the environment as the result of noise produced.

EFFECTS ON ORDERLY DEVELOPMENT OF THE REGION

The Granite Reliable Power Windpark is consistent with and conforms to the "orderly development of the region", in that it will help supply a new source of needed electricity generated with a clean, renewable source of energy (wind), and provide for economic growth, while respecting the environmental values of the northern New Hampshire region. Plans for

Granite Reliable Power Windpark have been discussed with all of the directly affected and neighboring communities in Coos County. The Project will provide substantial economic benefits to the region in the form of employment opportunities and tax revenues, including but not limited to an annual payment of $495,000 to Coos County through a Payment in Lieu of Taxes (PILOT) agreement.

COMMERCIAL TIMBER PRODUCTION

The Project is proposed on over 80,000 acres of private land actively used for commercial timber production. Over 140 miles (225 km) of existing private logging roads have been constructed over the past century to support timber harvesting.

Wind power development is compatible with forestry-based activities. Access roads built or in place for one use can be used for the other. Wind turbines occupy a relatively small amount of the forest, while providing a substantial additional source of revenue for the property owners, thus improving the economic attractiveness of continuing commercial forestry management.

Once in operation, the Project is expected to have little or no negative impact on continued use of this land for commercial timber production, and could enhance its continued use for this purpose. As such, the Granite Reliable Power Windpark is not expected to have unreasonable adverse impacts on the use of the private lands on which it is proposed.

OUTDOOR RECREATION

The large tracts of remote private land on which the Project is located, together with neighboring public and private land, support many types of outdoor recreation. Examples include golfing, hiking, cross country skiing, snowmobiling, ATVing, hunting, fishing and outdoor activities. Several state recognized snowmobile trails (#28, 110, and 134) pass through or near the Project. Some existing logging roads are permitted trails for ATV use in the summer. Many trails are used and maintained by five or six established snowmobile or ATV clubs. The COHOS hiking trail crosses Dixville Peak, sharing the trail with ATV and snowmobiles. This Dixville Peak trail will be the closest to the wind turbines.

The Project's impact on these recreational uses will be almost entirely related to intermittent views of the Project from various open areas on these trails. This potential for visual impact was examined by an independent visual consultant who determined that the Project will not have an unreasonable adverse impact on the aesthetics of the region, including recreational uses. Potential safety issues for wintertime users in close vicinity to Dixville Peak turbines will be addressed with cautionary signs, and other controlled access measures.

ECONOMIC IMPACTS

The forestry and tourism/recreational industries are the two main sources of economic activity in Coos County, with forestry activities predominating in the Project area, and tourism in the southern portion of the County. The County continues in a state of transition following the closure of several paper mills that previously have been important employers in the region. The negative economic impacts from the loss of these paper mills are expected to be felt throughout the region's economy into the next decade.

The development of the County's renewable energy resources will bring much needed economic activity to the County, and help support timber harvesting uses or otherwise help fill the eco-

nomic void left by the decline of the local paper industry. The Granite Reliable Power Windpark will be an important first part of the development of the region's wind power resource. At 99 megawatts in size, the cost of the Project will be approximately $275 million. A large portion of this, approximately $19.4 million dollars, will be infused into the local economy for the purchase of local goods and services during construction activities. Clearing, earthwork, project management, civil engineering, construction, crane services, electrical services, sand and gravel, and concrete services are examples of these Project-related economic benefits.

In addition to the influx of construction dollars into the local economy, the Project will have substantial long-term economic benefits, including:

- Direct and indirect employment related to the operation of the Windpark.
- Increased commerce in the region from the purchase of services for the Project and spending by the Project's employees.
- An increased annual flow of revenue into the County as a result of the Payment in Lieu of Taxes (PILOT) agreement with the Windpark, change of use tax and timber tax.
- Improved sustainability of the existing forestry industry and related economic benefits through additional revenues to land owners.
- Increased economic diversification of revenue sources.

To estimate the direct and indirect economic effects of the Project on the local economy, a "Jobs and Economic Development Impact" (JEDI) computer model was used, with certain employment estimates and other project-specific economic inputs. The results of the model indicate that with the creation of six skilled operators, management, and administrative personnel, an additional 19 more indirect and induced jobs will be created county-wide (with a total estimated payroll and benefits of $800,000). Local economic benefits during plant operations are estimated to be $2.2 million annually, including payrolls, supplies, materials, payments in lieu of property taxes, and Windpark lease payments. Total economic benefits accruing to the local economy, based upon regional multipliers applied to direct Project expenditures in original capital investment and ongoing operational expense, are estimated to be $63.4 million over 20 years.

In addition to these local and regional impacts, the Project will have a beneficial effect at the state level as well by contributing to various taxes including: the statewide utility property tax, the business enterprise tax, and the business profits tax.

The Project is not expected to have an adverse impact on the region's or state's economy or property values, nor is it expected to have an adverse effect on tourism and its contribution to the local economy. In fact, GRP believes that the overall effect will be extremely positive

LOCAL OUTREACH ACTIVITIES

Consideration of the Views of Municipal Governing Boards

Representatives of the Project have met with many town leaders, planners, residents, area businesses, and civic organizations from all the surrounding towns and beyond. Granite Reliable Power views the development of this Project as a collaborative effort in which local involvement and support are imperative. The success of these efforts is best measured by the strong support this Project enjoys from officials at the local, county, and state levels.

CONSISTENCY WITH STATE ENERGY POLICY

RSA 378:37 states that it is the energy policy of this state "to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of nonrenewable resources; and consideration of the financial stability of the state's utilities." This Project, by providing clean, renewable electricity, will help to meet the energy needs of citizens and businesses of the state. The additional power provided by this Project will be used to meet current and future electricity demands via non-polluting generation. Adding a cost efficient source of electricity to the region will help to maintain or lower prices for all customers, since windpower will help to promote fuel diversity and a supply shift away from New England's historical reliance on natural gas. By producing electricity from a source that does not contribute to greenhouse gases, the Project will help preserve the physical environment of the state from further degradation caused by certain air emissions. Finally, by adding a renewable source of electricity, this Project will help New Hampshire utilities meet their requirements under the new Renewable Portfolio Standard law, RSA 362-F, passed by the New Hampshire Legislature in 2007 and thereby maintain their financial stability.

LIST OF **APPENDICES**

APPENDIX 1: Financial Statements for Granite Reliable Power, LLC. Information Redacted – Confidential Treatment Requested

APPENDIX 2: Standard Dredge and Fill Permit Application

APPENDIX 3: Site Specific Terrain Alteration Permit

APPENDIX 4: 401 Water Quality Certification Request

APPENDIX 5: REGIONAL PLANNING DOCUMENTS

5a: Master Plan for the Unincorporated Places in Coos County. Office of the County Commissioners. October 17, 1989.

5b: "Millsfield and Erving's Location: Land Use Guidance Map." Complex Systems Research Center, University of New Hampshire. November, 1990.

5c: "Dixville and Dix Grant: Land Use Guidance Map." Complex Systems Research Center, University of New Hampshire. November, 1990.

5d: "Odell: Land Use Guidance Map." Complex Systems Research Center, University of New Hampshire. November, 1990.

5e: Zoning Ordinances: Coos County Unincorporated Places. Coos County Planning Board. April 20, 1991.

5f: Town Of Dummer Master Plan. Dummer Planning Board. April, 2000.

5g: Zoning Ordinance: Town of Dummer, New Hampshire. March 9, 1999.

APPENDIX 6: New Hampshire Department of Transportation Application for Driveway Permit.

APPENDIX 7: V90- 3.0 MW: An Efficient Way to Move Power. Vestas Americas. July 1, 2006.

APPENDIX 8: System Impact Study for Granite Reliable Power.

APPENDIX 9: "Utility Wind Integration: State of the Art". Summary Document, Utility Wind Integration Group. May, 2006.

APPENDIX 10: 2005 New England Marginal Emissions Rate Analysis. Systems Planning Department, ISO New England, Inc. July, 2007.

APPENDIX 11: *Granite Reliable Power Windpark Visual Impacts Report.* Jean Vissering Landscape Architecture and Thomas Kokx Associates (TKA). December, 2007.

APPENDIX 12: New Hampshire Division of Historical Resources

12a: New Hampshire Division of Historical Resources Project Area Form, Granite Reliable Power Windpark. April, 2008.

12b: Phase IA Archeological Survey, Granite Reliable Power, LLC Proposed Windpark. April, 2008.

APPENDIX 13: The U.S. Electric Power Sector and Climate Change Mitigation.

Pew Center on Global Climate Change. June, 2005.

APPENDIX 14: Intergovernmental Panel on Climate Change Presentation to United Nations, September 24, 2007:

14a: "Introductory Speech." Dr. Rajendra Pachauri. United Nations Headquarters, New York. September 24, 2007.

14b: "The IPCC Fourth Assessment Working Group Reports: Key Findings". Presentation, United Nations Headquarters, New York. September 24, 2007.

APPENDIX 15: Reconnaissance-Level Rare Plant Survey at the Proposed Windpark, Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). October 12, 2007.

APPENDIX 16: Natural Community Characterization, Granite Reliable Power's proposed Wind Power project in Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). May, 2008.

APPENDIX 17: Rare Plant Survey at the Proposed Windpark, Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). Spring 2008.

APPENDIX 18: Reconnaissance-Level Wetland and Vernal Pool Survey Proposed Windpark in Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). August 17, 2007.

APPENDIX 19: Fall 2006 Radar Surveys of Nighttime Migration Activity at the Proposed Windpark in Coos County, New Hampshire. Woodlot Alternatives (now known as Stantec Consulting. October, 2007.

APPENDIX 20: Spring 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Windpark in Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). October, 2007.

APPENDIX 21: Fall 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Windpark in Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). January, 2008.

APPENDIX 22: Coordinated Survey Results for Proposed Granite Reliable Power and North Country Wind Projects in Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). January, 2008.

APPENDIX 23: Breeding Bird Study for Proposed Granite Reliable Windpark, Coos County, New Hampshire. New Hampshire Audubon. October, 2007.

APPENDIX 24: Breeding Bird Study for Proposed Granite Reliable Windpark, Coos County, New Hampshire, Dixville Peak Supplement. New Hampshire Audubon. April 22, 2008.

APPENDIX 25: 2007 Winter Track Survey at the Proposed Windpark in Coos County, New Hampshire. Stantec Consulting (formerly Woodlot Alternatives, Inc.). October, 2007.

APPENDIX 26: Risk Analysis of Ice Throw from Wind Turbines. Seifert, Westerhellweg, et al. April, 2003

APPENDIX 27: Advisory Circular: Obstruction Marking and Lighting. U.S. Department of Transportation, Federal Aviation Administration. February 1, 2007.

LIST OF **APPENDICES**

APPENDIX 28: Environmental Sound Survey and Noise Impacts Assessment. Hessler Associates, Inc. November 26, 2007.

APPENDIX 29: Facts About Wind Energy and Noise. American Wind Energy Association. No date.

APPENDIX 30: Studies on Wind Turbines and Property Values:

30a: The Effect of Wind Development on Local Property Values. Renewable Energy Policy Project. May, 2003.

30b: Impacts of Windmill Visibility on Property Values in Madison County, New York. Hoen, Ben. April 30, 2006.

APPENDIX 31: "Executive Summary." New Hampshire Energy Plan. Governor's Office of Energy and Community Services. November, 2002.

APPENDIX 32: New Hampshire Clean Power Strategy. New Hampshire Department of Environmental Services. January, 2001.

APPENDIX 33: New Hampshire Policy Documents Encouraging the Use of Renewable Energy:

33a: "Fact Sheet ARD-23: Global Climate Change and Its Impact on New Hampshire." NH Department of Environmental Services. 2005.

33b: "Information on Regional Greenhouse Gas Initiative (RGGI)." NH Department of Environmental Services. October, 2007.

33c: "Energy Programs: The Climate Change Challenge." NH Department of Environmental Services. December 2005.

33d: "Overview of House Bill 284." NH Department of Environmental Services. November 2007.

33e: "Energy Programs: NH Greenhouse Gas Registry." NH Department of Environmental Services. December 2005.

33f: "About Us." New Hampshire Office of Energy Planning. No date.

APPENDIX 34: Proposed Exhibit List

APPENDIX 35: Reserved for Documentation Indicating that Copies of the Application have been Provided to the Town of Dummer and the Coos County Commissioners

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TABLE D: Calculated New England Marginal Emissions Rates and Estimated Annual Offset.

TABLE E: Total Acres of Impact to Natural Communities Above 2700 ft at GRP's Proposed Windpark.

TABLE F: Comparison of Three Seasons of Nocturnal Radar Surveys- Granite Reliable Wind Project.

TABLE G: Raptor Mortality found during post-construction mortality surveys at wind farms in the U.S.

TABLE H: Results of the JEDI model for Granite Reliable Power Project.

APPLICATION OF GRANITE RELIABLE POWER, LLC

Based on N.H Admin. Rule Site 301

Requirements for Applications for Certificates and

RSA 162-H:7 Application for Certificate

Granite Reliable Power, LLC (hereinafter "GRP" or "the Applicant") respectfully submits this Application to the New Hampshire Site Evaluation Committee ("NH SEC", "SEC" or "Committee") and requests that the Committee issue a Certificate of Site and Facility to construct and operate the Granite Reliable Power Windpark in the central portion of Coos County in northern New Hampshire. The Windpark will include 33 wind turbines and associated electrical interconnection facilities with a total nameplate capacity of 99 megawatts located in the unincorporated places of Dixville, Ervings Location, Millsfield and Odell, and the incorporated town of Dummer.

For the purposes of this Application, the Applicant has generally organized the information in this Application according to the Committee's rules adopted on June 16, 2008 (in particular Site 301.02, Format of Application).

(a) SIGNATURE OF APPLICANT

Certification by Executive Officer of Granite Reliable Power, LLC

In accordance with RSA 162-H:8, I, Walter Q. Howard, the chief executive officer of Granite Reliable Power, LLC, do hereby swear and affirm that the information contained in this Application is true and accurate to the best of my knowledge and belief.

I also certify that, as an Applicant to the New Hampshire Site Evaluation Committee, Granite Reliable Power, LLC agrees to provide such information as the Committee shall require to carry out the purposes of RSA 162-H.

Granite Reliable Power, LLC

Walter Q Howard

Name: Walter Q. Howard

Title: Chief Executive Officer

Date: 6/26/08

State of Connecticut

County of Middlesex

On this day of 26th of June 2008, personally appeared before me the above-name Walter Q. Howard, Chief Executive Officer of Granite Reliable Power, LLC and swore and affirmed that the information contained in this Application is true and accurate to the best of his knowledge and belief.

Meredith M. Fiorino

Notary Public

Commission Expires on Jan. 31, 2013

MEREDITH M. FIORINO
NOTARY PUBLIC
MY COMMISSION EXPIRES JAN. 31, 2013

(b) APPLICANT INFORMATION

(1) *Name of applicant*

Granite Reliable Power, LLC

(2) *The applicant's mailing address, telephone and fax numbers and email addresses*

Granite Reliable Power, LLC

8 Railroad Avenue

Essex, CT 06426

Telephone: 860-581-5010

Fax: 860-767-7041

Email: info@noblepower.com

(3) *The names and addresses of the applicant's parent company, association or corporation if the applicant is a subsidiary*

Granite Reliable Power, LLC is majority-owned by Noble Environmental Power, LLC ("NEP"), a privately held Delaware Corporation which markets renewable energy and develops, owns, constructs and operates wind power projects.

Noble Environmental Power, LLC

8 Railroad Avenue

Essex CT 06426

Telephone: 860-581-5010

Fax: 860-767-7041

Email: info@noblepower.com

Website: www.noblepower.com

(4) *If applicant is a corporation,*

a. The state of incorporation

Granite Reliable Power, LLC is a Delaware Limited Liability Company, registered to do business in New Hampshire with the New Hampshire Secretary of State.

b. The corporation's principal place of business

Granite Reliable Power, LLC's principal place of business is in Essex, Connecticut. GRP also has an office in Lancaster, New Hampshire.

c. *The names and addresses of its principal directors, officers and stockholders*

Address	8 Railroad Ave., Second Floor
	Essex, CT 06426
President	Walter Howard
Vice Presidents	Charles Hinckley
	John Quirke
	Elizabeth Grisaru
	Christopher Lowe
	Thomas Swank
	Daniel J. Mandli
	Jeff Wood
	Neil Dyment
Treasurer	Christopher Lowe
Secretary	Elizabeth Grisaru

(5) *If the applicant is an association, the names and residences of the members of the association*

Not applicable. Granite Reliable Power, LLC is not an association.

(6) *Whether applicant is the owner, lessee of the site or facility or has some legal or business relationship to it*

The applicant, Granite Reliable Power, LLC, is the owner and developer of the Project; it has lease agreements with the landowners and will be the operator of the Project.

(7) *A statement of assets and liabilities of the applicant*

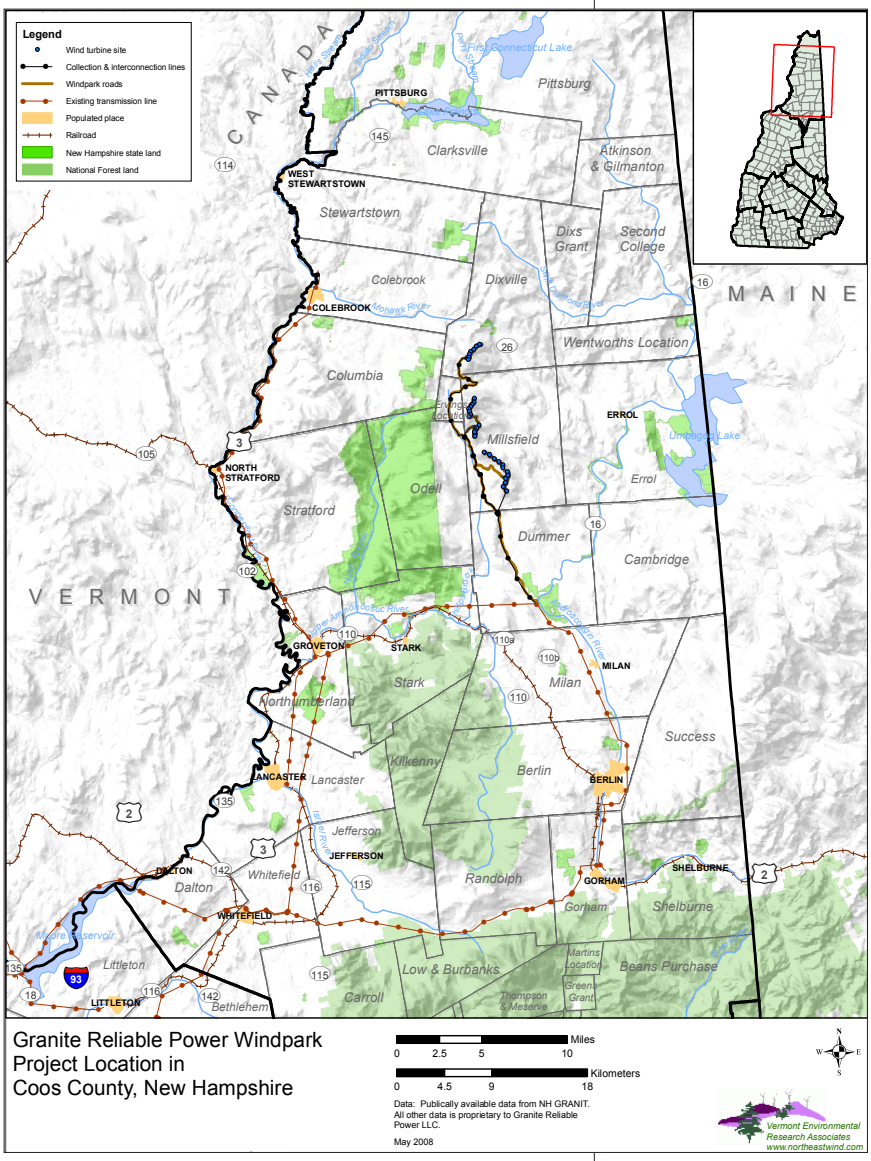
Applicant Granite Reliable Power, LLC is a Delaware Limited Liability Company formed for the ownership, development, and eventual operation of the Project. Financial Statements for Granite Reliable Power are included as **Appendix I.**

A redacted copy of the Applicant's Financial Statements is included as **Appendix I**. An unredacted copy of this Appendix will be filed with a Motion for Protective Order.

(c) SITE INFORMATION

(1) LOCATION AND ADDRESS OF SITE OF PROPOSED FACILITY

The Granite Reliable Power Windpark ("Windpark" or "Project") is proposed to be installed on private land in the central portion of Coos County in northern New Hampshire. Project components, including wind turbines, access roads, and electrical interconnection facilities, will be located in the unincorporated places of Dixville, Ervings Location, Millsfield, and Odell, and the town of Dummer. The Windpark is primarily a linear project with wind turbines to be installed along the north-south oriented ridges in the region; a geographic group of the wind turbines is referred to as a "wind turbine string". Geographically, the northernmost point of the Project, the proposed wind turbine string on Dixville Peak, is located approximately 1.6 miles (2.5km) south of NH Route 26 where the highway passes northwest from Errol though the Dixville Notch to NH Route 3 in Colebrook.



To electrically connect all of the Project's wind turbines to the grid, a substation will be constructed along Dummer Pond Road, to the south of the wind turbine strings. A new interconnecting power line will be built to deliver the electricity from the substation to an existing electric transmission line owned by Public Service Company of New Hampshire ("PSNH"). A new maintenance building and lay down area will be constructed in the vicinity of the substation as part of the Windpark.

In its longest dimension, the Project components will span approximately 14.5 miles (24.1 km) from the northernmost wind turbine string to the existing transmission line located in the south.

The project site is located in Coos County, New Hampshire, regionally illustrated in **Figure I**. The northern extent of the Project site is located in the upper reaches of Dixville Peak (elevation 3482 feet (1061 m)). Extending south from Dixville Peak, the wind turbine strings will be located on the named summits of Mount Kelsey (elevation 3468 feet. (1057 m)), Owlhead

Figure 1:

Map of regional geographic features in the vicinity of the Granite Reliable Power Windpark.

Mountain (elevation 2867 feet (874 m)), and an unnamed ridge, commonly referred to as Fishbrook Ridge (this is a local name that does not appear on most maps) that terminates to the north of Dummer Pond at elevations of approximately 2582 feet (787 m). An aerial photo of this range of mountains is provided as **Figure 2**.

To the west of the ridges on which the wind turbine strings to be sited lie uninhabited mountain slopes and valley lands stretching roughly 2 to 3 miles (3.3 – 5.0 km). These slopes consist of private commercial forests, locally known as the Phillips Brook Tract (approximately 24,000 acres). Further west of the Phillips Brook valley, along the tract's western property boundary, the terrain rises up to the higher peaks of the Nash Stream State Forest where Muise Mountain (elev. 3596 feet (1096 m)) and Whitcomb Mountain (elev. 3317 feet (1011 m)) are the nearest peaks to the wind turbine strings. To the southwest, straddling the property border of the Phillips Brook Tract and the Nash Stream State Forest are Trio Ponds and Long Mountain (elev. 3652 feet (1113 m)). To the south of the Project site, near the southwestern section of Dummer, Phillips Brook empties into the Upper

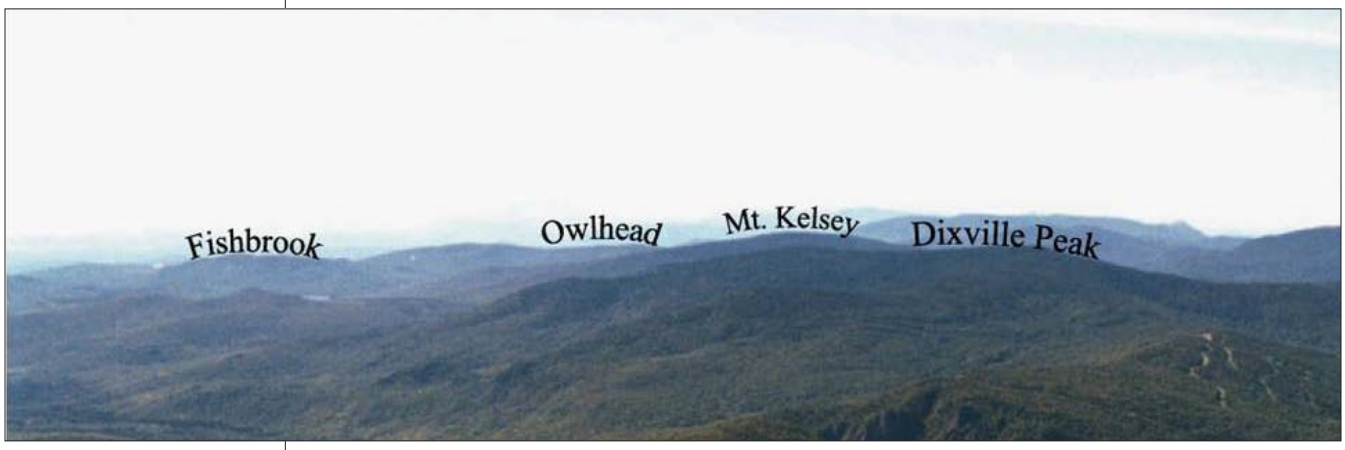
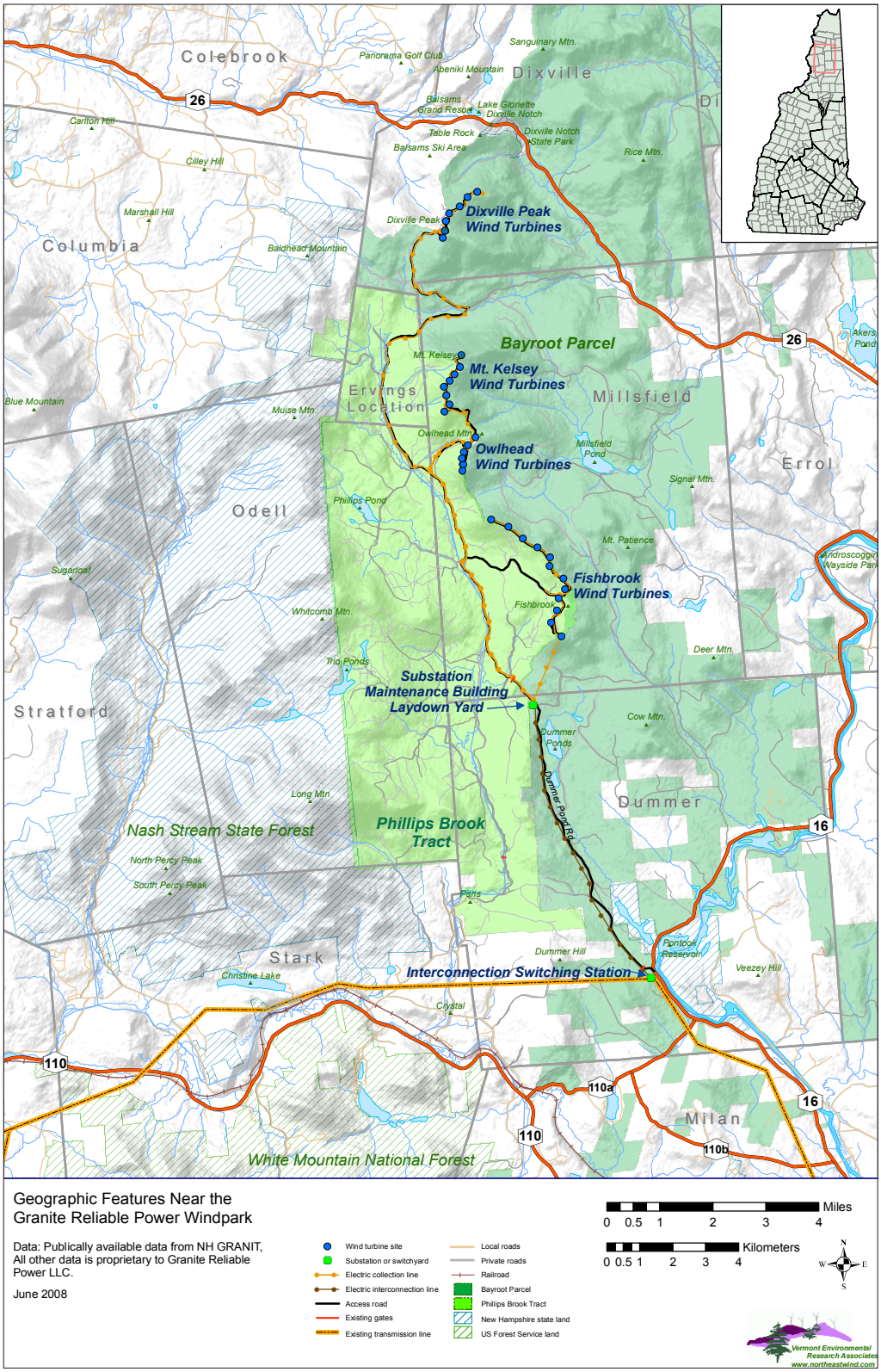


Figure 2: Aerial view of the ridgeline in north central New Hampshire on which the Granite Reliable Power Windpark is proposed. View is looking south.

Ammonoosuc River which flows west through the White Mountains. Further south, the northern flanks of the Kilkenny Mountains and parts of the White Mountain National Forest rise above the Ammonoosuc River valley. To the east of the Project are the lower slopes and hills associated with the majority of the commercial timberlands of Bayroot, LLC in the unincorporated place of Millsfield and the town of Dummer. Mt. Patience and Signal Mountain are two named summits several miles to the east of the northern portions of the Project site with generally lower elevations (elev. 2720 feet (829 m) and 2697 feet (822 m), respectively) than those of the wind turbine string ridgelines. Dummer Pond and Cow Mountain (elev. 2277 feet (694 m)) are to the east of the southern portions of the Project. These features are shown in **Figure 3**, a map of the main Project components in relation to nearby geographic features.

The majority of the Project components will be located on two privately-owned land tracts. Granite Reliable Power has entered into long-term lease agreements with the landowners. The two parcels are often referred to as the Phillips Brook Tract (23,768 acres) and the Bayroot Parcel (59,776 acres). These two properties share a common boundary that roughly forms the ridgeline south of Dixville Peak along which the wind turbine strings will be located. This ridgeline also forms a divide between two watersheds; to the west the Phillips Brook and its tributaries drain into the Upper Ammonoosuc River as it flows west to meet the Connecticut River in Groveton. The Bayroot Parcel drains largely to the

east through several tributaries that join the Androscoggin River as it flows south and east through Gorham. These tracts of land, along with other major physiological features in the vicinity of the Project, are illustrated in **Figure 3**.



C

SITE **INFORMATION**

Figure 3: Project site Map illustrates the location of major Project components, the private road network, and the physiographical features in the vicinity.

SEE ENLARGED MAPS IN BACK OF APPLICATION

Principal access to the Project site will be in the town of Dummer at the intersection of NH Route 16 and Dummer Pond Road, a private road off the north side of Route 16, approximately 1.25 miles (2.0 km) north of the intersection of state Route 110A and Route 16 in Dummer, NH (see **Figure 4**). Access to this point along NH Route 16 is via state and town public roads. From the intersection of Route 16 and Dummer Pond Road, access to the Project site is through an extensive network of private all-season roads within the Phillips Brook and Bayroot properties.

Figure 4:
Dummer Pond Road's (private) junction with NH Route 16. View is looking north from along Route 16.

C

SITE **INFORMATION**

(2) SITE ACREAGE - SHOWN ON FIGURE 3

The locations of the major components of the Project are shown in **Figure 3** and are more fully described in Section (h)(1). In total, the installation of all Project components within the Project site will require the alteration of 203 acres of land. The breakdown of this land alteration by Project component is provided in **Table A**.

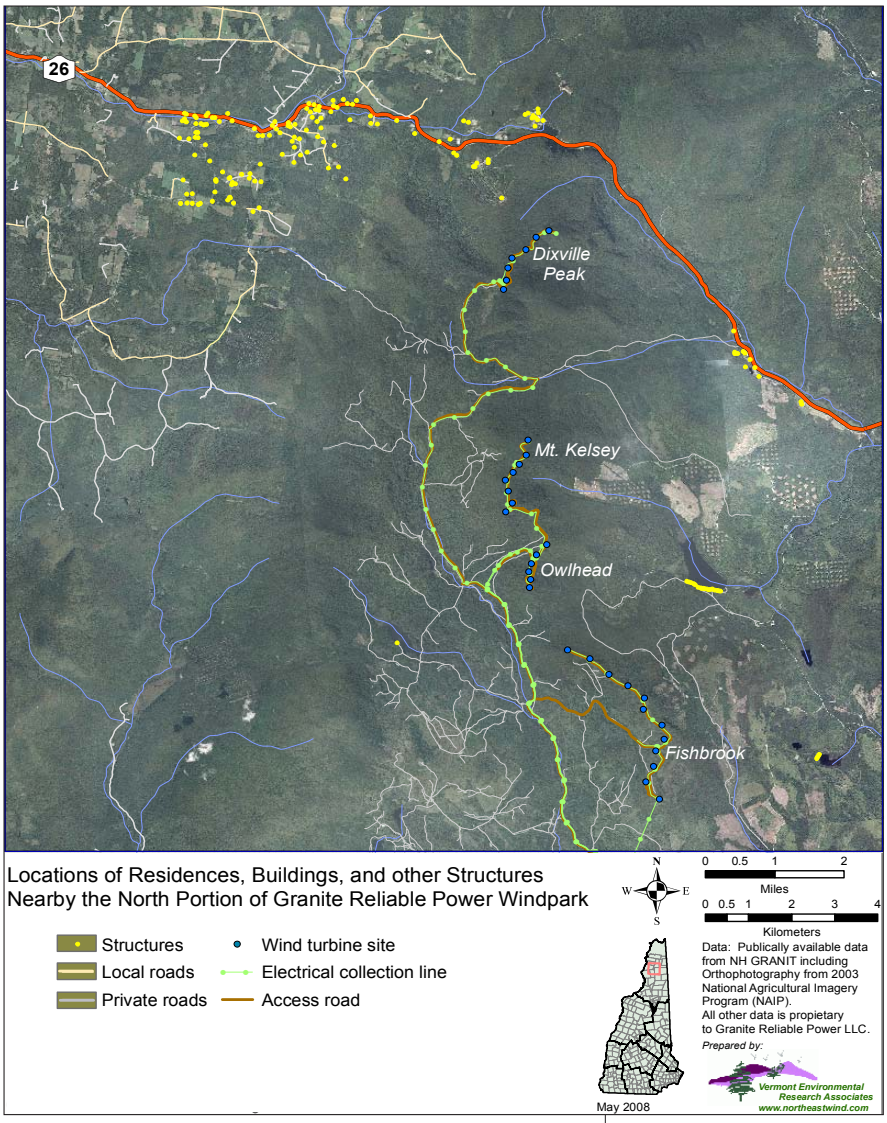
Table A:
Breakdown of Earth Alteration Area by Project Component

Disturbance Description	Disturbance Area (acres)	Towns / Unincorporated Places Involved
Dummer Pond Road Upgrades	21.12	Dummer, Millsfield, Odell, Erving's Location
Dixville Road Upgrades	10.41	Millsfield, Dixville
Owl Head Spur Upgrades	0.75	Millsfield
Fishbrook Spur Upgrades	8.11	Millsfield
Phillips Brook/Dixville Connector Road Construction	8.65	Erving's Location, Millsfield
Fishbrook Turbine String Construction	46.34	Millsfield
Owl Head / Kelsey Turbine String Construction	55.75	Millsfield
Dixville Turbine String Construction	26.96	Dixville
Switching Station Construction	3.29	Dummer
Substation / Staging Area Construction	13.21	Dummer
Kelsey Staging / Storage Area	2.55	Millsfield
Dixville Staging / Storage Area	2.58	Dixville, Millsfield
Fishbrook Cross-Country Power Line	3.15	Millsfield
Total Disturbance	202.87	(8,837,017ft^2)

(3) THE LOCATION OF RESIDENCES, INDUSTRIAL BUILDINGS, AND OTHER STRUCTURES AND IMPROVEMENTS WITHIN OR ADJACENT TO THE SITE

The locations of residences, buildings, and other structures in the vicinity of the Project site are shown on the aerial photographs for the northern and southern portions of the Project and are described below.

The existing structure that will be closest to the Project is the seasonally-used upper lift terminus of the neighboring Balsams Wilderness Ski Area located approximately 0.8 miles (1.3 km) to the west of Dixville Notch on the southern side of NH Route 26, as shown in **Figure 5**. The closest year-round residence to the wind turbine locations will be approximately 2.9 miles (4.7 km) to the east along Route 26, as shown in **Figure 5**. There is no permanent residential land use on the private land on which the Project will be constructed. Approximately 2 miles (3.2 km) to the east of where the Mt. Kelsey wind turbine strings are proposed to be located are seasonal cabins on the southern shore of Millsfield Pond.



To the southwest of the Project there are ten to twelve seasonal cottages or camps along the town portion of Paris Road and Bell Hill Road that are at least 5 miles (8.0 km) from the proposed wind turbines. Additionally, there is a seasonal cabin on the shore of Phillips Pond, approximately 2 miles (3.2 km) to the southwest of the proposed location for the Project. The electrical interconnection line, connecting the substation to the interconnecting switching station located beside the existing PSNH transmission line, is also shown in **Figure 6** relative to existing structures. The nearest residences are more than 1 mile (1.6 km) away from the proposed interconnecting switching station.

The wind turbines will be far enough from any existing structures that any physical impacts (e.g. from noise, ice shed, shadow flicker, etc.) will be substantially mitigated. The visual impacts will be mitigated due to the densely-forested nature of the area and the presence of intervening terrain blocking long-distance views from many population centers. Further discussions of potential impacts outside the immediate vicinity of the Project are included in Section (i).

(4) IDENTIFICATION OF WETLANDS AND SURFACE WATERS OF THE STATE WITHIN OR ADJACENT TO THE SITE

Wetlands have been delineated by certified New Hampshire wetland scientists. Con-

Figure 5: Enlargement of the NAIP aerial photograph in the northern region of the Project to show the proximity of existing structures to the Dixville Peak turbine

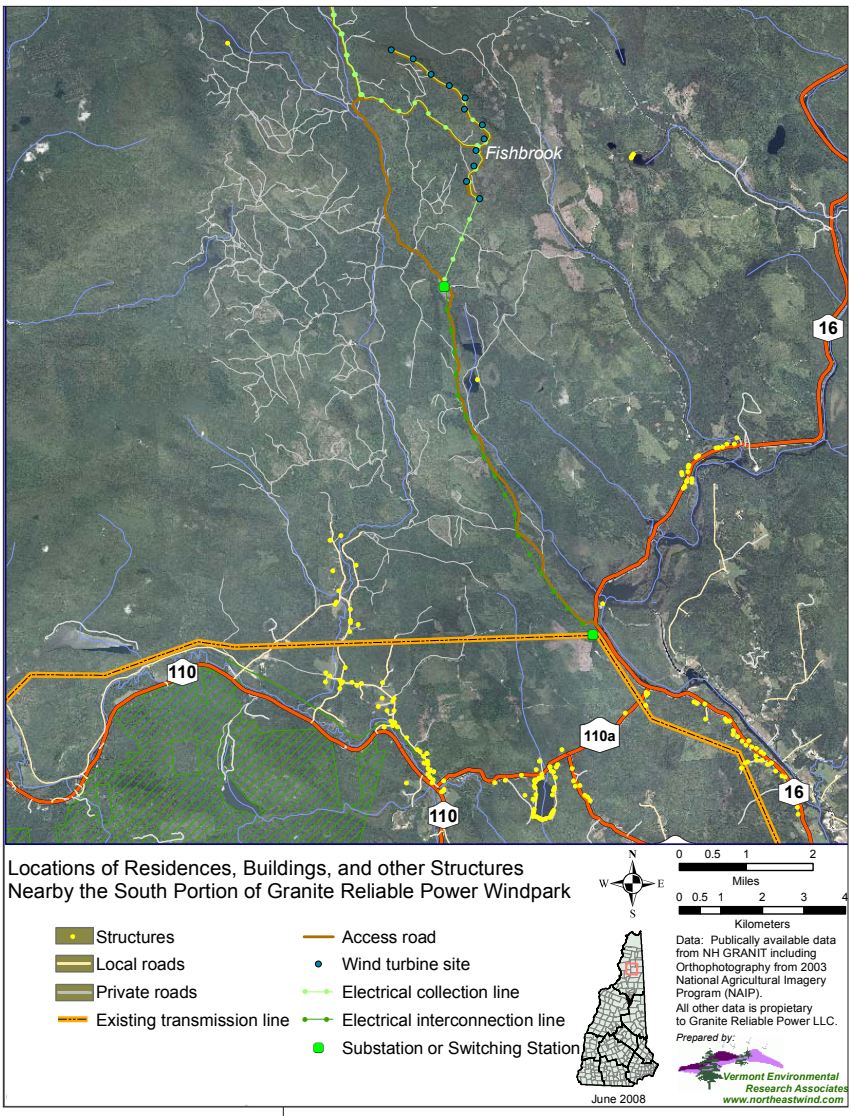


Figure 6: Enlargement of the NAIP aerial photograph in the southern regions of the Project to show the proximity of existing structures to the proposed maintenance building, interconnection power line and interconnecting switching station.

tained within this Application are the complete wetland delineation results. Surface waters of the site are described in detail in the application forms, design plans, and maps provided in conjunction with the NHDES Standard Dredge & Fill Permit Application, NHDES Site Specific Terrain Alteration Application, and NHDES Section 401 Water Quality Certification Request, discussed in Section (d). These documents are included as Appendices 2, 3, and 4.

(5) IDENTIFICATION OF NATURAL AND OTHER RESOURCES WITHIN OR ADJACENT TO THE SITE

Historically, the vast majority of land in the vicinity of the Project has been under private forest management. With significant timber resources, the land has been used for commercial forestry to produce logs for processing and manufacturing of wood products and to supply pulp to paper mills in three states. The region is generally rural in nature, with NH Routes 3, 26, 16, and 110 serving as the only highways linking the northern part of Coos County with southern parts of the state (see **Figure I**).

The resource values of the Phillips Brook parcel were evaluated in 2004 – 2005 in connection with an application prepared by the Society for the Protection of New Hampshire Forests ("SPNHF") for a landowner within the Project in consideration of conservation funding under the Forest Legacy Program. While specific to Phillips Brook, the characterization is largely applicable to the surrounding areas as well. Particular findings include the following:

- Phillips Brook is a tributary of the Upper Ammonoosuc River, which flows to the Connecticut River.
- The parcel provides habitats for wide ranging mammals and provides east-west and north-south travel corridors for wildlife.
- The parcel contains several remote ponds which improve the quality of wildlife habitat.
- Public recreational use is available, including NH Snowmobile Corridor Trails #28, #110, and #134 which cross these private lands.

As discussed within this Application, these sources of information as well as studies conducted on the property formed the basis for turbine siting activities in an effort to minimize, or to the extent possible eliminate, potential adverse impacts. Further

discussion of natural and other resources at the site are described in Section (i).

(6) INFORMATION RELATED TO WHETHER THE PROPOSED SITE AND FACILITY WILL UNDULY INTERFERE WITH THE ORDERLY DEVELOPMENT OF THE REGION HAVING GIVEN DUE CONSIDERATION TO THE VIEWS OF MUNICIPAL GOVERNING BOARDS

The Project has taken into account the local and regional views throughout the development and planning process for the Windpark. In order to inform the public about the Project and address questions/concerns, GRP representatives have met with county planners and agencies, residents, area businesses, non-governmental agencies and other interested parties over the course of the last two years. GRP views the development of this Project as a collaborative effort in which local and regional community involvement and support is imperative.

Information on the Project has been and will be presented to political and community leaders on multiple occasions in Coos County. Some of these groups include: the Coos County Commissioners, the Coos County Planning Board, the North Country Council, the Coos Economic Development Corporation and Coos County legislators. Informational meetings have also been held with the towns of Stark, Dummer and Colebrook.

GRP is committed to being involved in Coos County's communities. Project representatives participate in numerous Coos County special events including: the Lancaster Fair, Rotary Club, Lions, Police Athletic League and Booster Club Fundraisers. Additionally, Project representatives work with educational institutions and participate in panels such as "The Challenges of Non-Renewable Fuels" hosted by the Balsams Grand Resort Hotel during the "Green Expo". The Project has also sponsored fundraisers to help provide athletic equipment to regional high schools.

GRP employs other methods of communicating Project information which include the GRP website[2] , a fact sheet available on the website, and cooperation with local media such as the Coos County Democrat, the Colebrook Chronicle, and The Berlin Daily Sun among other local publications.

Although it believes that the New Hampshire site evaluation law preempts local zoning requirements, GRP is mindful of these requirements and will attempt to comply with local zoning regulations as practicable. Operative zoning and planning documents for each town and unincorporated place are listed in **Table B** below.

[2] http://noblepower.com

Table B:
Planning and Zoning Regulations in effect in each of the Towns and Unincorporated Places

Table B:
Planning and Zoning Regulations in effect in each of the Towns and Unincorporated Places

Town/Place	Government Type	Master Plan/Date	Zoning Ordinance/Date
Dixville	Unincorporated	County Master Plan 1989	Coos County Unincorporated Places Zoning Ordinances 1991
Dummer	Incorporated	Master Plan 2000	Zoning Ordinance 2006
Ervings Location	Unincorporated	County Master Plan 1989	Coos County Unincorporated Places Zoning Ordinances 1991
Millsfield	Unincorporated	County Master Plan 1989	Coos County Unincorporated Places Zoning Ordinances 1991

The Project is consistent with the goals for economic development in Coos County, as well as the energy goals articulated by the North Country Council, Inc. and associated planning organizations. A further discussion of the Project's consistency with regional planning goals and with specific existing town plans follows. All regional planning documents are compiled into **Appendix 5:** Regional Planning and Zoning Documents.

Unincorporated Places Master Plan

The Master Plan for the Unincorporated Places in Coos County (1989) ("Master Plan") is a statement of goals and policies to guide County development decisions into the future. This plan "does not set a precise timetable for, nor dictate where elements shall be placed on the land, but it does provide for their general location by performance standards when they are needed." [3]

Developing wind power in Coos County's Unincorporated Places supports and enables the Master Plan's Human Resource, Natural Resource and Development goals and policies. Granite Reliable Power Windpark will provide additional employment opportunities that diversify and complement existing positions as is called for in the Human Resources section. The Project will help maintain policies outlined in the Natural Resources Section by encouraging compatible land use with timberland owners to preserve forest resources, by operating emission-free to protect air resources, and by providing a source of renewable energy in accordance with energy resource policies. GRP is sensitive to the policies outlined in the Development section, which call for containing development and has sited the Project appropriately by taking into consideration existing land use.

The GRP Windpark is consistent with the Forest Resources goal to: "Conserve, protect and enhance the forest resources which are essential to the economy of the state as well as to the County." Wind power and forestry land uses are complementary; both uses need roads to reach remote locations, and these roads can be a shared resource. In addition, wind turbines are most appropriately sited at the windy, higher elevations where timber resources generally have the lowest commercial value. Wind power, as a co-use of timber land, strongly supports and enables the Forest Resource policies, particularly the policy to: "Encourage present ownership patterns and maintain private control which maintains historical character of existing forests and encourages present ownership patterns." Development of the County's wind power resources provides a substantial additional source of income in the form of lease payments to property owners. This additional source of income can encourage the property owners to keep the parcel as one contiguous tract of land, thereby forgoing the need to subdivide the property for purposes of income or related capital requirements.

The Master Plan does not specifically address wind energy as a source of energy or discuss locations that might be appropriate for wind development. However, the Energy Resource section does articulate that the Master Plan supports: "environmentally sound and socially beneficial utilization of indigenous energy resources," with the following specific policy objectives:

- Support energy conservation and diversification

[3] *See Appendix 5a*: Master Plan for the Unincorporated Places in Coos County, page 3.

- Support existing state and federal jurisdiction over energy developments and related land uses in areas identified as environmentally sensitive where there are overriding, conflicting environmental and other public values requiring protection
- Encourage development of new, small hydropower projects and reconstruction of existing hydropower projects where these can be undertaken in an environmentally sound manner. [4]

The careful development of Coos County's wind energy resources would clearly support this Energy Resource goal when done in an environmentally sound manner. Wind energy development in the County is also consistent with the first two policies (above), the second of which acknowledges the potential for "conflicting environmental and other public values". The Project is also consistent with the Air Resources Section that has the stated goal to "protect and enhance the quality of air resources throughout the County's Unincorporated Places" through policies that:

- Support state and federal air quality standards, and
- Encourage state, federal and international initiatives directed at reducing emission of air pollutants.

There are aspects of the Master Plan where potential conflicts may exist. For example, the Scenic Resources section encourages the protection of scenic values and encourages growth to occur in areas to minimize impacts on these values. Further discussion of visual effects of the Project can be found in Section (i)(1): Aesthetics. Similarly, the Development section of the Master Plan includes a policy encouraging new development to remain in close proximity to existing development. In New England, wind turbines must be located on the ridge lines to harness the best available wind resources. Therefore, the ideal locations for wind power generation tend to be distant from existing development, and often are some of the more visually prominent areas. However, this Project is also proposed in an area where commercial forestry currently exists. Thus, its distance from existing population centers and heavily traveled public highways in the County tends to effectively mitigate the Project's impacts on the human environment.

Zoning Ordinance for the Unincorporated Places

The Zoning Ordinance for the Unincorporated Places, adopted in 1991, is administered by the Coos County Planning Board.

The objectives stated in the zoning document indirectly reflect the potential for impacts by developments such as wind power. For example, wind power is consistent with the objective to "reduce pollution . . .", and with the objective "to encourage appropriate residential, recreational, commercial and industrial uses not detrimental to the proper use or value of these places". Separately, a state statute further emphasizes the importance of zoning ordinances allowing renewable energy sources. RSA 672:1,III-a seeks to clarify all zoning and related regulations to ensure that these regulations:

> [E]ncourage energy efficient patterns of development, the use of solar energy, including adequate access to direct sunlight for solar energy uses, and the use of other renewable forms of energy, and energy conservation. Therefore, zoning ordinances should not un-

4 *See Appendix 5a:* Master Plan for the Unincorporated Places in Coos County, page 21.

> reasonably limit the installation of solar, wind, or other renewable forms of energy systems or the building of structures that facilitate the collection of renewable energy, except where necessary to protect the public health, safety, and welfare.[5]

The land occupied by the Project is classified as "Management District", or areas "which are appropriate for forest management or agricultural uses and for which there are no approved plans for additional development." The higher elevations of the Project where some of the wind turbines and associated infrastructure are proposed are in a sub-category "Protected District", labeled PD6 Steep Slopes & High Elevations. This district is defined as areas above 2,700 feet (823 m) in elevation, or slopes in excess of 60 percent over 10 contiguous acres. Its purpose as a sub-management district is to "preserve the natural equilibrium of vegetation, geology, slope, soil, and climate in order to reduce danger to public health and safety posed by unstable mountain areas, to protect water quality, and to preserve mountain areas for their scenic values and recreational opportunities". Primitive recreational uses and use by motorized vehicles, and trail construction are examples of uses allowed in this sub-district without a permit.

The wind power facilities proposed for the Management District are generally consistent with its purposes, especially given the extent to which wind power development is consistent with the existing timber harvesting and recreational uses of the Management District. The Granite Reliable Power Windpark is also consistent with the purpose of the sub-management area PD6 and will be designed and constructed to best management practice engineering standards in order to accommodate the sensitive and fragile nature of these areas and to minimize the Project's impact on them. As a clean renewable generation facility, the Project will be of value to the region's environment by helping to offset or displace other generation sources in the region that produce CO2 emissions which are harmful to air quality and are believed to contribute to global warming. The Project will positively impact Coos County and the region. For the above reasons, while not specifically addressed in the zoning document, Granite Reliable Power believes wind power development is a consistent land use under the Coos County Unincorporated Places Zoning Ordinance.

Review of the land use standards relative to the affected Sub-districts of the Zoning Ordinance and the Coos Master Plan supports the conclusion that the Project as proposed would qualify for a special exception because, overall, it is not detrimental to the resources or uses which these Municipal Land Use Regulations protect. In summary, the Granite Reliable Power Windpark is generally consistent with the goals and intent of the Coos County Zoning Ordinances for Unincorporated Places, as adopted on April 20, 1991.

Master Plan and Zoning for the Town of Dummer

Over 94% of the total land area in Dummer is in Current Use (26,900 of 28,490 acres). Town of Dummer Master Plan of 2000 indicates that less than one percent of Dummer is developed, with most of the land area being used for commercial forestry activities. One notable commercial development in the town is a privately-owned hydroelectric facility on the Androscoggin River. The Guiding Principles in the Plan's Statement of Goals and Objectives draw upon the community's desire to remain "primarily a residential community interspersed with a few small family operated businesses" while placing a

[5] General Provisions of RSA 672:1 under Title LXIV, Planning and Zoning. See http://www.gencourt.state.nh.us/rsa/html/LXIV/672/672-11.htm

high value on clean environmental conditions. The Plan's Recommendations for Future Land Use section supports maintaining "free, open, or wild land" near lakes, rivers and wetlands, and encourages "diversification of commercial/industrial development" in view of declining timber operations. While wind power development is not addressed in the Dummer Master Plan, it is consistent with the Plan and will not increase the need for town services. In summary, the Granite Reliable Power Windpark is generally consistent with goals and objectives of the Dummer Master Plan.

Regional Planning & Energy Goals

The North Country Council Inc. ("NCC") is the regional planning commission and economic development district serving Coos and two other counties. NCC incorporates the goals of the New Hampshire Office of Energy and Planning ("NHOEP") in establishing its legislative priorities for the current year and its planning guidance. NHOEP's responsibilities include: "exploring opportunities to expand the use of renewable, domestic energy resources such as biomass, wind and solar energy" and "ensuring the reliability, availability, and security of the state's energy supply through a comprehensive statewide energy plan".[6] NHOEP articulates a state policy goal of "increased commitment to renewable energy resources and investments." The initiatives of the NCC and NHOEP policy goals indicate the Project will have a high level of consistency with regional energy planning and policies.

(d) OTHER REQUIRED APPLICATIONS AND PERMITS

(1) IDENTIFICATION OF ALL OTHER FEDERAL OR STATE GOVERNMENT AGENCIES HAVING JURISDICTION, UNDER STATE OR FEDERAL LAW, TO REGULATE ANY ASPECT OF THE CONSTRUCTION OR OPERATION OF THE PROPOSED FACILITY

- New Hampshire Department of Environmental Services, Water Division, Wetlands Bureau (authority under state and federal law over wetlands impacts)
- New Hampshire Department of Environmental Services, Water Division, Site Specific Program (authority under state and federal law over alteration of terrain and pollutant discharge)
- New Hampshire Department of Environmental Services, Water Division, Water Management Bureau (authority under federal law related to U.S. Army Corps of Engineers individual wetlands permit)
- New Hampshire Department of Transportation (authority under state law over highway safety and driveway permit)
- U.S. Army Corps of Engineers
- Federal Aviation Administration
- New Hampshire Department of Safety (blasting permit)

(2) DOCUMENTATION THAT DEMONSTRATES COMPLIANCE WITH THE APPLICATION REQUIREMENTS OF AGENCIES HAVING JURISDICTION

Information satisfying the application requirements of such agencies has been included within the agency application forms. Copies are included in the Appen-

[6] See the New Hampshire OEP website :http://www.nh.gov/oep/aboutus.htm

dices referenced in Section (d)(3) below.

While the New Hampshire Department of Transportation ("NHDOT") will have authority to regulate oversize/overweight transport vehicles associated with the Project's construction, the "Special Permit to Move a Load In Excess of Legal Limit" is submitted by the trucking contractor once Project permits are issued and turbine equipment is ordered. Transport information relevant to the requirements of New Hampshire Department of Transportation has been provided in Section (f)(5)e. Heavy/oversize trucking loads. GRP will also comply with all rules and permit requirements for blasting that may be necessary in the construction and decommissioning of the facility.

Applications to USACOE and FAA will be submitted late Summer 2008. Copies will be provided upon filing.

(3) A COPY OF THE COMPLETED APPLICATION FORM FOR EACH AGENCY
Please see attached the following completed application forms:

- **Appendix 2**: Standard Dredge and Fill Permit Application
- **Appendix3**: Site Specific Terrain Alteration Application
- **Appendix 4**: NH DES Section 401 Water Quality Certification Request
- **Appendix 6**: NH DOT Application for Driveway Permit

(4) IDENTIFICATION OF ANY REQUESTS FOR WAIVERS FROM THE INFORMATION REQUIREMENTS OF ANY STATE AGENCY OR DEPARTMENT WHETHER REPRESENTED ON THE COMMITTEE OR NOT
The Applicant has not requested such waivers.

(e) ENERGY FACILITY INFORMATION [7]

Not applicable. Granite Reliable Power Windpark is a renewable energy facility under RSA 162-H:2, XVII, not an energy facility as defined in RSA 162-H:2,VII.

(f) RENEWABLE ENERGY FACILITY INFORMATION

(1) MAKE, MODEL AND MANUFACTURER OF THE UNIT
The wind turbines proposed for the Granite Reliable Power Windpark are the "V90" series manufactured by Vestas Wind Systems A/S [8]. Vestas is one of the oldest existing wind turbine manufacturing companies in the world, established during the worldwide oil crisis of the late 1970s. In the past thirty years, the company has grown through increasing sales and through key acquisitions of competitors to become one of the largest wind turbine manufacturing companies in the world. In 2006 Vestas sold over 15,000 MW of nameplate wind capacity, comprising 28.2% of the worldwide market share. On a cumulative basis, Vestas is responsible for over 74,000 MW of wind capacity installed worldwide [9], and employed over 15,000 people worldwide as of May, 2008.

The V90 3.0 MW wind turbine is a flagship of the Vestas product line. Details on the Vestas wind turbine can be found in **Appendix 7:** V90-3.0 MW: An Efficient Way to Move Power. The V90 3.0 MW is one of the most technologically advanced wind turbines

D
OTHER **REQUIRED APPLICATIONS AND PERMITS**

E
ENERGY FACILITY INFORMATION

F
RENEWABLE ENERGY FACILITY INFORMATION

[7] Since Granite Reliable Power Windpark is a renewable energy facility under RSA 162-H:2, XVII, not an energy facility as defined in RSA 162-H:2,VII, this section has been omitted.

[8] More information about Vestas is available at www.vestas.com.

[9] Source: BTM Consult, World Market Update 2006, March 2007.

in the world. Each wind turbine is comprised of three major components: the tower, the nacelle (the housing for the generating components as described more fully below), and the rotor blades.

The nacelle and rotor blades are supported by a tubular steel tower, which is widest at the base, approximately 16 feet (4.88 m) in diameter, and tapers to approximately 9 feet (2.74 m) in diameter just below the nacelle. The tower's top will be high enough to position the center of the rotor blades 262 feet (80 m) above the ground. See **Figure 7** for a diagram of wind turbine components. The tower will be painted a neutral white or off-white color. The foundation designs are site specific and will be completed following geotechnical investigations.

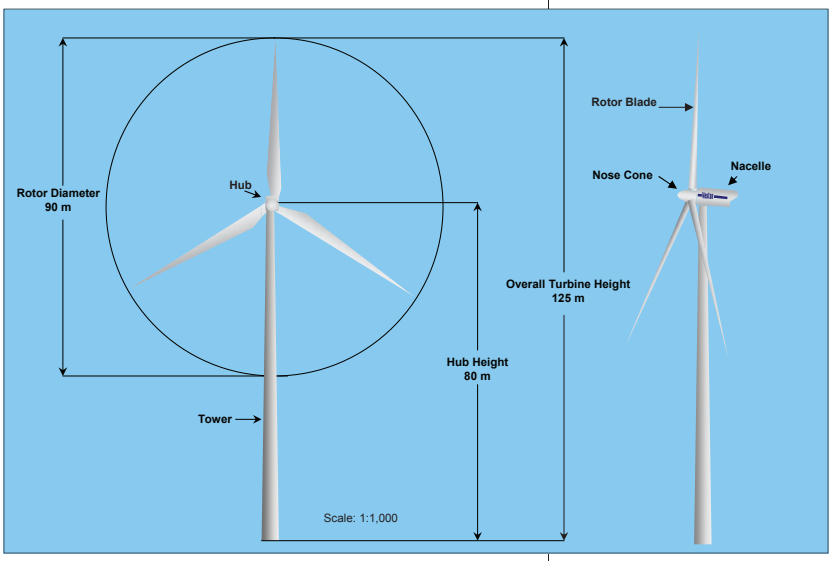


Figure 7: Components and dimensions of the Vestas V90 3.0 MW wind turbine

The nacelle is attached to the top of the tower and houses the main mechanical components of the wind turbine, including a variable speed generator, transmission, and yaw drive (a system enabling the nacelle to rotate atop the tower). The nacelle is approximately 13 feet (4.05 m) high, by 12 feet (11.8 m) wide by 32 feet (9.65 m) long. The rotor hub connects to the transmission through one end of the nacelle, and the rotor is then connected to the hub. The V90 uses a three-bladed rotor in an upwind configuration with an active yaw system in the nacelle to keep the wind turbine facing into the wind. The variable speed generator ensures steady and stable electric power production in gusting wind conditions while reducing high load conditions on the main components. The variable speed feature also provides precise control over reactive power and gives smooth connection sequencing when linking the generator to the grid.

The V90 3-bladed rotor has a diameter of 295 feet (90.0 m) and utilizes pitch regulation which allows efficient energy production in a wide range of wind and atmospheric conditions through a multi-processor controller system. Pitch regulation refers to the capability of individual rotor blades to be "pitched" or rotated along their longitudinal axis, allowing them to operate most efficiently over a range of wind speeds. Pitch regulation is also important in cold climates (where icing conditions occur during winter months) because pitching the blades will allow them to shed ice before it builds up.

Under normal operating conditions, the wind turbines will begin generating power in wind speeds of about 9 mph (4 m/s) and will continue to do so until wind speeds reach 55 mph (25 m/s). At speeds greater than 55 mph (25 m/s) the blades will "feather" (i.e. turn parallel with the direction of the wind).

(2) CAPACITY IN MEGAWATTS, AS DESIGNED AND AS INTENDED FOR OPERATION

Granite Reliable Power Windpark will utilize 33 Vestas V90 turbines. Each turbine has a rated nameplate capacity of 3.0 megawatts, allowing for each turbine to generate up to three MWs of electricity. The Project will have a total installed nameplate capacity of 99MWs.

(3) TYPE OF UNIT INCLUDING

a. Fuel utilized

Not applicable. The Project utilizes the wind to power generator units.

b. Method of cooling condenser discharge

Not applicable.

c. Whether the unit is proposed to serve base, intermediate or peaking loads

The Project will produce power for the regional electric grid and the amount of power output at any time is dependent on varying wind dynamics at individual wind turbines throughout the Windpark. Since wind power has no fuel costs and very low operating costs, it is considered to be a low cost supply and will operate continuously to serve all load requirements.

d. Unit efficiency

The Granite Reliable Power Windpark's estimated annual energy production is expected to be 300,000 MWH. These calculations correspond to a net capacity factor of approximately 35 percent, providing the equivalent of the electricity needs of approximately 40,000 New Hampshire households, based on the assumption that the average household electrical use is 7500[10] KWH per year.

With no fuel utilized in the power generation process, the Project will be extremely energy efficient.

e. Impact on system stability and reliability

The Granite Reliable Power Windpark will interconnect to an existing 115 kV transmission line using a three-breaker ring-bus switching station installed beside the existing line in the town of Dummer. The line owner, Public Service Company of New Hampshire/Northeast Utilities, and ISO New England (ISO-NE) entered into agreements in the summer of 2007 to conduct the necessary interconnection studies[11]. The System Impact Study is in the process of being finalized. GRP will provide a copy to the Committee when it is completed. **Appendix 8** has been reserved for a copy of this study. The study evaluated preliminary thermal and voltage conditions of the pre-project and post-project systems under pre-contingency and post-contingency operations. The results of the thermal and voltage analysis indicated that the existing electrical system will require relatively minor upgrades to the existing 115 kV line. Most of these upgrades involve re-sagging the electrical lines (stretching them tighter) to accommodate the additional electrical load. With these upgrades, no thermal, voltage, or short circuit problems were observed in the modeling exercises conducted in these studies. In conclusion, the Project will not have significant negative impact to the stability, reliability

[10] Data based on calculations for 2006 residential energy use from page 18 of the NH Public Utility Commission's Biennial Report. http://www.puc.state.nh.us/Home/AboutUs/bien05-07%20100307.pdf

[11] The initial feasibility and system impact studies were conducted assuming the Project would use General Electric 1.5 MW turbines. Current Project designs assume the use of Vestas V90 turbines as described in this application.

and operating characteristics of the New England bulk power transmission system.

In general, wind power has been found to maintain the reliability and integrity of the electric system without adversely impacting system reliability or increasing operating costs up to certain threshold levels on each power system. According to a comprehensive analysis released May 22, 2006 and prepared by the Utility Wind Integration Group ("UWIG") in cooperation with Edison Electric Institute, American Public Power Association and National Rural Electric Cooperative Association (groups which represent nearly 100 percent of the utilities in the United States), there are not "any fundamental technical barriers at the present time to wind penetrations of up to 20 percent of system peak demand, which is far beyond where we are today." [12] The UWIG study investigates the impact of wind power on the operating costs of the non-wind portion

Granite Reliable Power, LLC
Proposal Schedule

Date: June 25, 2008

Granite Reliable Power Windpark

Task Name	Duration	Start	Finish
GRANITE RELIABLE POWER WINDPARK	360 days	Tue 5/5/09	Wed 9/15/10
Access Roads	88 days	Mon 5/18/09	Tue 9/15/09
Electrical Interconnect Lines	79 days	Tue 6/16/09	Thu 10/1/09
Substation	130 days	Tue 9/1/09	Mon 3/1/10
Foundations	33 days	Sat 8/1/09	Tue 9/15/09
Turbine Erection	56 days	Sat 5/1/10	Thu 7/15/10
Electrical	306 days	Wed 6/17/09	Sun 8/15/10
Overhead Collection System	56 days	Wed 7/1/09	Tue 9/15/09
Underground Collection Systems	110 days	Fri 5/1/09	Wed 9/30/09

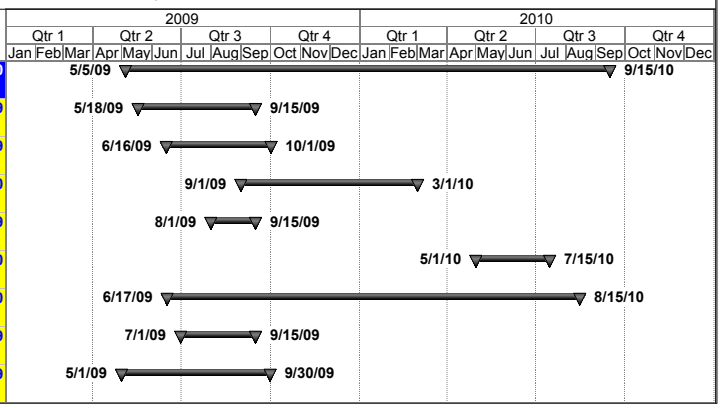


Figure 8: Major tasks in the construction schedule for 2009-2010.

of the power system and on the system's electrical integrity. The study concludes that "the consensus view is that wind power impacts can be managed with proper design and operation of the system." A summary of the findings of the UWIG is provided as Appendix 9: "Utility Wind Integration: State of the Art."

(4) ANY ASSOCIATED NEW SUBSTATIONS AND TRANSMISSION LINES

A new substation, interconnection switching station, collection line and electrical interconnection line will be required in order to interconnect the wind turbine generators to deliver power to the grid. The collection line (34.5 kV AC) along the access roads will carry all electricity from all wind turbines to the substation that will be located along Dummer Pond Road. At the substation, the 34.5 kV power will be transformed to 115 kV and carried on a new 115 kV electrical interconnection line which will run between the substation and interconnection switching station and which will connect with the existing PSNH 115 kV transmission line.

(5) CONSTRUCTION SCHEDULE, INCLUDING START DATE AND SCHEDULED COMPLETION DATE

Pre-construction work, such as surveying and staking the location of Project components, will take place in the winter/spring of 2009 based on the status of the SEC process.

Construction of the Granite Reliable Power Windpark will begin after all required approvals have been obtained. The start date for this work will be upon receipt of

[12] Charlie Smith. "UWIG Issues Assessment of Integration of Wind into Utility Power Systems" Dallas, Texas, May 22, 2006. http://www.uwig.org/

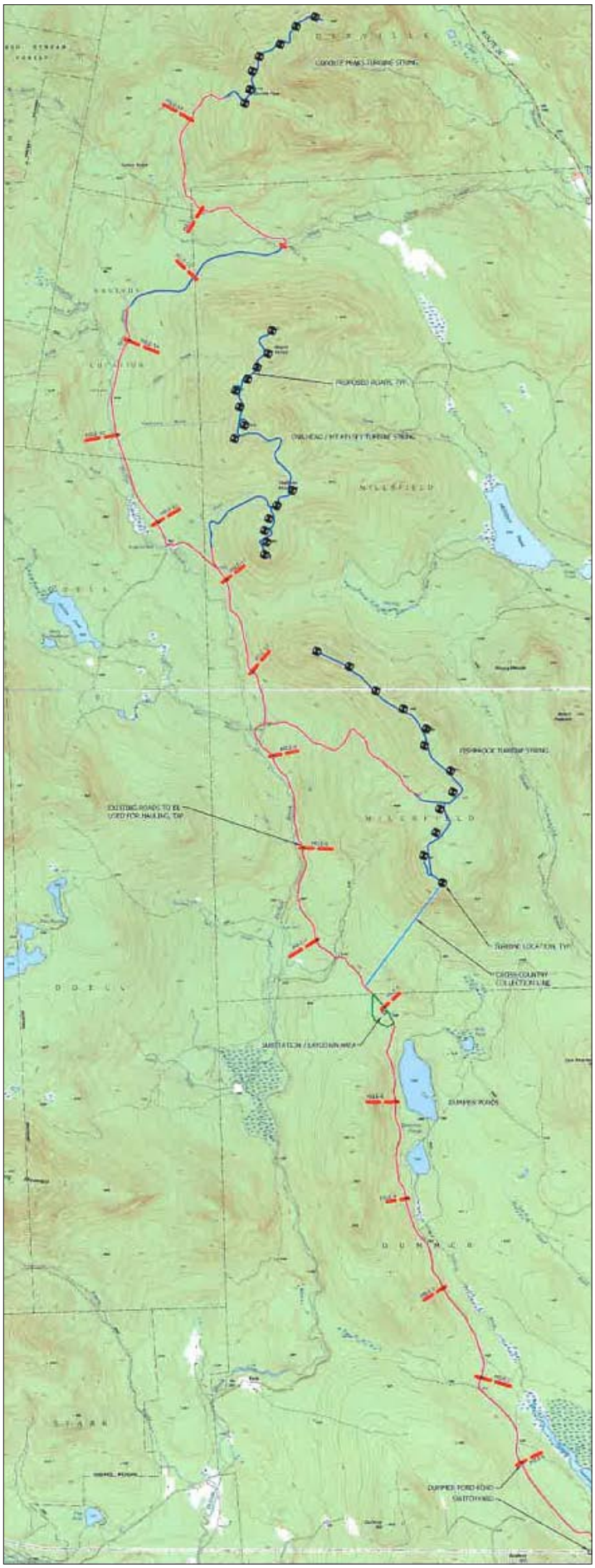


Figure 9: Newly constructed (shown in blue), upgraded and existing access roads (shown in red) to be used in the construction of the Project

required approvals. A typical sequence of construction activities is displayed in **Figure 8**.

Precursors to construction activities include the acquisition of all state and federal permits for the construction and operation of the Project. Construction work on the maintenance building and electrical interconnection components will begin once the site is clear and erosion control measures are established.

Road construction work will include upgrading existing logging haul roads and construction of new access roads up to and along the ridgelines.

Concrete and foundation work will be completed at several wind turbine sites simultaneously. The towers, nacelles and rotor blades will be erected upon completion of unit foundation work. Parallel work will involve installation of the substation, interconnection switching station, and electrical interconnection line components.

After the wind turbines are erected and the physical details of wiring and assembling the mechanical subsystems are completed, the wind turbines will be subject to a carefully prescribed acceptance test. The

target commissioning date for all wind turbines and electrical facilities and connection of them to the grid is summer of 2010.

a. Access roads

The Project is located entirely on private lands mainly used for commercial timber harvesting operation. A well defined network of roads to support this use exists on the Phillips Brook Tract and Bayroot Parcel. Some of these roads will require upgrades to support construction needs. The Project site access roads are shown in **Figure 9**. Site specific geotechnical information considering the load-bearing requirements of construction traffic and equipment will be used in the design of upgrades and new roads. Upgrades of existing roads will include changes in the horizontal and vertical geometry and widening them to a minimum of twenty (20) feet to accommodate the turning radii of the haul rigs, upgrading existing culverts and installing new culverts, upgrading existing bridge crossings, installing temporary and permanent erosion control measures, and resurfacing the roads with crushed gravel. Tree trimming or clearing will be necessary in some locations to support these activities. Pull-off areas may be established as needed to safely accommodate traffic for construction activities in conjunction with ongoing forestry operations.

The Dummer Pond Road, privately owned by Bayroot LLC, will provide the main access to the Project. New access roads will be built to access areas that currently do not have acceptable routes. Typically, roads to the ridgeline will be 25 feet (7.6 m) wide. Project access roads along the ridgeline will be constructed to a 34 foot (10.4 m) width to accommodate crane movement, large wind turbine equipment deliveries and the safe deliveries of all other support materials. All access roads will be constructed within a right-of-way ("ROW") defined as the width needed to install the road (with any cut and fill needed) plus 10 feet (3.0 m) on either side. This additional area will be used for erosion and sediment control measures and temporary construction needs. The temporarily disturbed area will be stabilized and allowed to revegetate after the construction activities are complete. When co-located with an access road, overhead or underground collection lines will be installed within the construction ROW.

Project access roads will be gravel roads designed to bear the weight of truck traffic transporting concrete, gravel and wind turbine components to the wind turbine sites. See **Figure 10**, a cross-section diagram of a typical access road. The road base sections will be constructed using site-specific geotechnical information considering the load-bearing requirements of construction traffic and equipment on suitable native mate-

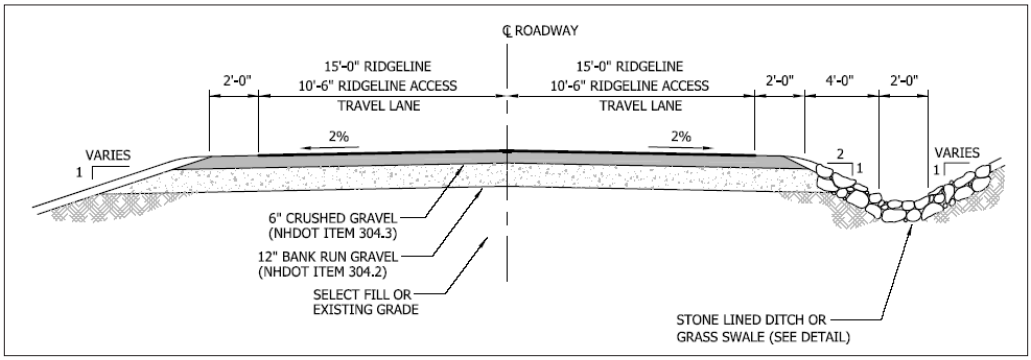


Figure 10: Cross-Section of a typical access road

rial. Geotextile fabric, or a comparable product, may be used to separate the road base material to prevent fine soil particles from migrating into the gravel base material and to preserve road base integrity.

During construction, culverts will be installed as needed to maintain pre-existing drainage paths to the extent practicable. Roadside ditches will be incorporated as dictated by the terrain to convey stormwater runoff away from the roadways. Proper stormwater measures will be utilized as necessary.

b. Substation, interconnection switching station, laydown yard and maintenance building

The substation and interconnection switching station are designed to standard applicable utility specifications that include geotechnical information, soils resistivity, drainage slope, measures to maximize safety and any applicable local, state or federal codes or regulations. The sites will be cleared of vegetation and graded. Topsoil will be stockpiled nearby and segregated from sub-soils for use in site restoration. Concrete foundations for equipment and structural supports will be poured and underground conduit, cable trenches/raceways and grounding grid will be installed. Above-ground construction will involve the installation of transformers, structural steel, bus conductors, poles, cabling, insulators, switches, circuit breakers, controls, fencing, security cameras and any other appurtenances required. Final steps for these installations will involve placing crushed stone, testing the electrical control systems and completion of site restoration.

The maintenance building, laydown yard and staging area will be constructed beside the substation. The area will be cleared of vegetation and topsoil will be stockpiled for restoration. As necessary, geotextile fabric will be placed beneath the crushed stone to separate the subsoil from construction fill and provide stability for the site. Upon completion of construction, the laydown yard and staging area will be restored by removing the crushed stone and geotextile fabric, replacing the stockpiled topsoil and stabilizing the site until natural revegetation occurs. The maintenance building will remain with a driveway and parking area for staff.

c. Turbine Installation

Each wind turbine will be installed using a systematic process. First, an area approximately 200 feet (61 m) in diameter will be cleared and graded to facilitate installation of foundations, associated grounding and electrical collection system components. This construction area will incorporate the directives of the site specific Stormwater Pollution Prevention Plan ("SWPPP") and other measures that may be required to avoid impacts to nearby wetlands, other sensitive resources, or physical land features. The layout of the construction area may be modified to further reduce impacts to these resources. Once the construction of the wind turbines is complete, the construction area will be stabilized and allowed to revegetate.

Wind Turbine Foundation Construction

Site preparation and excavation for the installation of wind turbine foundations will commence during construction of the road system. Clearing and grubbing will be completed

and topsoil will be stockpiled for use during site restoration. Foundation construction will occur in several stages beginning with excavation using backhoes, excavators, dump trucks and bulldozers to remove material. Geotechnical information gathered at each wind turbine site will be incorporated into foundation and ground grid design. The intended designs for these foundations will be determined upon geotechnical investigations. In the event that blasting is required, Granite Reliable Power will follow all applicable state requirements and industry standards. Individual, site specific blasting plans will be prepared to accommodate all such requirements and applicable standards. Excavation and foundation construction will be conducted in a manner that will minimize the size of excavated areas required to install foundations. If necessary, dewatering of foundation holes will be conducted in accordance with the SWPPP and Best Management Practices.

Figure 11: Typical spread footing foundation design

To complete the foundation, generally, the exposed portion will be covered with structural backfill that extends to approximately 6 feet (1.8 m) outside the perimeter of the foundation base. The remaining exposed portion of the foundation is a 16 foot (4.9 m) diameter pedestal that typically extends from 6 to 12 inches (15 to 30 cm) above grade.

Wind Turbine Assembly and Erection

With road construction complete and the wind turbine foundations cured, the erection of wind turbines can commence. Wind turbine components generally consist of a down tower assembly ("DTA" see **Appendix 7**: V90- 3.0 MW: An Efficient Way to Move Power , three tower sections, nacelle, blade hub and rotor blades. These components will be delivered to individual wind turbine sites and staged for a series of rigging activities to assemble and erect each wind turbine. Wind turbine erection is performed in redundant multiple stages including:

- Setting the down tower assembly cabinet on the pedestal foundation over conduits embedded in the concrete
- Placement of the tower base section
- Placement of the tower midsection, followed by verification of plumb and prep for grouting under the base section ring
- After an approximate 72 hour cure time for the grout, placement of the top tower section and nacelle during the same period using a larger crane with more lift capacity and a longer reach
- As each tower section and nacelle are placed, torque of nuts and bolts to assemble each section to a vendor specified torque value
- With all components assembled, including the connection of all electrical and control cabling between the nacelle and DTA, final verification of bolt torquing

between tower sections and any ancillary equipment, i.e. climbing ladders, etc. Lastly, a final vendor inspection is made regarding cleanliness and security.

d. Collection System Installation

Underground collection lines will generally be installed along the ridgelines. Underground collection lines will also be installed, to the extent practicable, within the area of temporary road disturbance. Direct burial methods utilizing cable plow, rock saw, and/or trencher will be used during the installation of underground collection lines whenever possible. The underground cables will generally be buried in a trench 4 feet (1.2 m) in depth.

Medium voltage overhead collection lines will be erected along the main access roads, and wherever necessary to minimize environmental impacts in sensitive areas. Installation of overhead lines will require a 50 foot (15.2 m) ROW. The ROW will be cleared of any trees and large woody vegetation to allow for safe and efficient installation of poles and overhead lines. In addition, occasional "danger trees" outside the ROW will be removed or trimmed if they are deemed likely to fall onto the conductors. Where overhead lines are located adjacent to existing roadways, best efforts will be made to install poles from the edge of the road. Poles will generally be located 20 to 25 ft (6.0 to 8.0 M) from the road shoulder.

e. Heavy/ Oversize trucking loads:

The delivery of large wind turbine components to the site will involve transport of oversize and overweight loads. These loads will be subject to the NHDOT's "Special Permit to Move a Load In Excess of Legal Limit."

NH DOT regulations provide that special permit applications are issued only to the person or firm who will actually be hauling the oversized load. At this time, Granite Reliable Power has not selected the hauling contractors for the wind turbine equipment and will not be able to do so until wind turbine orders are solidified and transportation logistics are planned around the transportation needs of the specific equipment.

Transportation routes will be planned to avoid or minimize the impact to state and local roads. The Project will work with NH DOT and local town highway departments to survey the transport impacts on the route selected to minimize safety risks to the general public.

(6) PROJECT DECOMMISSIONING

Granite has been working with the Coos County Commissioners regarding Project decommissioning. The executed Payment in Lieu of Taxes Agreement ("PILOT") between Granite Reliable Power LLC and the Coos County Commissioners contains the following provision: "Granite Reliable Power agrees to discuss with the COUNTY, and other parties necessary, a proposal for establishing a decommissioning fund sufficient to decommission the Facility at the end of its useful life and to establish such a decommissioning fund as part of the New Hampshire Site Evaluation Committee process." Granite Reliable Power will continue to work with the Commissioners and the parties to the Site Evaluation Committee proceeding in order to establish a fund sufficient to decommission the Windpark.

G

ELECTRICAL INTERCONNECTION LINE INFORMATION

(g) ELECTRICAL INTERCONNECTION LINE INFORMATION

(1) LOCATION SHOWN ON U.S. GEOLOGICAL SURVEY MAP

The location of the electrical interconnection line is shown on a USGS map, included as **Figure I2.**

(2) CORRIDOR WIDTH

The corridor for the electrical interconnection line will be 100ft (30 m) wide and located along the west side (uphill side) of Dummer Pond Road The entire electrical interconnection line will require vegetation clearing.

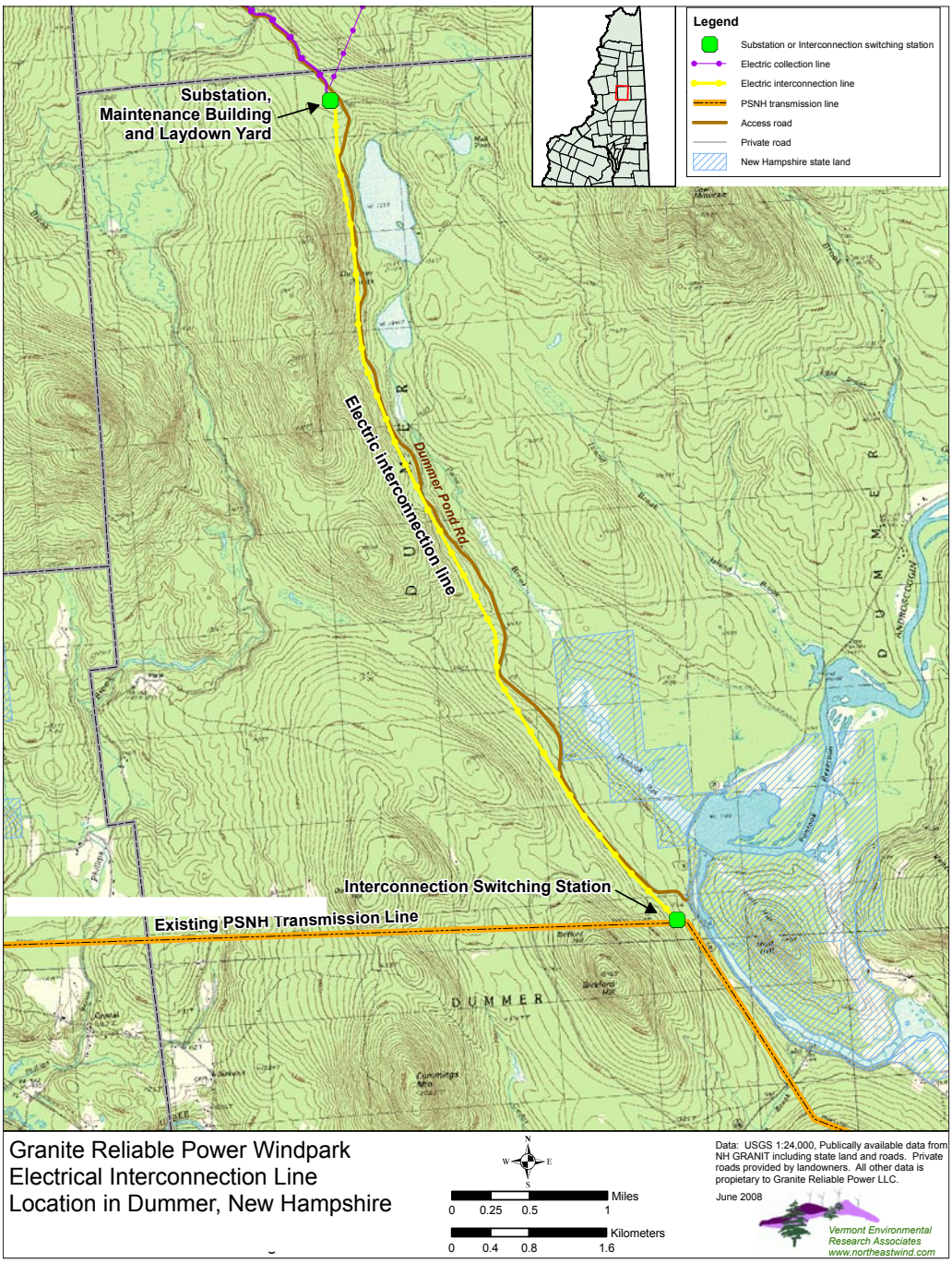


Figure 12: USGS Map illustrating the new electrical interconnection facilities required for the Granite Reliable Power Windpark, from the substation to the interconnection switching station

a. New route

The electrical interconnection line corridor will extend from the north side of PSNH's existing 115 kV transmission line W179-2 (Lost Nation to Pontook) in a northerly direction along the west side of Dummer Pond Road some 5.8 miles (9.3 km) to a location identified as the collector substation. The electrical interconnection line will tie into the existing W179-2 line by means of a new PSNH 115 kV switching station to be constructed on the north side of the existing line.

b. Widening along existing route

Not applicable.

(3) LENGTH OF LINE

The length of the new electrical interconnection line will be 5.8 miles (9.3 km).

(4) DISTANCE ALONG NEW ROUTE

The entire distance of the new route is 5.8 miles (9.3 km).

(5) DISTANCE ALONG EXISTING ROUTE

Not applicable.

(6) VOLTAGE (DESIGN RATING)

The electrical interconnection line is designed for operation at a nominal voltage of 115,000 volts (115 kV).

(7) ANY ASSOCIATED NEW GENERATING UNIT OR UNITS

The electrical interconnection line is associated with the installation of 33 Vestas V90 wind turbine generators. The purpose of the electrical interconnection line will be to

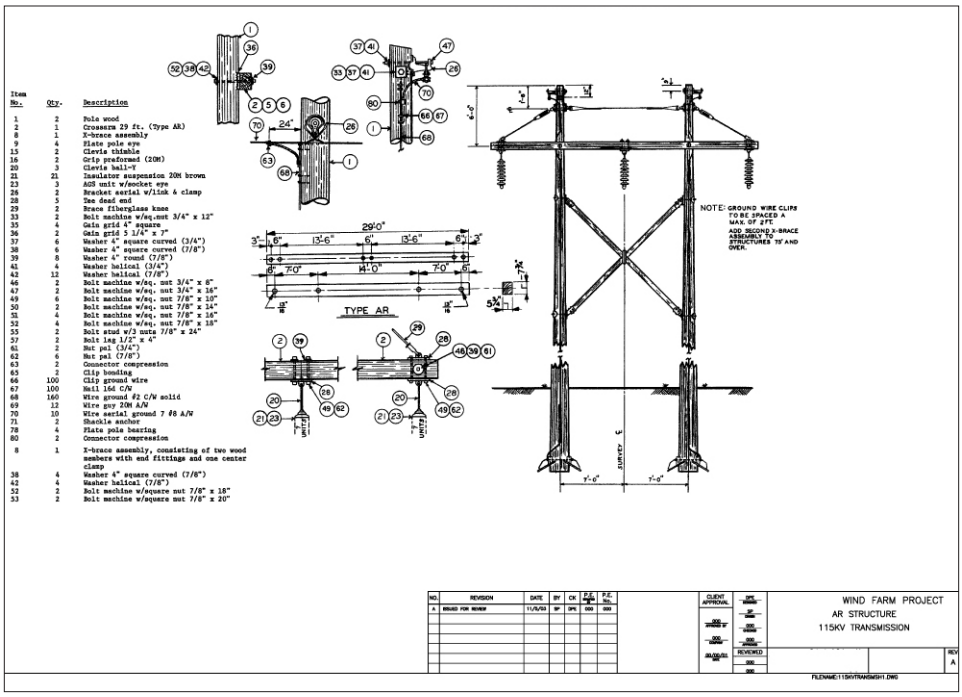


Figure 13: Typical 115 kV Tangent Structure

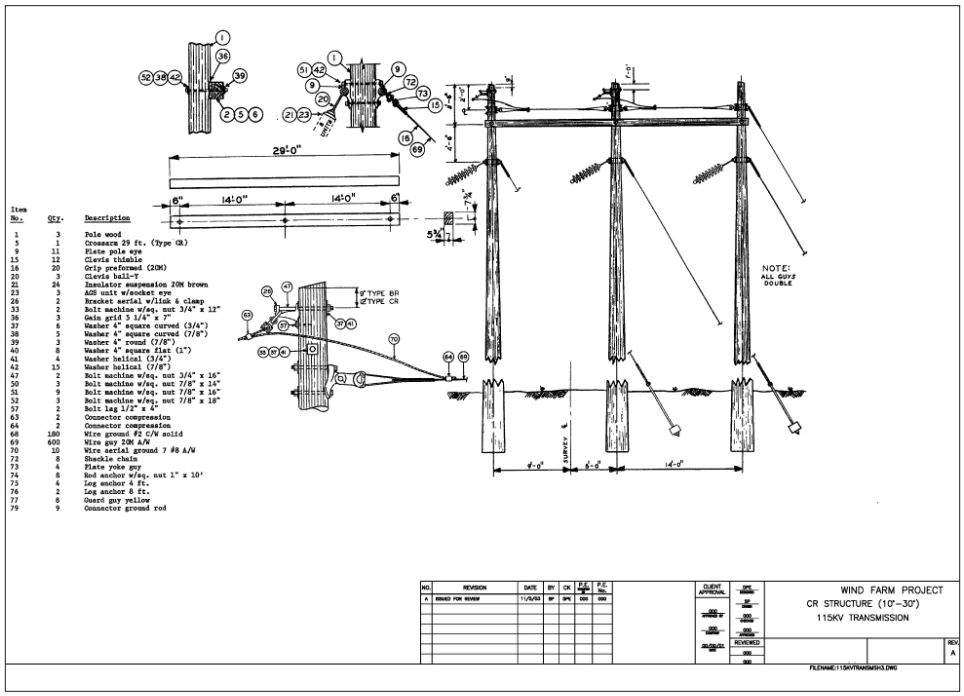


Figure 14:
Typical 115 kV Angle Structure

transport power generated by the Granite Reliable Power Windpark to the existing high voltage transmission network owned by PSNH.

(8) TYPE OF CONSTRUCTION (DESCRIBED IN DETAIL)

The electrical interconnection line will consist of overhead, wood, H-frame type structures that will run parallel to the west side of the Dummer Pond Road to provide ready access for construction and maintenance and to minimize clearing for ROW access. The structures will be centered on a 100 foot wide cleared ROW. Spans between structures will generally range between 400 and 600 ft (122-183 m). Phase conductors are expected to be 477 kcmil ACSR. Optical grounding wires and static wires will provide a fiber-optic telecommunications link. **Figures 13** and **14** illustrate typical tangent and angled structures to be employed.

(9) ELECTRICAL INTERCONNECTION LINE CONSTRUCTION SCHEDULE

a. Anticipated Start Date

Spring/Summer 2009 as indicated in Section (f)(5): Construction Schedule.

b. Scheduled Completion Date

Summer 2010 as indicated in Section (f)(5): Construction Schedule.

(10) IMPACT ON SYSTEM STABILITY AND RELIABILITY

This is discussed in Section (f)(3)e: Impact on system stability and reliability. The results of the Feasibility, System Reliability and Impact studies conducted by ISO-NE indicate that the Project is not expected to have any negative impact to existing system stability and reliability.

Figure 15: Photograph of the area along Dummer Pond Road planned for the new substation, maintenance building, and laydown yard. View is looking west.

(h) ADDITIONAL INFORMATION

(1) A DESCRIPTION IN DETAIL OF THE TYPE AND SIZE OF EACH MAJOR PART OF THE PROPOSED FACILITY

The Granite Reliable Power Windpark will involve constructing 33 wind turbines grouped into four wind turbine strings spanning approximately 6.5 miles (10.5 km) of ridgeline. The Project will also include the construction of a substation and interconnecting switching station, a maintenance building, laydown yard, approximately 30.4 miles (48.9 km) of collection line and 5.8 miles (9.3 km) of new 115 kilovolt (kV) electrical interconnection line to serve as a generator lead to the existing PSNH 115 kV transmission line that runs between Milan and Groveton.

The Project will utilize approximately 19 miles (30.6 km) of existing roads and will require the construction of 12 miles (19.3 km) of new access roads to access the wind turbines and other facilities. The elevation of land used in this Project varies between approximately 1,200 feet (366 m) and 3,450 feet (1052 m) above mean sea level.

The wind turbines will be located within the boundaries of the unincorporated places of Dixville, Ervings Location, Millsfield, and Odell. The remaining Project components, including a new substation, laydown yard, maintenance building, 115 kV electrical interconnection line, and interconnecting switching station will be located along Dummer Pond Road in the town of Dummer (see also Geographic Features Near the Granite Reliable Power Windpark in **Figure 3**).

The maintenance building, Project substation and laydown yard will be located on a portion of land timber-harvested four to six years ago. (**see Figure 15**.)

The approximately 5,000 square foot (465 square meter) maintenance building will be used to store tools and associated materials necessary for the Project vehicles, spare parts for the wind turbines and associated equipment. Communications equipment

Figure 16: Photograph of a typical maintenance building similar to what is proposed for the Granite Reliable Power Windpark (photo is of similar facility in western New York).

will be housed at this location. A representative photograph is provided in **Figure 16**.

Adjacent to the maintenance building and substation will be a laydown yard for temporary storage of large components, and a smaller number of spare parts. These facilities will be located on the western side of Dummer Pond Road approximately 6.2 miles (10.0 km) north of the NH Route 16-Dummer Pond Road intersection (see **Figure 3**).

Also located on Dummer Pond Road adjacent to the maintenance building and laydown yard will be the substation, an electrical facility that will transform collection line voltage (34.5 kV) to the voltage of the electrical interconnection line (115 kV). See **Figure 17** for elevation and plan views of this facility.

The interconnecting switching station will be located at the intersection of Dummer Pond Road and NH Route 16. This facility will be designed to connect the electrical

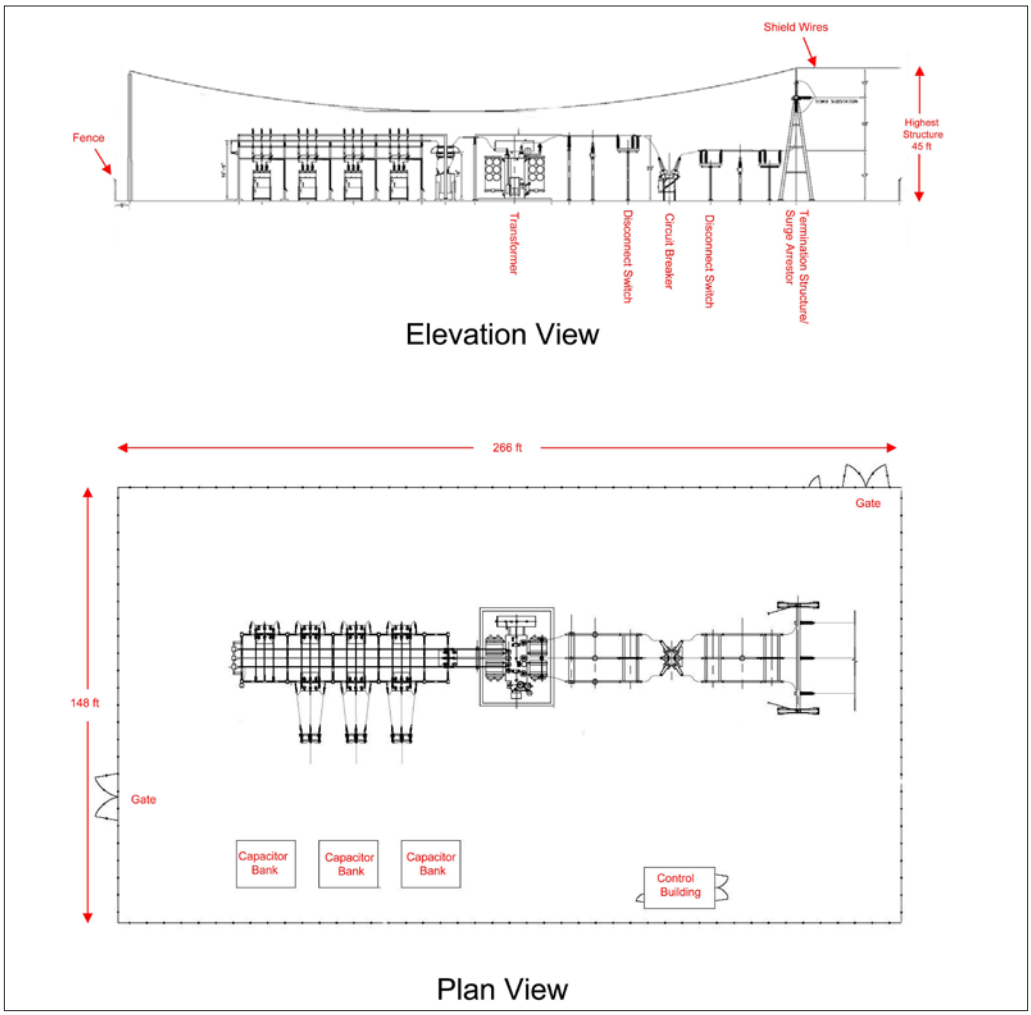


Figure 17: Elevation and Plan Views of the typical size and layout of the major structures in a 34.5 kV- 115 kV substation as proposed for the Granite Reliable Power Windpark.

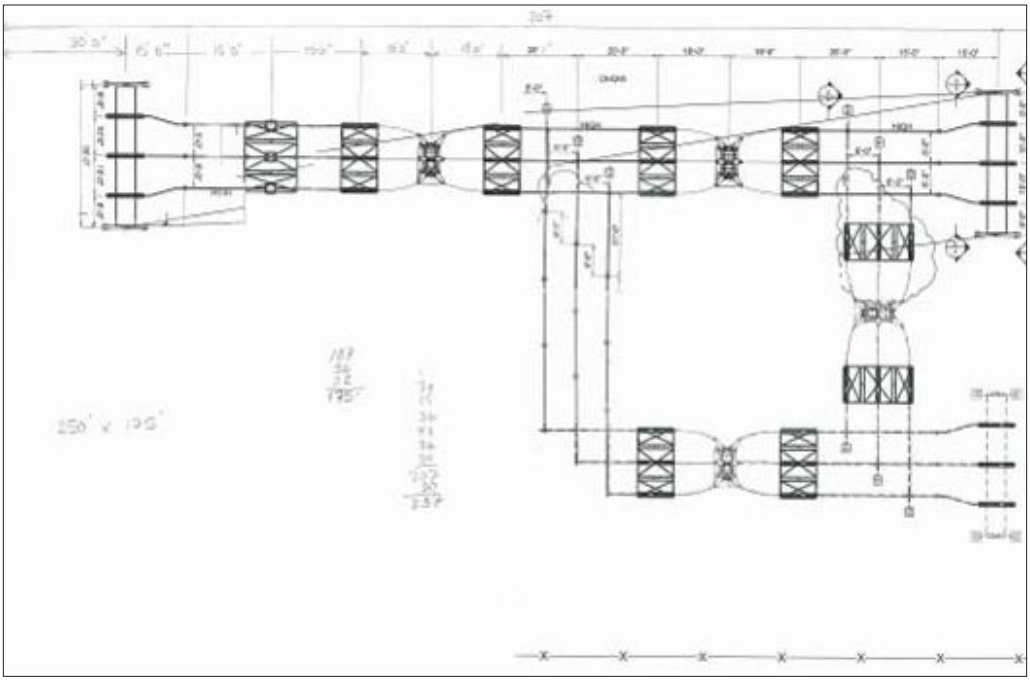


Figure 18: Typical design and layout of interconnecting switching station, as proposed for Granite Reliable Power.

interconnection line to the existing 115 kV transmission line owned by PSNH. A typical interconnecting switching station design is shown in **Figure 18**.

(2) IDENTIFICATION OF THE APPLICANT'S PREFERRED LOCATION AND ANY OTHER OPTIONS FOR THE SITE OF EACH MAJOR PART OF THE PROPOSED FACILITY

Preliminary screening

In 2006, Noble began a wide area study of several potential project areas within multiple project regions. Many potential project areas were identified in New York and New England. The Project site within Coos County was one of many sites evaluated within New England using the following criteria:

- AVAILABILITY OF SUFFICIENT WIND RESOURCES. Wind turbines must be sited in locations where there is sufficient wind flow of adequate speeds and duration. Potential project sites were evaluated using topographic maps and the AWS TrueWind™ map. Generally, wind speeds averaging at least 7.5 meters per second (16.8 mph) are needed for commercial wind energy project viability. The higher elevation of the Phillips Brook Tract and Bayroot Land was an area identified as having an adequate wind resource for a commercial scale wind project. Site specific wind studies have been ongoing since early 2007 to confirm the wind resource.
- PROXIMITY TO EXISTING ROADS AND TRANSMISSION LINES. A key consideration for wind project siting is the accessibility of an existing utility system to deliver the power generated into the electricity grid. Use of existing transmission facilities minimizes environmental impacts associated with construction of new power transmission facilities, which would include clearing ROWs and other construction impacts. The location of the 115kV PSNH line located to the south of the turbine locations creates an ideal situation for interconnection to the grid.

The Project is accessible from Route 16 and has a well developed system of private

logging roads allowing access to the wind resources. However, some of the existing logging roads will need to be upgraded to meet standards needed for construction traffic. Improving these existing roads for Project access minimizes the need for the construction of new roads.

- AVAILABILITY OF PRIVATELY-OWNED LANDS. The Project is comprised of three privately-owned parcels of land. The majority of this land is currently managed for commercial timber production. Representatives of GRP met with and obtained lease rights for the construction, operation and maintenance of a wind facility on these properties.
- PRESENCE OF ENVIRONMENTAL AND LAND USE CONSTRAINTS. GRP conducted a preliminary analysis of the site to determine the environmental and land use constraints present at the potential project site locations. GRP's analysis revealed that there was a relatively low potential for disturbance of sensitive ecological resources, land and water resources, cultural and visual resources, and landowners within the area of study.
- IDENTIFICATION OF PREFERRED PROJECT SITE AND TURBINE LOCATIONS. Throughout the development, layout and design processes, the GRP Windpark has examined many different alternatives for Project components as well as component layout. The primary variables that have been considered are turbine technology and placement, road width and road design parameters, electrical collection design including type of equipment and placement, substation, interconnecting switching station and electrical interconnection layout, as well as other Project component placement. GRP believes that the proposed Project represents the best available alternatives resulting in the least amount of environmental impact while preserving the viability of the Project.

Turbines

Granite Reliable Power has explored many alternatives to the current turbine technology and layout. During the initial stages of Project development it was established that the Project could support a 100MW capacity facility in the area being studied. Initially this was intended to consist of 67 turbines, each with a capacity of 1.5MWs, constructed on both the western ridges and eastern ridges. With this thought in mind, the initial environmental and wind resource studies began. Two significant developments led to the current turbine technology and layout. The detailed wind assessment of the site showed that the wind resource would support a turbine rated up to 3.0MW. With the addition of the Bayroot Parcel, more land became available for turbine placement, allowing for the Project to examine consolidating the Project components exclusively on the eastern ridges of the Phillips Brook Tract.

Additional benefits of the present design include: a larger distance of separation from the Nash Stream Forest, significant reduction in length of roads and collection line, and eliminating the need to cross the Phillips Brook watershed multiple times with collection lines and proposed access roads. The final design reduces the amount of area disturbed while maintaining Project viability. Benefits not directly related to reducing site disturbance include reducing the visibility of the Project, reducing the number of turbine foundations by half as a result of using fewer higher rated turbines,

and eliminating the need for the cut and fill required to support the 34 turbines that will not be built.

Another variable related to selected turbine technology is the site parameters needed for construction and operation of the Windpark. During discussions with the wind turbine manufacturer and qualified personnel familiar with the construction process for the selected turbine model, multiple turbine site designs that would allow for safe construction of the Project were identified. Each turbine site needs to have some basic features, including: crane pad; turbine foundation clear area; area for staging of components; and a cleared area for safe maneuvering of the heavy lift loads, specifically the blades. Many different configurations and construction sequences were explored to arrive at the current site design that meets the construction site requirements while minimizing the clearing area needed. The blade lift process is one example. This step in the construction process that requires the most cleared area. Typically the blades are attached to the hub while on the ground and there is a single lift to attach all three blades. For a turbine with a rotor diameter of 300ft this involves a very significant clearing. GRP has been able to reduce the amount of clearing by employing a single blade lift process, which, as its name suggests, means that a single blade is lifted onto the hub at a time. This is a more time consuming process but minimizes the clearing area needed at each turbine location.

Roads

From the beginning of the layout process it has been a goal of GRP to maximize the use of the existing network of logging roads and minimize clearing needed to construct the Project. Beyond utilizing existing roads, Granite Reliable Power has explored other alternatives to reduce primary and secondary impacts while holding safety as the primary concern. The road design parameters for GRP started with the standard road specifications. GRP consulted with specialty hauling companies in order to determine where these parameters could be reduced. By incorporating changes, such as reductions of turning radii, Granite Reliable Power reduced the length of road, switchbacks, cut and fill and total area of disturbance needed to safely access the turbine sites. In addition, the locations of the roads have been modified to avoid wetlands and other sensitive resources to the extent practicable.

Electrical collection system

Various types of collection systems were considered to determine the best design for the Project. Some of the initial designs considered include: underground collection, open conductor overhead lines and closed conductor overhead lines. The final design utilizes a combination of collection systems to minimize the overall footprint necessary to install these electrical facilities.

The location of the collection line was modified to minimize impact to sensitive resources. During the initial stages of planning, the Project intended to route collection lines along and between the ridgelines in as straight a line as possible down to a point of interconnection along Paris Road. Doing so would reduce the amount of line losses (energy lost through inefficiencies in conducting power) incurred by the Project.

While this is a sound design from an electrical engineering standpoint, the impact to the resources would have been extensive. Based on work conducted by the New Hampshire Audubon Society, GRP focused on ways to both re-route the collection lines to follow the access roads and utilize areas previously disturbed primarily from commercial timber activities. Secondly, by engaging the adjacent landowner, Bayroot, the collection lines, substation, interconnecting switching station and laydown areas were rerouted to run parallel to Dummer Pond Road obviating the need to install six new miles of electrical line through forested areas.

Substation, interconnecting switching station, electrical interconnection line

Design of substations and interconnecting switching stations are generally standard and few options exist to alter the size of the area disturbed by these facilities, therefore geographical placement of these facilities is the most effective way to minimize environmental impacts. To this end, Granite Reliable Power began looking at existing disturbed areas for placement of the substation. Three sites that were all recently cleared during logging activities were initially selected as viable for a substation: one near the Fishbrook Ridge turbine string, another between the Owlhead and Mt. Kelsey turbine strings and the last along Dummer Pond Road. After these sites were selected, GRP examined the placement of the electrical interconnection power line route from each of these locations in order to tie into the existing 115kV PSNH transmission line.

The interconnection power line is a 115kV line and requires a 100 ft (30.5 m) cleared ROW. By placing the interconnection power line next to the Project access roads, the Project was able to reduce the amount of additional clearing needed by using the access road disturbance as part of the ROW. With this information, sensitive resources were then taken into account and Granite Reliable Power determined that the substation location along Dummer Pond Road was the least environmentally intrusive option, as it is located in a recently clear-cut area.

The electrical interconnection line will be an H-frame structure and will be entirely located within the town of Dummer. The interconnecting switching station location was determined by the location of the PSNH transmission line and the proximity to Dummer Pond Road.

Other project facilities

Additional Project facilities that are necessary for the construction and operation of the Project include a laydown yard, maintenance building and a backup laydown yard. Focusing on previously disturbed areas, Granite Reliable Power determined that the most suitable site for the primary laydown yard and maintenance building would be to locate them next to the Project substation in the same clear-cut area. The secondary laydown yard will be located in an existing clear-cut along Dummer Pond Road, south of the substation, laydown yard and maintenance building, and will be used for the purposes of equipment overflow and additional equipment staging.

a. Project alternatives evaluated

Smaller Project size

GRP evaluated reducing the size of the Project by using a smaller number of turbines.

However, reducing the Project's size would reduce the energy production and the resulting environmental and economic benefits of the Project. A smaller project would also be less financially viable.

Granite Reliable Power evaluated a project with fewer turbines and determined that such a project would reduce the localized environmental impacts only marginally. The footprint and visibility of the Project would be slightly reduced, thereby also reducing the amount of disturbed forest land, vegetation, and wetlands. Visually, a reduction in the number of turbines may provide a minimal benefit at a particular receptor, but it would do little to change the overall impact of the Project on the regional landscape. There would also be a minimal reduction in the need for collection lines and the visual impacts associated with the site clearing. Thus, the reduction of the size of the Project would only marginally change its aesthetic profile. Given the minimal impacts to forest land, vegetation and wetlands of the Project as proposed, as well as the marginal change in the aesthetic profile of the Project, it appears that a smaller project alternative does not warrant the loss of generating capacity and related social and economic benefits.

Project viability

Wind generating projects have certain fixed "infrastructure" capital expenditures that are independent of the size of the facility. For example, the cost of the utility interconnection and the facility substation will not vary significantly with the size of the facility. The financial viability of a project depends on its ability to recover these fixed capital expenditures by maximizing output.

Prices for electricity produced by the Project are based on multiple market factors including the costs of electricity generation. As a fuel-free energy resource, the Project's main costs are fixed capital costs. To be competitive with other wind projects and other sources of electrical energy, the capital and other fixed costs per kilowatt-hour (kWh) output must be reduced while maximizing electrical output. Reducing Project output without a corresponding reduction in fixed costs would create a negative impact on its overall financial viability and would discourage investment.

The Project has been sized to maximize the available wind resource while being sensitive to various environmental factors. A smaller project would produce fewer global benefits (e.g. clean energy, emissions reductions and reductions in fossil fuel combustion), and fewer local economic benefits to the region and the state. It also would be contrary to the state's goals of increasing the use of renewable sources of electricity to the same extent as the Project that has been proposed.

No-build alternative

Selection of the no-build alternative would preclude the development of a windpark in an area with favorable wind resources and infrastructure to support such a project. In the northeastern United States, good wind energy project sites are limited and those that do exist are primarily located in areas that will have similar social and environmental concerns. Therefore, the selection of the no-build alternative would force continued reliance in the northeast on non-renewable energy resources (e.g. fossil fuels and nuclear materials). Energy production with such non-renewable sources results in a plethora

of severe direct and indirect adverse environmental impacts (e.g. air emissions, water consumption, toxic effluents and thermal emissions, by-product wastes, significant infrastructure needs and related land use impacts, visual impacts, noise impacts, traffic impacts, and health impacts), and socioeconomic effects (e.g. decreased energy diversity and reliability, fluctuating and increased consumer costs, and uncertainties regarding the ability to meet increasing energy demands).

Furthermore, the benefits of adding approximately 99 MW of clean, renewable electric energy to the power grid would be lost in a no-build situation. Electric generation by fossil fuel-fired facilities presents serious consequences in the form of, among other things, air emissions (i.e. carbon dioxide, sulfur dioxide, nitrogen oxides, particulate matter, and mercury). The continued reliance on fossil fuel-fired generators would negate the reductions in emissions expected from operations of the Project. Those reductions are estimated to be 525,000 pounds of sulfur dioxide (a precursor of acid rain), 162,000 pounds of nitrogen oxides (a smog precursor), mercury[13] (a deadly poison), and 332,100,000 pounds of carbon dioxide (a greenhouse gas) over each year of operation[14]. The adverse environmental and health effects of air emissions from combustion of fossil fuels are well-documented and include global warming, acid rain, smog, respiratory health effects, and significant long-term impacts on wildlife.

Beyond air emissions, fossil fuel-fired facilities have other significant environmental impacts. These include, among others, massive water withdrawals/consumption for cooling (which entrain and impinge fish), the release of toxic effluents resulting from plant operations, thermal releases (when cooling waters are returned to the water body from which they were withdrawn), and visual impacts resulting from the facilities' structure and vapor/steam plume. To the extent that new technologies are required under the Clean Water Act to reduce water withdrawals, such technologies have their own attendant adverse environmental impacts (e.g., construction and maintenance of massive structures in water bodies, thereby causing long-term habitat disturbance). In any event, even with modern pollution control devices, significant adverse impacts remain. The cumulative effect of the operation of many fossil fuel power plants continues to pose an environmental threat that will only worsen with continued and expanded usage necessary to meet the ever-increasing demand for energy.

Beyond environmental impacts, fossil fuel power plant facilities also have significant adverse socioeconomic effects. Strict air emissions regulations and control measures, along with other environmental requirements to permit new or re-powered fossil fuel-fired facilities, have increased the capital and operating costs of power plants which, in turn, results in higher electricity costs to consumers.

Further, the infrastructure required for efficient energy distribution is lacking, in some instances, which leads to price fluctuations and unreliability of energy supply. For example, natural gas is transported through a network of pipelines throughout the country which is not always capable of transporting the required gas to various regions. This results in significant price swings and increased costs to consumers due to supply and demand forces. In extreme instances, supply disruptions may force use of dirtier fuels such as fuel oil to be combusted in order to meet electrical demand[15]. In addition, natural gas facilities suffer from many of the same adverse environmental

[13] The actual displacement of mercury emissions as a result of the Project is difficult to quantify. Individual power plants have different mercury emission rates based on the type of fuel and equipment utilized. Furthermore, current regulatory conditions make it difficult to accurately estimate future mercury emissions.

[14] Based on marginal emissions rates calculated by the New England Independent System Operator. See Appendix 10: 2005 New England Marginal Emissions Rate Analysis.

impacts as do coal-fired and oil-fired plants, particularly with respect to water withdrawals, thermal releases, and visual impacts. Thus, fossil fuel-fired facilities, which depend on non-renewable resources, have undeniable and well-defined significant environmental and social costs.

Nuclear facilities pose their own unique set of dangers, including the disposal of radioactive waste (high-level and low-level), impacts on the marine environment from thermal water discharge, and the potential danger of a catastrophic radioactive release as the result of an accident.

The National Renewable Energy Laboratory ("NREL") highlights the attributes of wind, showcasing how fossil fuel and wind power are markedly different. According to their findings, in the publication "Wind Energy Benefits", wind energy is beneficial in the following ways:

1) Wind energy is economically competitive
2) Wind energy is a valuable crop of the future for farmers and ranchers
3) Unlike most other electricity generation sources, wind turbines do not consume water
4) Wind energy is an indigenous, homegrown energy source that contributes to national security
5) Wind energy is inexhaustible and infinitely renewable
6) Wind energy has many environmental benefits
7) Wind energy reduces the risk associated with volatile fossil fuel prices
8) Wind energy is the fuel of today and tomorrow
9) Wind energy can be used in a variety of applications[16].

Wind projects do, however, require appropriate wind resources, and they are generally distributed over a larger land area than fossil fuel facilities. These characteristics make rural areas appropriate for wind project development. Rural areas often are used for farming or logging, and wind energy facilities are wholly compatible with these two land uses. They do not require the project sponsor to own land; instead, an easement or lease agreement is signed and ownership of the land remains with the current owner. Thus, revenues are paid to the landowner, which help sustain economic vitality in the rural area[17]. In addition to easement payments to private landowners, the Project is expected to make significant PILOT and other payments to local taxing jurisdictions, and make road improvements as a result of construction and post-construction remediation. The no-build alternative would deprive the rural area of this direct economic benefit as well as preclude development of an environmentally benign and beneficial energy production technology.

Importantly, both the United States' and NH's energy policies explicitly recognize the need to supplement non-renewable energy production resources with renewable energy resources. Thus, they encourage development of renewable sources and support renewable sources as a vital part of the local and national long-term energy strategy.

[15] Diversity in the mix of energy sources that supply our electricity can help reduce price fluctuations for the consumer.
See RSA 362-F:1.

[16] US Department of Energy, Energy Efficiency and Renewable Energy, "Wind Energy Benefits", April 2005. http://www.nrel.gov/docs/fy05osti/37602.pdf

[17] US Department of Energy, Energy Efficiency and Renewable Energy, "Wind Energy for Rural Economic Development." Updated August, 2004. http://www.nrel.gov/docs/fy04osti/33590.pdf

(3) A DESCRIPTION IN DETAIL OF THE IMPACT OF EACH MAJOR PART OF THE PROPOSED FACILITY ON THE ENVIRONMENT FOR EACH SITE PROPOSED

A detailed description of the potential environmental, health and safety impacts of the Project is contained in Section (i).

(4) A DESCRIPTION IN DETAIL OF THE APPLICANT'S PROPOSALS FOR STUDYING AND SOLVING ENVIRONMENTAL PROBLEMS

GRP has been careful to account for natural communities at the Project site and analyze possible effects the Project may have on the natural environment. Additional studies have been performed related to breeding birds, bats, winter animal tracking, rare plants, and wetlands. These studies are discussed in detail in Section (i).

It is important to recognize that in comparison to other energy sources that could be built to meet demands for electricity, wind power's impact on the environment and wildlife is minimal. The list of environmental and wildlife impacts from other energy sources is long and varied, including:

- Habitat impacts from mining (coal, uranium), drilling (natural gas, oil), and compressing fuel (natural gas). Some of these effects are local, while others can extend over fairly broad areas.
- Habitat impacts from air and water pollution: acid rain, smog, mercury, drilling and wastewater disposal (fossil fuels).
- Habitat impacts from global warming (fossil fuels). Significant changes in some species' ranges are already occurring, particularly in northern latitudes.
- Habitat impacts from thermal pollution of water (nuclear and fossil power plants).
- Habitat impacts from flooding of land and streamflow changes (hydropower).
- Habitat impacts from waste disposal (coal). The American Bird Conservancy estimates that mountaintop mining/valley fill operations in West Virginia, Tennessee, Kentucky, and Virginia will lead to a massive and permanent impact on mature forest birds including the loss of tens of thousands of breeding Cerulean Warblers and other forest birds in the next decade.[18]

(5) A DESCRIPTION IN DETAIL OF THE APPLICANT'S FINANCIAL, TECHNICAL AND MANAGERIAL CAPABILITY FOR CONSTRUCTION AND OPERATION OF THE PROPOSED FACILITY

Granite Reliable Power, LLC is majority owned by Noble Environmental Power, LLC. GRP is a Delaware Limited Liability Company, formed for the development of, and eventual ownership and operation of, the Project that is the subject of this Application. GRP is registered to do business in New Hampshire. As stated in a recent S-1 filing with the Securities and Exchange Commission, Noble Environmental Power is a rapidly growing wind energy company operating 282 MW of electrical generating capacity with more than 950 MW of additional capacity that Noble expects to commence operations during 2008 and 2009. Noble is focused on developing, financing, constructing, owning and operating windparks in the United States. Through RPS programs and REC markets, Noble is able to monetize the environmental attributes associated with the

[18] See AWEA's Fact Sheet "Wind Energy and Wildlife", http://www.awea.org/pubs/factsheets/050629-ThreeC'sFactSheet.pdf and "Save the Loon with Wind Energy" http://www.awea.org/pubs/factsheets/wildlife.pdf

power it produces, in addition to generating revenue from the actual power produced. Operating in these deregulated energy markets also enables Noble to execute its energy hedging strategy, which helps stabilize revenues while allowing the company to benefit from future increases in energy prices.

Noble was founded in August 2004 and commenced operations of its first windparks in March 2008. To date, Noble has grown into a fully integrated wind energy company with over 170 employees, with the capability to develop, finance, construct, own and operate windparks. Noble will utilize its understanding of the commodity markets to site windparks in attractive regions and to monetize the output of the projects effectively.

In addition to Noble's current capacity of 282 MW, construction of additional windparks in New York and Texas has begun and will provide an additional 465 MW of capacity in 2008. Noble plans to grow capacity significantly over the next several years. By the end of 2012, the company expects to have approximately 3,850 MW of capacity as it further expands into attractive wind energy markets in Maine, Michigan, Minnesota, New Hampshire, Vermont and Wyoming.

Noble maintains strong relationships with major turbine suppliers, who it expects will provide the turbines required for the company's expanding windpark portfolio.

Noble has a fully-integrated, cross-functional organizational structure that enables the company to develop, finance, construct, own and operate each of the projects, including GRP, with a long-term ownership perspective. A commodities and risk management team works closely with the company's developers and meteorological team identifying regions for optimal project development. Collaboration among the developers, engineers and managers on each of the projects allows for transition from one stage to the next and to regularly identify process and technical improvements over the life-cycle of each project.

Noble has a dedicated development team of professionals engaged in activities including site selection, market analysis, land acquisition, community relations and permitting. Noble also has significant expertise in engineering, construction, operations and maintenance, with a combined total of 76 employees. Finally, Noble's management team has extensive project finance and commodity hedging expertise, allowing the company to optimize its capital structure and reduce the impact of spot market energy price volatility. This integrated project management strategy will enable Noble to continuously improve the development timing, cost and capital structure and revenue optimization of projects across its portfolio.

Noble's management team has extensive knowledge of every aspect of the development, financing, construction and operation of windparks, as well as many years of experience in traditional independent electricity generation. The company's senior management has an average of over 15 years of experience with complex power and infrastructure projects, from initial development through financing to ongoing operations and maintenance.

In addition to the Lancaster, New Hampshire office, Noble maintains permanently-staffed project offices in Altona, Arcade, Bliss, Churubusco and Fredonia, New York;

Austin and Hitchland, Texas; Ubly, Michigan; and Rutland, Vermont. By maintaining these offices and becoming involved in local community affairs, the company works to develop a meaningful local presence, which helps the company navigate local permitting processes and enlist the support of local communities for its windparks.

Noble's corporate headquarters are located in Essex, Connecticut and it has an Operations Center in Plattsburgh, New York.

Noble seeks to maximize project efficiency and reduce costs by taking advantage of its in-house capabilities in development, financing, construction and operations. For example, in the construction phase, Noble believes that the ability to choose between using outside providers and taking advantage of its in-house capability to act as a general contractor provides significant flexibility in selecting the most cost-effective and strategically efficient option. Additionally, Noble will maintain a central warehouse of spare parts, which the company believes will result in significant benefits, including increased operational flexibility, as Noble will not have to delay maintenance as a result of waiting for an item with a long-lead time to arrive. As Noble's asset base grows, it will achieve further cost reductions due to economies of scale in maintaining its windparks and purchasing components.

Noble will arrange for the financing of the Project through various potential sources and structures to provide capital for construction equipment and operation of the Project. The Project is currently estimated to require approximately $275 million in capital, depending on final equipment costs and construction pricing.

Through the selection of the various financing alternatives generally available to wind energy developers, Noble seeks to maximize the rate of return on project investments. Noble intends to use tax equity financing arrangements in order to monetize the value of accelerated tax depreciation that are available to it as a wind energy generator. Noble will be able to enter into these arrangements at a cost of capital that reflects the tax equity investor's ability to utilize these tax benefits. Until Noble has significant taxable income, the company intends to continue financing its windparks with tax equity financing structures so long as tax incentives and tax equity investors remain available.

Copies of recent financial statements for Granite Reliable Power and Noble are included in Appendix 1, though they have been redacted as they are the subject of a motion for confidential treatment.

Contractors will be required to carry contractor's insurance, including worker's compensation insurance, commercial general liability insurance, automobile insurance, excess liability insurance and professional liability insurance to cover liability arising out of any negligent act, error or omission resulting from the contractor's engineering, design, and commissioning services. The contractor will also require any subcontractors to maintain similar insurance. Contractors are also required to carry a builder's all –risk insurance policy covering the risk of physical loss or damage to wind turbine equipment. During the operation phase, the Project will carry insurance, including worker's compensations insurance, commercial general liability insurance, automobile insurance, excess liability insurance and professional liability insurance.

(6) A STATEMENT OF ASSETS AND LIABILITIES OF THE APPLICANT
SEE SECTION (B)(7) ABOVE AND APPENDIX 1.

(7) DOCUMENTATION THAT WRITTEN NOTIFICATION OF THE PROPOSED PROJECT, INCLUDING APPROPRIATE COPIES OF THE APPLICATION, HAS BEEN GIVEN TO THE APPROPRIATE GOVERNING BODY OF EACH COMMUNITY IN WHICH THE FACILITY IS PROPOSED TO BE LOCATED

The Coos County Planning Board (because the Project is located in the unincorporated places of Millsfield, Ervings Location, Dixville and Odell, all located in Coos County), and the Town of Dummer have been provided with copies of this New Hampshire Site Evaluation Committee Application by U.S. mail, return receipt requested, at the same time the Application was filed with the Committee. Accordingly, the Applicant intends to file copies of the return receipts (once they are returned) to supplement this answer and has reserved **Appendix 35** for this purpose.

(i) POTENTIAL HEALTH AND ENVIRONMENTAL EFFECTS AND MITIGATION PLANS

(1) AESTHETICS

a. Visual Impact

BACKGROUND & POTENTIAL EFFECTS: Wind energy projects in New England are typically visible due to the size of wind turbines and the ridgeline locations, necessitated by the wind resource characteristics within most of New England. Visibility by itself does not necessarily mean there will be unreasonably adverse effects on the site or surrounding landscape. A study of visual impacts of the proposed Project shows that while there would be some visual impacts from a few areas, they would not be unreasonably adverse.

The study of the visual impacts of the Project examined important viewing areas within a 10-mile (16.1 km) radius of the Project. Foreground views extend up to 1/2 mile (0.8 km) away and include areas in which considerable detail can be seen. Middleground views extend up to 5 miles (8.0 km) away and are areas in which trees can be perceived in very clear conditions but not details such as individual leaves. Land forms appear distinct and land use and vegetative patterns are often clearly evident. Background views are those beyond 5 miles (8.0 km) and are generally those in which landforms begin to take on a bluish color (actual distances will vary depending on weather conditions), and overall landforms are more visually dominant than land use or vegetative patterns. Visual impacts become less significant with distance both because objects appear much smaller, and also because they occupy a much smaller portion of overall views. Beyond 10 miles (16.1 km) away, visual impacts are highly unlikely unless a proposed project is extremely large or located on a highly sensitive site.

STUDY & MITIGATION PLANS: In order to assess the visual impact of the Project, a visual study was completed by Jean Vissering Landscape Architecture and Thomas Kokx Associates, landscape architects with significant experience in this field. This visual assessment is based upon extensive field inventory including visiting the significant recreational and public use locations within a 10 mile (16 km) radius of the Project, and in some instances up to 15 miles (24 km). Field inventory work was conducted during

POTENTIAL **HEALTH** AND **ENVIRONMENTAL EFFECTS** AND **MITIGATION PLANS**

both leaf-on and leaf-off conditions. Areas of Project visibility were documented with photographs and identified on maps using a global positioning system ("GPS") unit. The visual assessment used a systematic methodological approach similar to that outlined in the recent National Academy of Sciences report Environmental Impacts of Wind-Energy Projects[19]. The methodology examines factors such as relative scenic quality, uniqueness of scenic resources, viewer sensitivity levels, documentation of scenic resources, proximity of views, duration of views and the relative prominence of the Project within views. Photographic simulations have been prepared illustrating how the Project would appear from five viewpoints considered to have higher sensitivity levels due to scenic quality, proximity, number of users or viewer expectations. The simulations illustrate a range of distances and geographic areas. The comprehensive study is included as **Appendix II:** Granite Reliable Power Visual Impact Report. A map of the visual assessment area is included as **Figure 19**.

Views from Federal and State Roads

The study found visibility from Routes 3, 16 and 110B to be very limited, with a brief glimpse possible in one location along each road. There would be no visibility from Routes 110 and 110A. Route 26 was determined to have more views of the Project, specifically between Errol and Signal Mountain Road in Millsfield and between Colebrook and Dixville Notch. The Project would not be visible in Dixville Notch, nor from any of the roadside parks or nearby rest areas. See **Figure 20** for a view of the Project site from the intersection of Fish Hatchery Road and Route 26.

Figure 19: Map of viewpoint locations for photographic simulations of the Granite Reliable Power Windpark.

[19] Environmental Impacts of Wind-Energy Projects. National Research Council of The National Academies. The National Academies Press, Washington D.C.: 2007.

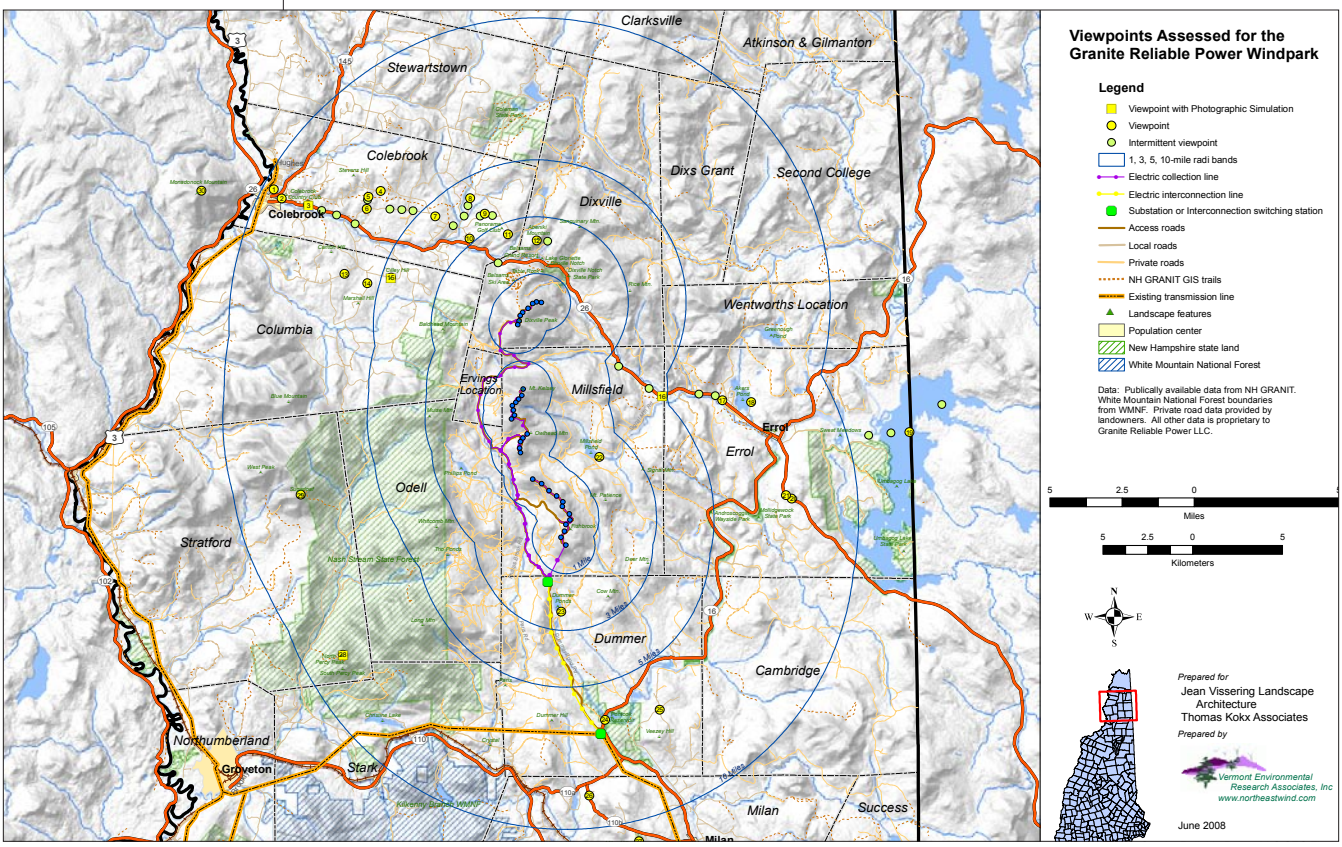


Table C:

VIEWPOINTS: describes characteristics of the five viewpoints which were selected as simulation points.

VIEW-POINT #	LOCATION	[20] PROXIMITY TO PROJECT (MILES)	NO. OF TURBINES [21]	NO. OF VIEWERS [22]	SCENIC QUALITY [23]	DOCUMENTED SIGNIFICANCE [24]	NOTES
3	Route 26 Fish Hatchery Road (Colebrook)	8.5 (13.7 km)	8	High	High	State Scenic Byway	Open foreground meadows permit views toward Dixville Peak with other fore-ground mountains and hills. Foreground views in simulation location are reltively intact but mixed commercial/residential development is visible in other locations.
15	Keach Road Cilley Hill (Columbia)	4.8 (7.7 km)	10	Moderate	Moderate - High	No Documentation	High open meadows inthe Cilley and Marshall Hill area contribute to scenic quality and permit distant views to many mountains in the area. Dixville Peak is visible in many views along with Baldhead and Muise Mountains.
16	Route 26 Signal Mountain Road (Millsfield)	5.3	8 (8.5 km)	High	High	State Scenic Byway	Along Route 26 between Errol and just north of Signal Mountain Road Dixville Peak and some of Kelsey Mountain are seen intermittently. The simulation view is one of the most scenic points with the open meadow and farmstead in the foreground and Dixville Peak beyond.
22 (2 photos)	Millsfield Pond (Millsfield)	2.7 (4.3 km)	15 (up to 27	Low Moderate - (from pond)	Moderate High -	No Documentation	Views would include turbines along portions of both Dixville and Kelsey/Owlhead, with someturbines on Fishbrook Ridge visible from the Pond. Relatively developed pond with industrial forestry activities evident in surrounding hillsides.
28	North Percy Peak Nash Stream Forest (Stratford)	9.5 (15.3 km)	20	Low	High	Noted in Appalachian Mountain Guide	Dixville and Kelsey/Owlhead are seen at a considerable distance with numerous foreground mountains blocking views to Fishbrook Ridge. Views to the Presidential and Mahoosuc Ranges are most dramatic

Views from Recreation Areas and Trails

The Project would not be visible from Dixville Notch State Park, from the Table Rock Trail, or from the immediate environs of the Balsams Grand Resort Hotel. Views of the Dixville Peak portion of the Project are possible from the Sanguinary Mountain Trail, from the summit of Mount Abenaki and from some of the Resort's cross country ski trails. The Dixville Peak portion of the Project will also be visible from some portions of the Panorama Golf Course and the Colebrook Country Club.

There would be no views of the Project from state parks within the study area including Dixville Notch State Park, Coleman State Park, and Mollidgewock State Park. Milan Hill State Park is just outside the study area, but there would be potential views from the fire tower. There would be no views from Umbagog Lake State Park.

Views would be extremely limited within the Nash Stream Forest except for fairly distant views from the summits of Percy Peak and Sugarloaf Mountain in Stratford, both accessible by a marked trail. See **Figure 21** for a view of the Project from the summit of North Percy Peak.

Portions of the Project would be visible from Millsfield Pond, Dummer Pond, and Phillips Pond within relatively close proximity (approximately 2.4 miles away or 3.9 km). Millsfield Pond has been identified as having the greatest sensitivity due to the presence of a number of camps around the pond, along with the potential visibility of the wind turbines along all three ridges from portions of the pond. There would also be views from Akers Pond in Errol and the Pontook Reservoir in Dummer. At the boat launch near the Pontook Dam, it is possible to see a portion of the Owlhead and Fishbrook Ridge wind

[20] Proximity is measured by the distance to the closest turbine.

[21] The number of turbines represents all potentially visible parts of turbines which may include only tips of blades.

[22] The number of viewers is a general figure based on the relative use of a viewpoint in comparison to similar use areas in Northern New Hampshire.

[23] Scenic quality ratings are described in more detail in the Report; they range from Low or Degraded, Moderate, High to Exceptional for outstanding views with intact foregrounds.

[24] Documentation includes publicly adopted planning or legal documents in which the resource/area is specifically identified; other types of documentation are noted also.

turbine strings south of Mt. Kelsey. There would be no views from the Androscoggin River except for a small section by Sweat Meadows near its source on Lake Umbagog. These views would be over 10 miles (16 km) away from the Project. Views toward portions of Mt Kelsey and Dixville Peak can be seen from the northern end of Lake Umbagog, but from the western edges and southern portions of the Lake, views are blocked by foreground hills and mountains.

Although outside the study area at about 11 miles (17.7 km) away, the Project would have limited visibility from Monadnock Mountain in Vermont.

Figure 20: Viewpoint #3 of Project site looking easterly from the intersection of Fish Hatchery Road and Route 26 in Colebrook.

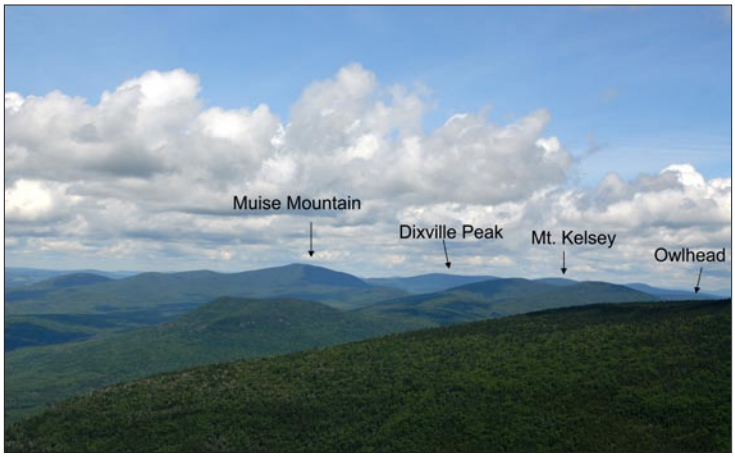


Figure 21: Photograph from North Percy Peak (viewpoint #28) looking east includes several of the peaks within the Nash Stream Forest, the Project ridgelines (in the right in the distance) and the mountain ridges to the north of Dixville Notch.

Views from Residential Areas

Views from residential areas were determined based upon views from adjacent roads. Residences along the western end of Golf Links Road, Munn Road and the eastern end of East Colebrook Road would have the most proximate views of the Dixville Peak turbines at distances ranging from about 3.2 to 4.6 miles (5.1 –7.4 km). There would be more distant views from portions of L Forbes and Reed Road from 5 to over 7 miles (8 to 11 km) away. In Columbia residential areas south of Route 26 along portions of Fish Pond Road, Marshall Hill Road and Keach Road would see the Dixville Peak wind turbines at distances ranging from 4.5 to 6 miles (7.2 to 9.6 km) away.

Some of the Dixville Peak and Mt. Kelsey wind turbines will be visible from camps located along the southern and eastern end of Millsfield Pond. From at least one camp on Dummer Pond, the Fishbrook Ridge, and perhaps the Owlhead wind turbines, will be visible. Both of these viewpoints are on the leased premises.

In the Errol area, the wind turbines will be distant features of the landscape from camps or homes on Akers Pond and along the northeastern shoreline of Lake Umbagog.

Discussion of Viewpoints Illustrated in Photographic Simulations

Certain locations were selected for photographic simulation to illustrate a range of geographic areas and land uses around the Project. Those locations are described in **Table C**.

Photographic Simulations

Photographic simulations are created using Digital Elevation Modeling, which creates an accurate three–dimensional computer model of the terrain. This computer model permits the terrain to be portrayed visually as if seen through a camera lens from a particular viewpoint. By inputting the horizontal and vertical coordinates for the point where the photograph was taken, the computer can calculate both elevation and relative position of the camera location in the model, and simulate the terrain visible through the camera lens. The simulated image is most representative of what the human eye sees when the photograph is taken with a "normal" lens setting (approximately 50 – 52 mm on a 35 mm film camera or about 34 mm on a digital camera).

The digital image is then superimposed on the digital terrain model. The computer program then digitally represents the wind turbines on the digital photo image, reflecting the meteorological and lighting conditions of the time and day of the year that the photograph was taken. Simulations so produced provide a useful illustration of how a project will appear from selected viewpoints. The viewpoint from the intersection of Signal Mountain Road and Route 26 is illustrated in **Figure 22**, and as is apparent from the simulation, the wind turbines will only be barely visible from these locations.

In its conclusion, the Granite Reliable Power Windpark Visual Impacts Report observes that there will be areas adversely affected by the addition of wind turbines in the view. However, the study notes that these visual impacts would not rise to the level of unreasonably adverse and that the visibility of the Project is relatively low. The Project was not found to obstruct or degrade views of any site documented publicly for its high scenic values.

Granite Reliable Power is working on an ongoing basis to provide visual impact information to the communities, through sharing photographic simulations from local vantage points, inventorying view points from historic places, sharing actual photographs from similar wind projects in operation and providing tours of windparks in operation.

b. Shadow Flicker

BACKGROUND & POTENTIAL EFFECTS: Shadow flicker is the periodic change in light intensity or shadows created by the moving turbine blades when back-lit by the sun. The alternation of shadows can be bothersome to nearby residences and businesses. Problematic shadow flicker occurs primarily during sunrise or sunset when the sun is low in the sky and shadows are cast at a distance from the rotating wind turbine blades. The wind turbine blades must be rotating for shadow flicker to occur. The intensity and frequency of shadow flicker depends on distance from the wind turbines, weather conditions and visual obstructions. At a given location, maximum shadow flicker will occur when the plane of the wind turbine rotor is oriented perpendicular to the line between the sun and the viewer. Up close, the effects of shadow flicker are more pronounced, with more contrast between light and dark. Further away from the

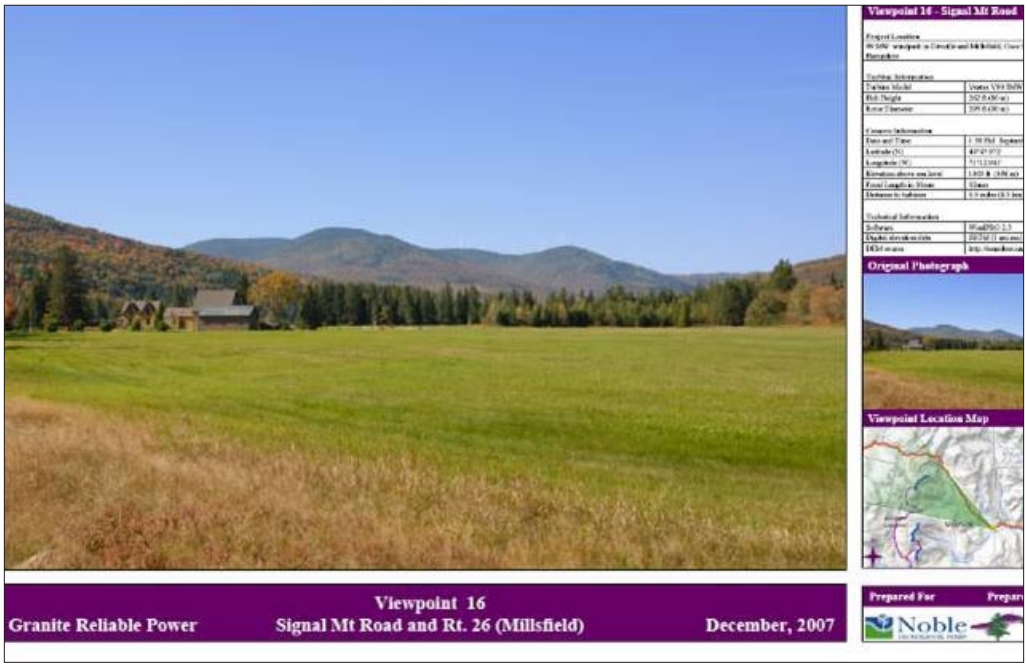


Figure 22: Viewpoint #16 visual simulation of the Project from the intersection of Signal Mountain Road and Route 26 looking west.

turbines, the contrast decreases since the wind turbine blades are less able to block the direct sunlight. Cloud cover and the presence of fog and other atmospheric interference will also reduce the effects of shadow flicker.

STUDY & MITIGATION PLAN: In order to predict the effect of shadow flicker in the vicinity of the wind turbines, a computer modeling analysis was conducted using WindPro software. The output of the modeling exercise is two maps represented in **Figures 23** and **24** that show estimated maximum number of hours per year shadow flicker could occur. **Figure 23** excludes all potential obstructions from vegetation cover, and **Figure 24** includes data from 2001 digital models of vegetative cover to incorporate the screening effect of trees in forested areas.

The computer modeling was performed using parameters specific to the Project and geographic location, including a digital elevation model of the surrounding terrain, wind turbine coordinates, rotor diameters, blade width, rotational velocity, and turbine hub heights. The model's threshold parameters for calculating shadow occurrence include the blade covering at least 20% of the sun, and that the sun is at least 3 degrees above the horizon.

Using the Earth's orbital and rotational information, the passage of the sun was then modeled over the course of one year, with calculations occurring at one minute intervals.

The model was run under an Astronomical Maximum Shadow scenario, in order to depict the maximum range of shadow extent and hours per year that any area could possibly be affected by shadow flicker from the Project. This scenario excludes external meteorological conditions that would in reality decrease shadow impact such as the probability of cloud cover, and the frequency of time that the wind turbines would be rotating while the rotor plane is oriented perpendicular to the line between the wind turbine and the sun. By running the analysis in this mode, the model essentially assumes that sun is shining all day, every day, and that the rotor always covers the

maximum portion of the sun.

Based on this "worst-case" analysis, shadow flicker will not cause annoyance to local residences or businesses. Due to the remote nature of the Project, even when excluding all interference from vegetation, no residences or businesses are expected to experience shadow flicker at any time of the year.

c. Wind turbine safety lighting

Due to FAA regulations, some of the wind turbines will be equipped with obstruction warning lighting as discussed in Section (i)(6)f.

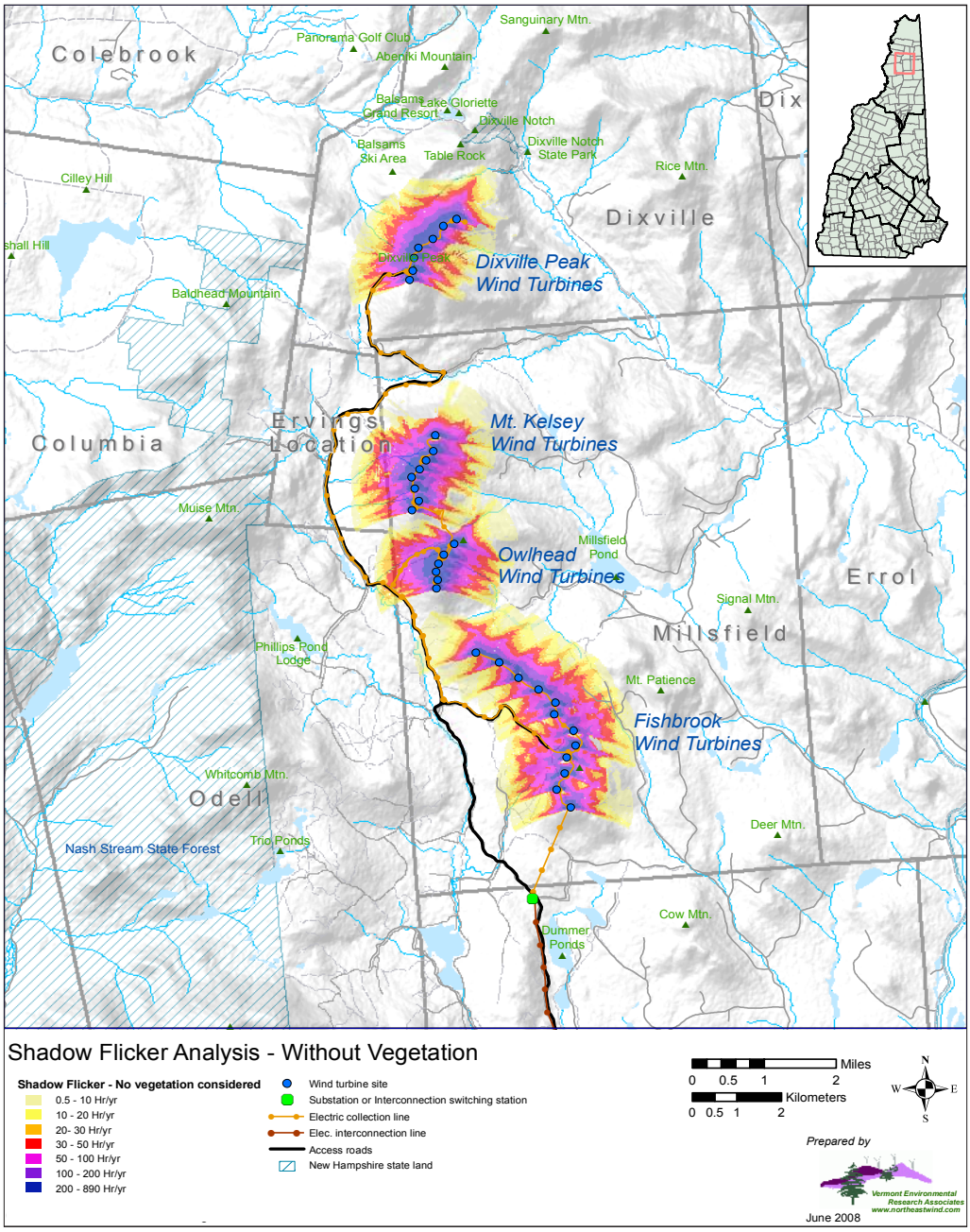


Figure 23: Map illustrating the extent of shadow flicker (maximum hours per year) not considering vegetative cover in the vicinity of the Project site.

POTENTIAL **HEALTH** AND **ENVIRONMENTAL EFFECTS** AND **MITIGATION PLANS**

(2) HISTORIC SITES

BACKGROUND & POTENTIAL EFFECTS: Properties of cultural or historical significance are identified as those listed and/or eligible for listing on the National Register of Historic Places ("NRHP") and the NHRHP. While the Project will not physically alter any existing buildings or structures, it could impact historic and cultural resources, through visual impacts to places or structures of historical significance and through impacts from construction and placement of facilities near archeological sites.

STUDY & MITIGATION PLANS: In order to identify properties of historical, architectural

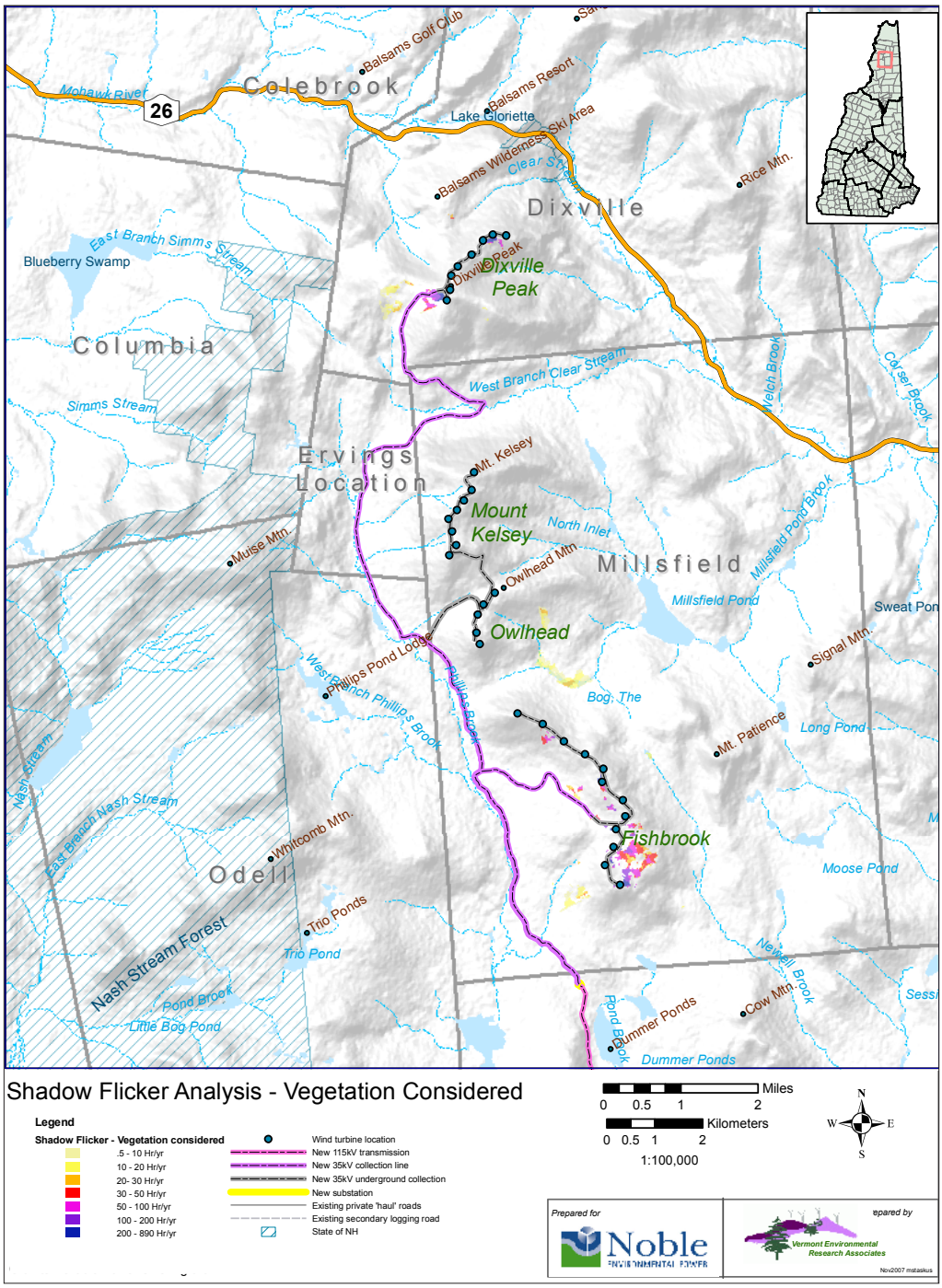


Figure 24: Map illustrating the extent of shadow flicker (maximum hours per year) considering vegetative cover in the vicinity of the Project site.

or cultural significance and to assess potential impacts to these places or sites of archeological signifiance, GRP contracted The Louis Berger Group, Inc. ("Louis Berger").

The historic architectural survey identifies historic properties eligible for listing on the NRHP within the area of potential effect ("APE"). In consultation with NHDHR, a radius around the Project of three miles (4.8 km) was identified as the APE. Louis Berger has completed a site file check at New Hampshire Division of Historical Resources ("NHDHR") identifying historic properties listed and/or previously determined eligible for listing on the NRHP and the NHRHP within the APE. The field survey within the APE identifies any properties that are NRHP-eligible. Louis Berger submitted its narrative findings and results to the NHDHR in early 2008. See **Appendix I2a**.

Based on the work conducted to date, the Project is unlikely to have any unreasonable adverse effect on any known historic resources. No historic structures will be physically impacted and at present it appears unlikely that the Project would demonstrably diminish any aspects of a setting that might contribute to the significance of such historic properties.

A Phase IA archeological survey was conducted to identify and assess areas of archeological sensitivity within 3 miles (4.8 km) of the Project site. See Appendix 12b. Based on the preliminary results of this survey, and in consultation with NHDHR, a Phase IB archeological survey has been recommended and will provide the basis for determining the need for further work.

Although it is anticipated that the Project is unlikely to have an unreasonable adverse effect on significant archeological resources, on-going consultation with the NHDHR will characterize and evaluate any potential effects on archeological resources and offer mitigation or avoidance strategies as warranted.

(3) AIR QUALITY

Background & Potential Effects: Granite Reliable Power Windpark, in its long-term operation, will produce no air emissions, thus it will not have an adverse impact on local air quality. Moreover, as a source of clean, renewable energy, the Project will positively contribute to regional air quality by offsetting fossil unit generation on the grid. These offsets will not only improve local and regional air quality, but may also help mitigate the impacts of global warming.[25]

Locally, global warming threatens the forest communities, seashores and economy of New Hampshire. NHDES cites global warming's economic impacts on the skiing, maple syrup, fall foliage, cold water fishing, and timber industries and indicates that these impacts could be serious. NHDES also references the possible increase of Lyme disease and other vector-borne diseases, flooding, erosion, and increased harmful algae blooms due to the effects of global warming.

Granite Reliable Power Windpark will supply energy which may offset regional emissions that would have been created by generators that burn fossil fuels. The electricity produced by the Project may offset the need for electricity produced by the combustion of distillate, residual, jet fuel and/or natural gas. The ISO New England 2005 New England Marginal Emission Rate Analysis calculated the annual average marginal

[25] Information from the New Hampshire Department of Environmental Services website: http://www.des.state.nh.us/ard/climatechange/impacts.htm Updated June, 2005.

emission rates based largely on fossil generation, identified in **Table D**. The report in its entirety is included in Appendix 10: ISO New England 2005 Marginal Emissions Rate Analysis.

Table D:
Calculated New England Marginal Emissions Rates and Estimated Annual Offset

Air Emission	ISO-NE 2005 Average Marginal Emission Rate (lbs/MWH)	Potential Emissions Offset by Granite Reliable Power Windpark (lbs/year) based on 300,000 MWH/yr
SO2	1.75	525,000
NOX	0.54	162,000
CO2	1,107	332,100,000

Based on the ISO New England 2005 average marginal emission rates (**Table D**, column two) and the Project's estimated annual net output of 300,000 MWH per year as described in Section (f)(3)d: Unit Efficiency, the Project's potential emissions offset in pounds per year have been calculated (column three of the table). Thus, the Project would contribute positively to regional air quality by offsetting the emissions of 332,100,000 lbs/year of carbon dioxide (CO2), 525,000 lbs/year of sulfur dioxide (SO2) and 162,000 lbs/year of nitrogen oxides (NOX).

The Pew Center on Global Climate Change released a report, U.S. Electric Power Sector and Climate Change Mitigation, in collaboration with Carnegie Mellon University in June 2005 (Appendix 13). The study concludes that the electric power sector is responsible for 38 percent of all U.S. carbon dioxide (CO2) emissions, and is the largest source of sulfur dioxide (SO2) and nitrogen oxides (NOX).

The report concludes that immediate action is necessary to slow the effects of climate change and decrease emissions of carbon dioxide and other greenhouse gases and that it is also necessary to embark on a path to a lower-carbon electric sector. On September 24, 2007 the Intergovernmental Panel on Climate Change ("IPCC") reported that there are current direct observations of global climate change that include increased global temperature, higher sea level and a reduction of snow cover in the Northern Hemisphere. The IPCC told the United Nations that "mitigation needs to start in the short term, even when benefits arise in a few decades".[26] Information about this presentation is included as Appendix 14: Intergovernmental Panel on Climate Change Presentation to United Nations.

STUDY & MITIGATION PLAN: During construction, fugitive dust will be controlled as needed. Project operations will have no air or greenhouse gas emissions that require study or mitigation.

The Project will have long-term beneficial impacts on climate and air quality and help serve New Hampshire's goal to achieve 25% of its electricity through renewable sources by 2025.

[26] Information from the IPCC website see the IPCC website http://www.ipcc.ch/index.html):

Dr. Pachauri's speech is located at http://www.ipcc.ch/Pachauri_240907.pdf.

The power point presentation is located at: http://www.ipcc.ch/UN_NYC_24thSep2007.ppt.

Both these documents are included as Appendix 14: Intergovernmental Panel on Climate Change Presentation to United Nations.

(4) WATER QUALITY

Water Intake or Pollution Discharge

BACKGROUND & POTENTIAL EFFECTS: The Project does not involve any water intake. Any activity that will result in the disturbance of over one acre of land must be evaluated for compliance with EPA's National Pollution Discharge Elimination System Construction General Permit ("CGP") if there is any potential for discharge of stormwater runoff from the construction site. As this Project proposes to disturb over one acre of land and has the potential to generate stormwater runoff that could discharge to surface waters or wetlands, coverage under the CGP will be obtained.

STUDY & MITIGATION PLAN: Consistent with the CGP, a Stormwater Pollution Prevention Plan ("SWPPP") will be prepared to evaluate potential sources of pollution, provide a strategy to prevent mobilization of soils or other pollutants, depict approaches to treat stormwater before it can be discharged from the site, and specify that qualified water quality specialists evaluate the effectiveness of the measures employed and if needed, modify best management practices as the Project moves forward.

Stormwater, Soil Erosion and Sediment Control

BACKGROUND & POTENTIAL EFFECTS: There are typically two categories of potential impacts that can occur as a result of any construction project: those that occur during the construction period (generally erosion related) and those that can occur as a result of the change in the use of the land. As described below the Project has been designed to minimize its influence on the existing hydrology and thereby minimize erosive forces and retain favorable conditions for localized treatment of stormwater that is generated on the site. Post-construction related impacts are generally associated with the intensity of use and thus the very low intensity of use of the proposed features (travel by maintenance personnel), combined with low runoff generation, is anticipated to exert little influence on receiving waters and environmental health.

STUDY & MITIGATION PLAN: Stormwater runoff, and erosion and sediment control have been addressed in the detailed plans and mitigation measures submitted in the Standard Dredge & Fill Permit Application, the Site Specific Application (attached as Appendices 2 and 3, respectively) and the SWPPP. The Site Specific Application contains a detailed set of Project plans for civil engineering measures to mitigate soil erosion from stormwater related to the wind turbine sites, access roads and other infrastructure. The design approach for new roadways has been to minimize the generation of runoff by diverting water from roadway surfaces at regular intervals before such runoff can reach erosive velocities. Any stormwater that is collected in stone stabilized ditches will be also be dispersed through the frequent culvert spacing called for in the design. This will closely mimic the natural hydrologic cycle to the extent possible and facilitate the use of less intensive and environmentally intrusive stormwater treatment measures than would be required without such design approach. Existing roads that are to be widened will be improved by stabilizing existing and new portions of such roadways with select gravel surfacing. It is anticipated that this work will lower the generation of sediments and associated delivery to surface waters and wetlands over that which exists today. Nonetheless, some sediment entrainment in runoff from the improved

roads is expected to continue, but at a significantly reduced rate. Treatment of this runoff will be provided as site conditions allow. However, locations for such treatment devices are constrained as many of the existing constructed ditchlines that lie adjacent to the existing roads now meet the criteria to be considered wetlands and despite their opportune location and functionality as stormwater treatment areas, NHDES standards prevent the use of these wetland/ditchlines for such purposes.

Wetlands Impacts

Wetland impacts are proposed at several wind turbine sites, laydown areas, substation area, switchyard area, and along the existing and proposed roadways that will be used to construct and maintain the project. Wetlands to be impacted include Palustrine forested wetlands, seasonal streams, and perennial streams.

BACKGROUND: The wetlands in the project area have been delineated by certified wetland scientists and surveyed onto project plans. The wetlands are dominated by Palustrine forested wetlands, seasonal intermittent streams and small perennial streams. Many of the wetlands are on sloping, basal glacial till or bedrock landscapes with low vegetative interspersion. Important wetland functions and values include wildlife habitat and sediment retention, based on preliminary wetland functions and values assessment using the USACE NED Highway Methodology. Historically, the wetlands in the project area have been impacted by decades of commercial logging including the construction of haul roads, log yards, and log skidder operations.

The location of the turbines on ridge lines minimizes impacts to significant perennial streams, and open and forested floodplain wetland complexes located in the valleys. Design and construction techniques will be utilized that will minimize wetland impacts by impacting wetlands previously impacted by logging whenever possible. This includes utilizing existing logging roads and skidder trails. Additionally, new access roads will be laid out to avoid wetlands and cross wetlands at their narrowest points whenever feasible. Erosion control will be important during construction to minimize sediment entering nearby wetland sites.

STUDY AND MITIGATION: Wetland Impacts will be addressed in the detailed plans and attachments to be submitted with the Standard Dredge and Fill application to the NH Wetlands Bureau. A comprehensive plan for assessing wetland impacts will include: 1. mapping and delineating wetlands; 2. classifying wetlands and vernal pools; 3. preparing an evaluation of wetland functions and values; 4. assessing wetland impacts; 5. avoiding proposed wetland impacts where possible; and 6. mitigating unavoidable wetland impacts.

Wetland impacts will be avoided whenever possible and minimized by reducing the width of access roads to the minimum required for safety and by locating towers and other structures out of wetlands. Alternative layouts and locations for towers and other structures have been investigated.

Since compensatory mitigation will be required for this project, a mitigation plan is being prepared. Several mitigation alternatives have been explored including wetland restoration, wetland creation, and upland buffer protection. The plan includes a wet-

land restoration component which will include replacement of a number of existing culverts on logging roads with open bottom culverts and bridges and restoration of stream channels. While additional wetland restoration opportunities exist such as removing existing logging yards and logging wetland crossings, they were rejected because the surrounding land will remain in commercial forestry use and the existing yards, logging roads, and skidder trails will be needed in the future for on-going forest management and logging operations.

The major component of the proposed compensatory mitigation plan involves upland buffer projection.

The upland buffer protection area proposed is a contiguous parcel of land in the headwaters of the Phillips Brook watershed approximately 660 acres in size and has been identified as an important subwatershed area of the Upper Ammonoosuc River. The proposed mitigation area is located in the northwestern portion of the site in the unincorporated town of Ervings Location and the town of Columbia. The area is at a high elevation (up to 2600 feet in elevation) and it buffers and includes important wetland complexes and portions of order 1 tributaries of Phillips Brook. Additionally, the area abuts the existing 39,000 acre Nash Stream Forest owned by the State of New Hampshire. A conservation easement will be placed on the entire parcel.

The proposed mitigation plan will substantially exceed state and federal minimum mitigation requirements and more than adequately compensate for unavoidable wetland impacts.

Surface Water Quality

BACKGROUND & POTENTIAL EFFECTS: As described above the two categories of potential effect on surface water quality are those that can occur during construction and those that relate to the use of the developed land. Total suspended solids are the potential pollutant of concern that must be addressed in both instances. To a lesser extent, gear and transformer oil are other potential pollutants as they are contained within the turbines and substations. Containment mechanisms, however, are incorporated into the design of each and these oils are therefore of much lower risk in terms of release to the environment.

Through the Alteration of Terrain Permit, Construction General Permit, and 401 process, the source, mobilization, and treatment of the aforementioned pollutants will be addressed.

STUDY & MITIGATION PLAN: Various best management practices ("BMPs") will be employed prior to and during construction to limit the mobilization of total suspended solids from disturbed surfaces. BMPs will include: mulch berms, silt fence, rock check dams, slope drains, rock stabilization of channels, seeding and mulching, erosion control matting, and temporary sediment traps. All have proven efficacy in projects characterized by steeper terrain, shallow depth to groundwater and short growing seasons. Frequent monitoring of the performance of such devices will occur and any potential vulnerabilities will be addressed in a proactive manner.

Post-construction related impacts to water quality by total suspended solids can typi-

cally be expected to be minimal with the gravel surfacing of roadways, and grass stabilization that will occur on other non-traveled portions of the Project. Nonetheless, measures will be employed on the new roads to further minimize the mobilization of solids. For example, diverters will be installed in the steeper portions of the roadway to shed water from the roadway before the precipitation can obtain sufficient velocity and volume to cause erosion of the solids from the roadway surface. During larger storm events the runoff that is generated from adjacent forested areas will be conveyed in stone-lined channels designed to retard erosive forces. Cross culverts will be located at frequent intervals to further disperse the runoff and avoid concentration of flows at any one down gradient point. Sediment traps will be located at many culvert outlets to dissipate energy, trap solids, and facilitate the removal of solids from the flow path of stormwater. Lastly, forested buffers located down gradient of roadways will be utilized to "polish" the stormwater so that fine sediments are retained within the forest floor litter. Such buffers will also provide a large area for the stormwater to infiltrate into the forest floor where it can replenish the groundwater table.

(5) NATURAL ENVIRONMENT

a. Plant Life

BACKGROUND & POTENTIAL EFFECTS: The GRP Windpark is proposed in a mountainous region of New Hampshire with elevations ranging from approximately 1,000 feet (304.8 m) to 3,400 feet (1,036.3 m). The range in elevations and, consequently, soils within the Project area results in varying plant communities. The plant communities also vary in age due to industrial forestry practices. Over the years, surrounding side slopes and valleys have undergone large scale forest harvesting activities resulting in an unevenly aged forest community consisting primarily of species typically found in northern hardwood–conifer forests, such as yellow-birch (Betula alleghaniensis), American beech (Fagus grandifolia), and sugar maple (Acer saccharum). However, high elevations (above 2700 feet or 823 m) are dominated by balsam fir (Abies balsamea) and red spruce (Picea rubens). These areas have experienced minimal forest harvesting activity.

Wind projects may potentially adversely impact plant life, particularly if rare or significant plant species are present. These impacts most commonly result from the construction of access roads, new electrical interconnection and collection lines, and the construction of an operation and maintenance building. Plant communities are affected by two types of wind project related impacts: temporary and permanent. Temporarily impacted areas, such as laydown and staging areas, will be stabilized and allowed to revegetate after construction. Permanent impacts can occur within the Project footprint due to turbine and access road placement where revegetation will not occur.

STUDY & MITIGATION PLANS: GRP Windpark's natural communities' experts, Stantec Consulting (formerly Woodlot Alternatives), continued to conduct work uninterrupted serving as project consultants, including three surveys to determine the potential impact to sensitive plant species and natural communities. These include a spring and summer 2007 Reconnaissance-Level Rare Plant Survey (**Appendix I5**), a spring 2008 Natural Community Characterization (**Appendix I6**), and a Spring 2008 Rare Plant Survey (**Appendix I7**).

The 2007 rare plant reconnaissance surveys were initiated with a review of the New Hampshire Natural Heritage Bureau's ("NHNHB") rare plant database, by town, for information on rare plant species that may occur or have occurred in the vicinity of the Project site. In addition to this review, information requests were also sent to NHNHB for specific species listings for plants identified as "sensitive species" during the database review. Soil maps, aerial photos, and bedrock geology for the Project site were also reviewed to identify areas that would likely support sensitive species. Subsequent targeted field surveys were conducted to document specific findings and assess potential impacts to sensitive plant species prior to commencing the Windpark engineering work. The purpose of the surveys was to assist in determining the Project's conceptual design in order to help avoid and minimize impacts to sensitive areas. To enhance the thoroughness of field surveys, additional potential impact locations were provided by Stantec wetland scientists based on information collected during a spring 2007 wetland and vernal pool reconnaissance survey (**Appendix I8:** Reconnaissance-Level Wetland and Vernal Pool Survey Proposed Windpark in Coos County, New Hampshire).

Reconnaissance-level rare plant field investigations were focused in areas considered to have a greater likelihood for the presence of rare plant species. The reconnaissance surveys occurred over two 2-day periods on June 27-28, 2007 and August 28-29, 2007 to ensure proper identification of flowering species. Throughout the survey periods only one rare plant species was observed. Mountain sweet cicely (Osmorrhiza berteroi) was observed in one location on the southern slope of an unnamed peak near Baldhead Mountain (on the western portion of Phillips Brook Tract). This location is approximately two miles from the nearest ridgeline proposed for wind turbines and was found on the side slope of the ridge. Furthermore, this location has since been removed from the Project layout, and it is not anticipated that an impact to this species will occur as a result of the Project. A more intensive rare plant survey of the Project components (i.e. wind turbines, access roads, and electrical facilities) was conducted during the spring of 2008, once the Project design was finalized.

In coordination with the NHNHB, spring 2008 rare plant surveys were also conducted to provide a thorough investigation of plant species within the refined Project layout. These surveys were more focused than the spring 2007 surveys and utilized current maps of the refined Project layout, consequently narrowing the search area. The desktop analysis that was conducted prior to the field surveys used the same methods as the spring 2007 surveys described above; however, further consultation with NHNHB occurred. The NHNHB used the current proposed Project layout to conduct a detailed environmental review for potential rare or sensitive plant species that could potentially be impacted by the proposed Project. The species identified as possibly occurring, based on habitat conditions within the Project site include: heart-leaved twayblade (Listera cordata), lily-leaved twayblade (Listera convallarioides), northern comandra (Geocaulon lividum), Goldie's fern (Dryopteris goldiana), large yellow lady's slipper (Cypripedium parviflorum var. pubescens), Bebb's sedge (Carex bebbii) and Loesel's twayblade (Liparis loeselii). All areas identified by NHNHB as being suitable habitat for the above-mentioned sensitive plant species were investigated. In addition to the areas identified by NHNHB, two natural community types identified during the first rare plant survey (a semi-rich mesic forest and a circumneutral hardwood forest seep) were investigated a second time to confirm the absence of their existence within the

Project footprint. These natural community types were also searched a second time because of the greater likelihood for rare plants to occur there. No rare or sensitive plant species were observed on the Project site during this survey.

As an addition to the targeted rare plant surveys and to recognize concerns expressed by regulatory agencies over impacts to high elevation (above 2700 feet or 823 m) spruce fir communities, Granite Reliable Power conducted a spring 2008 natural community characterization for all areas of the project layout (i.e. wind turbines, access roads, and electrical facilities). Natural communities were mapped using high resolution aerial photographs and information was gathered using hand held GPS units during the field survey. Field surveys were conducted in March 2008 while snow was still present; consequently, observations of the herbaceous layer were not possible. Although snow was present during this survey, the spring 2007 rare plant survey and the June 2008 rare plant survey that followed the natural community characterization allowed for confirmation of the natural community types mapped during this survey.

The Project site is located on four ridges, all with areas of the summits over 2700 feet in elevation. A total of 3,747 acres of available high elevation habitat exists on these four ridges of which only 58 acres, or less than 2%, would be impacted by the Project (**Table E**).

Table E:
Total Acres of Impact to Natural Communities above 2700′
at Granite Reliable Power's Proposed Wind Park

Location	Impact Area	Total Acres above 2700′	% of Land Area above 2700′
Dixville Peak	25	1873	1%
Mt. Kelsey	29	1667	2%
Owlhead Mtn	3	49	6%
Fish Brook Ridge	2	158	1%
Total	58	3,747	2%

As **Table E** demonstrates, the loss of habitat as a result of the Project would be minimal with respect to the amount of available habitat surrounding the Project.

i. Tree Clearing

BACKGROUND & POTENTIAL EFFECTS: The majority of the Project is sited on privately-owned land that is maintained by forest management companies that allow various degrees of public access. As a result of forestry activities, a network of logging roads and skid trails exist. Some roads are maintained year-round to support ongoing forestry activities, while others are seasonal, where access is allowed during the non "mud seasons".

Higher elevations (above 2700 feet or 823 m) are dominated by balsam fir (Abies balsamea) and red spruce (Picea rubens) forests and are mainly undisturbed from industrial forestry practices. However, the surrounding side slopes and valleys have experienced large scale forest harvesting activities resulting in an uneven aged forest community consisting primarily of yellow-birch (Betula alleghaniensis), American beech (Fagus grandifolia), and sugar maple (Acer saccharum), species typically found in northern hardwood–conifer forests.

At lower elevations (below 2700 feet), forest harvesting has resulted in a mix of age classes with stands of both regenerating hardwood and softwood species.

The potential effects of tree clearing beyond that of the removal of trees can be in the form of ground scarification, wetland disturbance, and erosion. BMPs and SWPPP measures will be utilized during tree clearing activities associated with the Project.

STUDY & MITIGATION: Alteration of terrain at the Project will be addressed in the "Site Specific" permit application included as **Appendix 3**. As required under the Site Specific permit application, tree clearing will be documented in the "Notice of Intent to Cut" form, submitted to the town or unincorporated place before the commencement of work. The extent of tree clearing for the Project will be minimized by utilizing existing disturbed areas whenever practicable. This includes utilizing approximately 19 miles (30.6 km) of existing roads, locating the collection line and the electrical interconnection line along existing roads, and utilizing recent timber clear-cut areas for temporary construction and permanent operational facilities. Clearing activities are intended to take place while frost is on the ground in order to minimize ground scarification and soil disturbance. After construction of the Project, trees and other plant life will be allowed to re-grow in the areas that were cleared for use by large construction equipment and in connection with construction of individual turbines.

b. Wildlife

BACKGROUND & POTENTIAL EFFECTS: As discussed above, this part of New Hampshire is forested and mountainous with substantial commercial forestry practices occurring regularly over the last hundred years. The ongoing forestry activities have resulted in a patchwork mosaic of uneven aged forest stands and different areas of plant species composition in different areas and elevations, resulting in a diversity of habitats that could be utilized by a variety of wildlife species. Within these general wildlife groups, some species are present in the area as resident individuals or populations while others use the area during migration or while dispersing to different habitats depending on seasonal changes. Not all species present will be affected by the Project. Fish, in particular, are unlikely to be impacted because of the lack of populated habitat on the ridge tops.

The potential effects on wildlife from the construction and operation of the Project can be both direct and indirect in nature. Direct impacts from the Project refer to fatalities that could occur from collision with the wind turbine blades or monopole tower (mainly birds and bats). Indirect impacts refer to habitat loss and fragmentation, and the disruptions in foraging or breeding behavior caused by access roads, the wind turbines' physical presence and operation, and lighting of some turbines, etc. Displacement and avoidance of the area and possible changes in migratory patterns may be caused by the landscape alterations and operation of the Project.

When considering the potential effects of the Project on wildlife, it is important to recognize that in comparison to other energy sources that could be built to meet the demand for electricity, wind power's impact on wildlife is minimal. The list of environmental and wildlife impacts of other energy sources is long and varied, as discussed in Section (h)(3).

Study & Mitigation

Wildlife and wind turbines can successfully coexist. However, endangered or threatened wildlife species that may use or reside at the Project Site are of concern due to their already low populations. Consultations with the New Hampshire Fish and Game Department ("NHFGD") and the United States Fish and Wildlife Service ("USFWS") identified several state and federally-listed endangered or threatened species that are known to occur or have historically occurred within or in the vicinity of the Project site. In addition to these, NHFGD also identified some species of state conservation concern that may occur at the Project site. These include: bald eagle (Haliaeetus leucocephalus) (federally-threatened and state-endangered); Canada lynx (Lynx canadensis) (federally-threatened and state-endangered); peregrine falcon (falco peregrinus) (state-endangered); northern harrier (Circus cyaneus) (state-endangered); pied-billed grebe (Podilymbus podiceps) (state-endangered); three-toed woodpecker (Picoides tridactylus) (state-threatened); pine marten (martes Americana) (state-threatened); common loon (Gavia immer) (state-threatened), and osprey (Pandion haliaetus) (state-threatened). In addition to the above mentioned threatened and endangered species, several species are listed as "conservation concern" in New Hampshire and include: spruce grouse (Dendragapus canadensis); Bicknell's thrush (Catharus bicknelli); northern goshawk (Accipiter gentillis); wood turtle (Clemmys insculpta); leopard frog (Rana pipiens) and small-footed bats (Myotis leibii).

A number of wildlife surveys were conducted to address concerns for state or federally-listed threatened and endangered wildlife species. These surveys used standard methods and equipment for pre-construction surveys for wind projects in New England. They were designed in coordination with the NHFGD and include surveys for mammals, birds, bats, wetlands and vernal pools. A description of the methodologies and results of these surveys is provided in greater detail in the following sections.

Adverse wildlife impacts from the Project will be minimized using such measures as minimizing clearing, limiting human activity, and in some cases post-construction monitoring. More detailed potential effects and study plans are described in the species-specific sections to follow.

i. Birds

BACKGROUND & POTENTIAL EFFECTS: The Project has the potential to have direct and indirect impacts to birds that are either resident at or migrating through the Project site. Direct impacts are fatalities caused by collision with wind turbines, whereas indirect impacts refer to habitat loss and fragmentation, disruptions in foraging or breeding behavior caused by access roads, the wind turbines' physical presence and operation, lighting of some wind turbines, etc. Displacement and avoidance of the area and possible changes in migratory patterns may be caused by the landscape alterations and operation of the Project.

In recent years the expansion of wind power development has identified a need to evaluate potential effects of wind power development on wildlife and wildlife habitats. Since nocturnally migrating songbirds are the most abundant flying vertebrates at night during spring and fall migration periods, they have been the most frequently reported

bird fatalities at commercial wind facilities in the United States.

STUDY & MITIGATION: Three seasons of nighttime migration surveys were conducted over a two year period using marine radar to address the magnitude, height, and direction of nocturnal songbird migrants passing through the Project site during spring and fall migration. Breeding bird surveys were also conducted to identify the presence/absence of rare, threatened, or endangered species and to determine the relative abundance of species that breed at the Project site. A fall 2007 diurnal raptor migration survey was conducted to determine the number, species, and flight heights of raptors migrating through the Project site. All of these surveys were conducted to provide insight into the Project's potential impacts to birds.

Rare, threatened, or endangered bird species that were documented at the Project site during these surveys include the peregrine falcon (state-listed endangered) and three-toed woodpecker (state-listed threatened). Species of conservation concern in the state include Bicknell's thrush (Catharus bicknelli) and the Rusty blackbird (Euphagus carolinus). No federally-listed threatened or endangered birds are likely to breed within the surveyed area.

To address magnitude, height and direction of songbird migrants' flight, three seasons of nocturnal radar surveys were conducted by Stantec Consulting/Woodlot Alternatives. These surveys include:

- Appendix 19: Fall 2006 Radar Surveys of Nighttime Migration Activity at the Proposed Windpark in Coos County, New Hampshire.
- Appendix 20: Spring 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at Proposed Windpark in Coos County, New Hampshire.
- Appendix 21: Fall 2007 Radar, Visual and Acoustic Survey of Bird and Bat Migration at the Proposed Windpark in Coos County, New Hampshire.
- Appendix 22: Coordinated Survey Results for proposed Granite Reliable Power and North Country Wind Projects in Coos County, New Hampshire.

The three seasons of nocturnal radar surveys documented the passage rate (targets/km/hour), flight height (m), and flight direction of nocturnally migrating songbirds passing over the Project ridgelines. Within the three seasons surveyed, similar trends were observed and migration metrics were consistent between seasons. See **Table F**.

Table F:

Comparison of Three Seasons of Nocturnal Radar Surveys – Granite Reliable Wind Project

Season	Passage Rate (t/km/hr) with range	Flight height (m) with range	Flight Direction	% Below 125 m
Fall 2006 *	469 (2 to 1098)	455 (310 to 638)	223°	1%
Spring 2007	342 (2 to 870)	332 (81 to 583)	76°	14%
Fall 2007	366 (54 to 1234)	343 (179 to 636)	223°	15%

* The fall 2006 survey was not conducted from the summit of Owlhead Mountain due to limited access during this time period. For this season the survey was conducted approximately 800' lower in elevation, likely resulting in higher flight heights and a lower % below 125 m.

The mean flight height combined with the mean flight direction suggests that migrants use a broad front migratory path across the Project site and that areas of concentrated migration corridors are not likely to occur within its bounds. The results of the surveys were also consistent among seasons, indicating that similar migration characteristics could be expected year to year. Furthermore, the consistency in mean flight heights between the two seasons and locations implies that risk of collision with the proposed 410 feet (125 m) tall wind turbines from night migrating birds through the Project site is minimal.

The New Hampshire Audubon Society conducted a spring 2007 Breeding Bird Survey (Appendix 23: Breeding Bird Survey for Proposed Granite Reliable Windpark Coos County, New Hampshire) and a Spring 2008 Breeding Bird Survey at Dixville Peak (Appendix 24: Breeding Bird Survey for Proposed Granite Reliable Windpark Coos County, New Hampshire, Dixville Peak Supplement) prior to the final Project design, which was based on the conceptual layout of wind turbine strings and electric collection system design. During this survey no confirmed observations of state-listed threatened or endangered species were detected. There were unconfirmed detections of the state-threatened three-toed woodpecker along the ridgeline of Mt. Kelsey. These observations were not confirmed due to the possible presence of a similar species in the area, the black-backed woodpecker (Picoides arcticus), which utilizes similar habitats (high elevation spruce/fir with standing snags) and emits similar vocalizations as the three-toed woodpecker.

The breeding bird surveys did document the presence of two state-listed species of special concern. Bicknell's thrush and Rusty blackbird were both observed within areas of wind turbine strings. The Bicknell's thrush prefers dense, stunted, spruce/fir forests near tree line at higher elevations and was observed on Mt. Kelsey, Fishbrook Ridge, and Whitcomb Mountain. The Rusty blackbird prefers spruce/fir or spruce-fir-northern hardwood forest stands on the edges of streams, ponds, bogs, fens, and beaver flowages in NH and was observed in two locations on the south end of Fishbrook Ridge and the northwestern area of the Phillips Brook Tract.

It is possible that permanent habitat loss and fragmentation will occur for breeding birds, but it has been minimized and mitigated through careful site design (i.e., avoiding wetlands and large areas of mature forest, wider spacing of wind turbine sites burying the collection system along the ridgeline access road, minimizing the permanent footprint of Project components to the extent practicable, and restoration of all temporarily disturbed areas).

To address potential concerns for raptors in the Project Site, a fall 2007 raptor migration study was conducted (Appendix 21: Fall 2007 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Proposed Windpark in Coos County, New Hampshire). The results of this study documented low passage rates (42 individuals in total) in comparison to other established hawk watch sites in the region. The species observed during the survey were common migrants through the area. The most common species observed were red-tailed hawk (Buteo jamaicensis) (19 individuals) and turkey vulture (Cathartes aura) (7 individuals). However, two state-threatened species were observed flying over the Project site during the raptor survey. These include the Cooper's hawk

(Accipiter cooperii), and Osprey (Pandion haliaetus). The red-shouldered Hawk (Buteo lineatus), a species of special concern in the state, was also observed at the site. Although these species were detected during the survey, they appeared to be migrating through the area rather than residing there.

With the advent of more post-construction wind fatality studies, data are beginning to demonstrate that risk to migrating raptors is considered to be low. Newer windparks have much lower raptor density and wider-spaced turbines, taller tubular towers to minimize perching opportunities, and blades that spin slowly enough to be visible by raptors even at high wind speeds. [27] **Table G** below provides data from several post construction mortality surveys conducted in the U.S. in which very few raptor mortalities have been reported.

Table G:
Raptor mortality found during post construction mortality surveys at wind farms in the U.S.

Location	Study Period and Species	Number of Fatalities	Reference
Buffalo Ridge, MN	1994-1995	0	Osborn et al. 2000
Buffalo Ridge, MN	1996-1999	1 red-tailed hawk	Johnson et al. 2002
Searsburg, VT	1997	0	Kerlinger 2002
Foote Creek Rim, WY	1998-2002	1 Northern harrier, 3 American kestrel, 1 short-eared owl	Young et al. 2003
Vansycle, OR	1999	0	Erickson et al. 2000
Somerset County, PA	2000	0	Kerlinger 2006
Nine Canyon, WA	2002-2003	1 American kestrel, 1 short-eared owl	Erickson et al. 2003
Klondike, OR	2002-2003	0	Johnson et al. 2003
Mountaineer, WV	2003	1 red-tailed hawk, 2 turkey vultures	Kerns and Kerlinger 2004
Mountaineer, WV	2004	1 sharp-shinned hawk, 1 turkey vulture	Arnett et al. 2005
Myersdale, PA	2004	0	Arnett et al. 2005
Top of Iowa, Iowa	2004	1 red-tailed hawk	Koford et al. 2005
Buffalo Mountain, TN	2005	0	Fiedler et al. 2007
Maple Ridge, NY	2006	1 American kestrel	Jain et al. 2007

Because New Hampshire lies at the northern range of many species' breeding grounds, there are fewer birds passing through New Hampshire compared to other more southern locations in the North American hawk flyways.

GRP is continuing its efforts to work with the NHFGD and USFWS to minimize potential adverse impacts to avian species.

ii. Bats

BACKGROUND & POTENTIAL EFFECTS: Wind energy projects also present a concern for bat species. The potential effect of an increase in mortality to the species is of concern because some wind projects in the central Appalachian states have documented high

[27] Johnson, Erickson, Strickland, et al. "Collision Mortality of Local and Migrant Birds at a Large-Scale Wind-Power Development on Buffalo Ridge, Minnesota." Wildlife Society Bulletin, Vol. 30, No. 3 (Autumn, 2002), pp. 879-887.

bat mortality rates. Because bats have a slower reproductive rate, population recovery periods are significantly longer than for most bird species. However, northern New Hampshire is at the northern end of the range of most bat species in the northeast, potentially resulting in fewer bat species and lower regional populations.

Those bat species of concern in New Hampshire are tree-roosting bats that migrate or have shown to be impacted by other modern wind facilities. In New Hampshire only one bat species is listed as endangered: the small-footed bat (Myotis leibii) from the genus Myotis. State-listed species of special concern include Eastern pipistrelle (pipistrellus subflavus), Eastern red bat (Lasiurus borealis), Hoary bat (Lasiurus cinerus), and silver-haired bat (Lasionycteris noctivagans). A federally-endangered species, the Indiana bat (Myotis sodalis), could also occur in New Hampshire; however, the USFWS considers it unlikely due to the northern latitude of the GRP Windpark and the lack of suitable habitat in this region.

GRP Windpark wildlife experts have consulted with the NHFGD and the USFWS. While the Project has the potential for direct and indirect effects on bats, these are considered low.

STUDY & MITIGATION: The Project has conducted three full seasons of acoustic bat detector surveys to document bat activity at the site and timing of activity throughout the year. Bat activity documented within the Project site was found to be low throughout most of the year and the species detected during the surveys are common to this part of New Hampshire. Appendices 19, 20 and 21 provide detail of the study results.

iii. Other wildlife

BACKGROUND & POTENTIAL EFFECTS: Other wildlife that may potentially be affected by construction or operation of the Project include mammals (other than bats), fish, reptiles, and amphibians. GRP wildlife experts, in consultation with the NHFGD, deemed that fish and amphibians were not likely to be adversely impacted. Two mammals, however, pine marten and canada lynx were of concern. Pine marten is listed as endangered in New Hampshire and canada lynx is federally-listed as threatened and state-listed as endangered. The potential indirect impact to these species would most likely be due to habitat loss and avoidance. Although impacts could occur from vehicle collisions on access roads, existing vehicular and forest harvesting activities on the property do not indicate that this is a significant risk. Limiting vehicle traffic once the Project is in operation could minimize direct mortality from vehicle collisions.

Limited, temporary, adverse impacts to wildlife may occur due to incidental injury and mortality from construction activity and vehicular movement, construction-related silt and sedimentation effects on aquatic organisms, dredge and fill of wetlands, stream crossing disturbance, habitat disturbance associated with clearing and earth moving activities, and displacement due to increased noise and human activities.

Long term operational impacts could include habitat loss, fragmentation, or displacement. A total of approximately 203 acres of wildlife habitat will be permanently lost due to the Project operational footprint (i.e., converted from timber areas to built facilities).

STUDY & MITIGATION PLAN: In consultation with NHFGD and USFWS, GRP contracted with Stantec to conduct a winter track survey in 2007 to document the presence/absence of pine marten and lynx within the Project site (Appendix 25: Winter Track Survey at Proposed Windpark in Coos County, New Hampshire). Surveys were designed to target the presence of pine marten on the ridgelines; area searches were also conducted by vehicle and snowmobile to determine the presence of Canada lynx. Pine marten's presence was detected and no Canada lynx tracks were observed.

Careful site design (e.g., utilizing existing roads, avoiding sensitive habitat, and minimizing disturbance to the extent practicable) reduces impacts related to construction activity. In addition, construction contractors will be required to assure that all work remains within the designated construction limits.

(6) PUBLIC HEALTH AND SAFETY

a. Ice shedding

BACKGROUND & POTENTIAL EFFECTS: In northern climates such as New Hampshire, the potential for ice shedding from wind turbine blades needs to be considered in connection with public safety issues. Ice shedding occurs when built-up ice on a wind turbine is released due to aerodynamic and centrifugal forces or a change in weather. The frequency and nature of ice shedding depends heavily upon weather and wind conditions and on the operation and control system of wind turbines.

Green Mountain Power Corporation's Searsburg Windpower Facility has been operating for over 10 years in southwestern Vermont at elevations comparable to the Granite Reliable Power Windpark. The Searsburg area experiences heavy winter icing conditions similar to the GRP Project areas. Ice shedding has not been a public safety problem for the Green Mountain Power Corporation Searsburg Windpower Facility. Common sense solutions to potentially dangerous situations have been implemented by maintenance personnel. These solutions include limiting the general public's access to the site and operational adjustments.

Because the Project will be situated entirely on private land, where access by the general public can be controlled, the risk to the general public due to ice shedding is very minimal. Further discussion of public access concerns is found in Section (j)(1): Local land use.

STUDY & MITIGATION PLANS: Several research institutions have analyzed the risk involved with wind turbine operation in cold climates. The most widely referenced scientific study on icing is "Risk Analysis of Ice Throw from Wind Turbines" (2003) by Henry Seifert et. al. from Deutsches Windenergie-Institute GmbH in Cuxhaven, Germany. Another institution, the International Energy Agency Wind Research Annex XIX, was established in order to gather international information on wind turbine icing and cold weather generation. Compilations of the data collected on technical solutions and cold weather operational experience from all around the globe are contained in its studies "State-of-the-art of Wind Energy in Cold Climates" (April 2003) and "Expert Study Group on Wind Energy Projects in Cold Climates" (2005). The Seifert study is discussed in further detail below and is included as Appendix 26.

All studies recommend, in the interest of public safety, the use of caution signs to alert the public to danger in the event of ice shedding. In addition, the supervisory control and data acquisition ("SCADA") system will monitor sensor temperatures and automatically shut the turbine down and send an alarm to the control room if predetermined set points are exceeded as a result of icing conditions.

The primary mitigation measure to counteract the dangers of ice shedding is to train maintenance personnel in the proper safety procedures that reduce danger to themselves and others as they conduct routine maintenance work.

While the access roads can be controlled, it is possible that the public could reach these roads in the winter via existing trails or logging roads. Dangers presented to the general public will be limited to those areas where public access exists in the form of cross-country ski trails and snowmobile trails in close proximity to the wind turbines as described in **Figure 27**. Signage will be installed at appropriate trail junctions or headers to warn users of the potential ice shedding risk from wind turbines.

Trained maintenance technicians will also enforce procedures aimed at minimizing risk to the general public, such as maintaining caution signage, and closing and locking gates after passing through to keep the public at a distance from the wind turbines, particularly in the winter time.

b. Lightning strikes

BACKGROUND & POTENTIAL EFFECTS: Although wind turbines do not actually attract lightning, due to their height and conductive components, wind turbines and associated control and interconnection equipment are susceptible to either a direct or an indirect lightning strike (as are many other types of tall metal structures). As the industry has accumulated experience with this rare occurrence over the past decade, it has been extensively studied and substantial progress has been made to reduce or eliminate damage or interruption of normal operation resulting from lightning strikes.

STUDY & MITIGATION PLAN: The Project wind turbines are equipped with a state-of-the-art "total lightning protection" system, adhering to the International Electrotechnical Commission (IEC) 1024-1 standard. This system conducts the lightning from both sides of the blade tip down to the root joint and from there to the nacelle, tower and earthing system. Therefore, blade failure is prevented and electrical component damage is avoided.

A benefit of the Project being sited in a remote location is that it reduces the potential public safety concerns related to lightning.

c. Tower collapse/blade throw

BACKGROUND & POTENTIAL EFFECTS: While tower collapse/blade throw incidents have occurred, they are rare and are of minimal danger to Project personnel. Instances of blade throw and tower collapse were reported mostly during the early years of the wind industry. Technological improvements and mandatory safety standards during turbine design, manufacturing and installation have largely reduced such occurrences.

STUDY & MITIGATION PLAN: The remote nature of the wind turbine sites effectively mitigates many public safety concerns.

d. Stray voltage

BACKGROUND & POTENTIAL EFFECTS: Stray voltage is a low level of electrical current that can occur between two points on a grounded electrical system and is a concern usually raised by livestock farmers. Stray voltage can occur from a damaged or poorly connected wiring system, corrosion on either end of the wires, or weak/damaged wire insulation materials.

Study & Mitigation Plans: Proper grounding of wires eliminates occurrences of stray voltage and thus stray voltage is not considered to pose an unreasonable adverse effect.

e. Fire

BACKGROUND & POTENTIAL EFFECTS: Although wind turbines contain relatively few flammable components, the presence of electrical generating equipment and electrical cables, along with various oils (lubricating, cooling, and hydraulic) does create the potential for fire as with any electric generation facility. This, in combination with the elevated location of the nacelle and the enclosed space of the tower interior, makes response to a fire difficult.

STUDY & MITIGATION PLAN: While fires associated with wind turbines are extremely rare, wind turbines contain built-in fire safety systems that minimize the chance of fire. Fire protection features of the turbine include components in the nacelle that monitor bearing, oil and nacelle temperatures. These components will be connected to the turbine SCADA system. The SCADA system will monitor sensor temperatures and automatically shut the turbine down and send an alarm to the control room if predetermined set points are exceeded. In addition to the monitoring system, each nacelle and each service vehicle is equipped with a fire extinguisher. The remoteness of the Granite Reliable Power Windpark, together with the development of an appropriate fire protection plan, will minimize risks to the public.

f. Aviation safety risks (airspace issues)

BACKGROUND & POTENTIAL EFFECTS: The Federal Aviation Administration ("FAA") has oversight of any object that could have an impact on the navigable airspace or communications/navigation technology of aviation (commercial or military) or Department of Defense ("DOD") operations. In general, upon receipt of the Notice of Proposed Construction (FAA form 7460-1) from the developer, the FAA working with the DOD, will examine the applicant's proposal and identify any possible airspace or safety infringements caused by the Windpark. [28] The FAA analysis will consider several types of airspace impacts: (1) imaginary surface penetration, (2) operational impacts and electromagnetic interference, and (3) obstruction warning light arrangement.

STUDY & MITIGATION PLANS: *Imaginary Surface Penetration.* The FAA has established quantitative parameters (distances and angles) that form the basis for determining if a proposed structure will pose a hazard to navigation, take off, or landing with respect to nearby airports. Granite Reliable Power Windpark employed the services

[28] The filing of FAA Form 7460-1 is usually done after all possible project design alterations have been made in the permitting and final engineering process. The FAA analysis must consider the exact location of each turbine in its determination.

of Aviation Systems, Inc. of Torrance, California to examine the Project region for any potential concerns. The nearest airports to the Project are the Errol Airport and the Berlin Municipal Airport located in the valley floors to the east and southeast of the Project at distances of 7.5 miles (12.1 km) and 14.6 miles (23.5 km) respectively from the nearest wind turbines sites. The results of the analysis using Vestas V90 wind turbines indicated there would be no airspace surface penetration resulting from this Project.

GRP will also apply to the FAA for an official Determination of No Hazard for each wind turbine location prior to construction that will supersede other analyses and specify recommended lighting plans as discussed below.

OPERATIONAL IMPACTS AND ELECTROMAGNETIC IMPACTS. Experience has shown that wind turbines can impact performance of air traffic control or air defense radar. This threshold for interference is generally 15 miles (24.1 km), and there are no such radar installations this close to the wind turbine sites. The FAA is not expected to identify any operational or electromagnetic impacts resulting from the Project.

OBSTRUCTION LIGHTING. In order to reduce risks to aviation, the FAA recommends the lighting of wind turbines over 200 feet (61 m) high (to the top arch of the blades). Because the Windpark wind turbines exceed this threshold, the Project will submit a Form FAA 7460-1 Notice of Proposed Construction as discussed above, and will receive a Determination of No Hazard prior to the installation of the wind turbines.

In 2005, the FAA completed a 2-year national review of criteria for lighting windpower projects. The resultant modifications to previously redundant and excessive lighting criteria have been incorporated into revisions of the FAA Advisory Circular AC 70/7460-1K CHG 2 (2/1/07), included as Appendix 27. In general, turbines must be painted white for daytime visibility. At night, it is recommended that a single, medium intensity, red light be mounted atop the wind turbine nacelle at the borders of the wind turbine string and every half-mile within.

OPERATIONAL IMPACTS: The Project will apply for Determination of No Hazard to air navigation rulings from the FAA for all wind turbine structures, and the FAA will perform an aeronautical study to determine "that the structure does not exceed obstruction standards and would not be a hazard to air navigation." As a condition of the FAA's determination of no hazard, the Project must comply with FAA lighting standards, as referenced above.

g. Noise

BACKGROUND & POTENTIAL EFFECTS: Wind turbines are mechanical devices that emit sound when operating. There are essentially three sources of sound: 1) the rotor blades passing through the air (a swishing aerodynamic sound); 2) the gearbox or transmission; and 3) the yaw drive responsible for orienting the turbine to the wind at all times. Of these, the aerodynamic sound source is normally the only one that is audible at any significant distance from a typical wind turbine. When wind turbines are installed close to residences and aerodynamic noise from the nearest wind turbine exceeds the natural background sound level, annoyance can sometimes result, particularly when this noise is new and unfamiliar.

In this case, because of the unusually large geographic buffer distances between the GRP Windpark and the nearest residences, no unreasonable adverse impact is expected. The nearest year-round residence will be over 2.9 miles (4.7 km) from any of the wind turbines and most other residences will be considerably farther. At such distances Project sound is likely to be well below the background level and therefore inconsequential.

The Balsams Wilderness Ski Area is the commercial recreational land use closest to the Project. A modeling analysis conducted by sound experts, Hessler Associates, Inc. (Appendix 28: Environmental Sound Survey and Noise Impact Assessment) indicates that noise from the Project is highly unlikely to constitute an unreasonable adverse impact.

Construction activities will generate more noise than Project operations but will be temporary in nature and occur during daytime working hours. Because of the very large distances between the wind turbine sites and any of the nearest residences, the Environmental Sound Survey and Noise Impact Assessment estimates maximum construction sound levels from the site to be less than 22 dBA at any full-time residence. Such an extremely low sound level is far below the normal background sound level, even during calm and quiet conditions, and therefore highly unlikely to be audible.

Although potential for impact from Project sound on wildlife has been suggested, no existing studies or survey methods/metrics have been identified to the knowledge of Granite Reliable Power and its wildlife consultant experts.

STUDY & MITIGATION PLAN: The Environmental Sound Survey and Noise Impact Assessment, included as Appendix 28, documents a field survey of existing sound levels at predetermined locations along with a computer model of predicted sound levels from the Vestas V90 wind turbines.

Using conservative assumptions, the sound assessment concludes that sound emitted by the Project will have no unreasonable adverse impact on the human environment. With the possible exception of blasting, noises from temporary construction activities are unlikely to be audible at the nearest residences. In summary, no unreasonable adverse impacts are expected from sounds produced by the GRP Windpark.

Additional information on wind turbines and noise from the American Wind Energy Association has been attached as Appendix 29: AWEA Facts about Energy and Noise.

(j) EFFECTS ON THE ORDERLY DEVELOPMENT OF THE REGION; ESTIMATE OF IMPACTS OF CONSTRUCTION AND OPERATION OF THE FACILITY

(1) Local land use

a. Commercial timber production

The Project is proposed to be constructed on commercial forest land and on an adjacent parcel of private land. The two primary tracts of land which make up this commercial forest comprise over 83,744 acres. The properties are owned and actively managed by professional forest management organizations for

commercial timber production. Timber activities have occurred on the properties for over one hundred years. Local landscape features reflect these management practices through a diverse array of forest cover types and ages. Haul roads have been built over time to accommodate the transportation of timber harvesting equipment to and from the area being harvested and the transportation of the harvested timber. An example of the present land use is provided in a photograph of recent timber harvesting activity on Mt. Kelsey included as **Figure 25**.

Figure 25: Photograph of existing timber harvesting activities on Mt. Kelsey.

Existing road structure is visible in the photograph included as **Figure 26**. Currently there is estimated to be over 140 miles (225km) of existing roads on the Phillips Brook parcel alone, of which approximately 19 miles (30.6 km) will be used during the construction and operation of the Project.

The only direct loss of land for commercial harvesting includes the areas associated with the wind turbine strings, new access roads, the electrical collection system including substation, interconnecting switching station and power lines, and permanent operation and maintenance facilities. These improvements will result in the permanent conversion of approximately 203 acres of commercial forest to wind power use; most of the impacted area is low quality, wind-blown stands along ridgelines and has little commercial value.

The GRP Windpark will only have a minimal effect on commercial forestry activities. In addition, improvements to the existing road network and the construction of new roads may enhance the landowners' access to their forest land. While construction activities may also temporarily affect existing forestry operations, GRP will closely coordinate with the landowners regarding equipment movement logistics and various construction activities.

The Project is thus compatible with, and complementary to, the prevailing and planned future commercial forestry use of this land. In addition, wind development may help sustain forestry use by providing another source of revenue to owners, thereby helping to shore up marginal forestry economics in down years.

b. Outdoor recreation

Recreational activities in Coos County include hiking, snowmobiling, canoeing, kayaking, boating, camping/yurt experiences, all terrain vehicle riding, hunting, fishing, and multiple winter sports. Nearby designated recreational facilities or areas include the Dixville Notch State Park, the Nash Stream Forest, Mollidgewock State Park, Coleman State Park and the Androscoggin Wayside Park. Several water bodies provide recreational opportunities near the Project including: the Androscoggin River, Millsfield and Akers Ponds, Dummer Pond, Pontook Reservoir and Lake Umbagog, which is approximately 10 miles (16 km) away straddling the Maine – New Hampshire border. The Balsams Grand Resort Hotel offers recre-

ational opportunities, as does the Colebrook Country Club. Additionally, there are numerous small trails, logging roads, streams and ponds used for various recreational purposes in the vicinity of the Project. Specific recreational activities are described in the following sections and a map of recreational trails near the GRP Windpark is included in **Figure 27**.

The landowners of the private tracts of land occasionally accommodate public recreational uses of their land in accordance with contemporary corporate policies. These policies are generally designed to permit public access to the land for certain recreational purposes, while encouraging public safety and protecting the owners' ability to continue commercial timber activities safely and efficiently. Various types of signage are maintained by the owners to direct these activities to appropriate trails, roads or locations. Gates or similar impediments are used to control motorized access to remote parts of the property. The wind turbines are located along the upper reaches of the ridgelines, generally distant from public uses, and will not significantly diminish recreational uses on these private lands.

Figure 26: Existing Haul Road used for logging

Specific recreational activities are described in the following sections.

i. Motorized trail systems: snowmobile and all-terrain vehicle

Local snowmobile clubs maintain and utilize trail systems in the vicinity of the Project. These clubs include: the Colebrook Ski Bees Club to the northwest; the Umbagog Snowmobile Association of Errol to the east; the Groveton Trailblazers of Stark to the southwest; and the Milan All Weather Riders to the southeast. These groups maintain interconnected and numbered trails, some of which are used in the non-winter months by all-terrain vehicle ("ATV") riders and hikers. The Project is in proximity to multiple snowmobile trails as shown in **Figure 27**.

The Project will have only a limited impact on snowmobiling and all-terrain vehicle riding in the region. As discussed in Section (i)(6)a, signs will be posted at trail junctions with snowmobile trail #134 and 1000 ft (304 m) from each wind turbine, warning trail users that they are approaching a wind turbine area.

ii. Non-motorized trail systems: hiking, cross-country skiing and snowshoeing

There is a fairly extensive system of hiking, cross-country skiing and biking trails in the Dixville Notch area. Within Nash Stream Forest there are hiking trails on North and South Percy Peaks and on Sugarloaf Mountain. The Project would

not be visible to backcountry skiers or snowshoers in lower elevations within the Forest. The Cohos hiking trail extends from Notchland in Hart's Location in New Hampshire to the Canadian border (about 162 miles (260.7 km)) and connects with

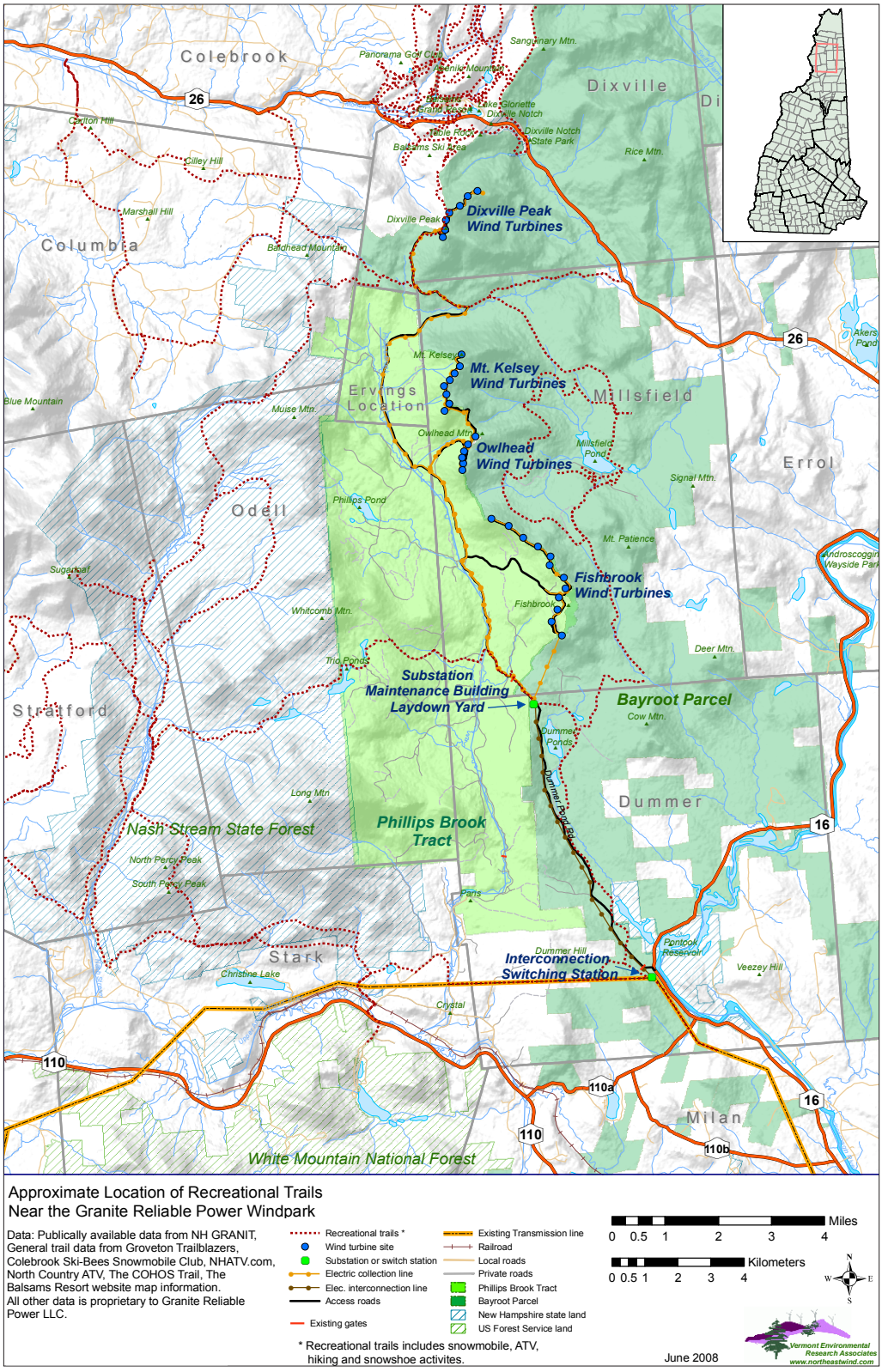


Figure 27: Recreational uses in the vicinity of the Granite Reliable Power Windpark

trails in Quebec extending from the Megantic area. This trail has been recently developed and is still evolving in places.

Although the use of the recreational activities within the area would be minimally affected by the Project, there would be some visual impacts. The section of the Cohos Trail over Dixville Peak will overlap in some areas with the Project but the overall effect on the recreational experience will be minimal. Views are discussed in detail in Appendix 11: Granite Reliable Power Visual Impact Assessment. The results of this report indicate that visual impacts would not be unreasonably adverse; views of the wind turbines generally include only a portion of the Project.

iii. Other recreational uses

CANOEING, KAYAKING AND BOATING. Boating, kayaking and canoeing are made possible in the area by public access areas and/or boat launches at Millsfield Pond, at Lake Umbagog, along the Androscoggin River, and at other smaller ponds. There are also small boating, canoeing and kayaking opportunities in the small lakes, ponds and streams closer to the Project site. The Project will not directly inhibit any of these water-based recreational activities, other than through limited visual impacts. Visibility of the Project from the Androscoggin River is extremely limited. There would be no visibility from lakes and ponds within Nash Stream Forest. The closest views of the Project would be from Millsfield and Dummer Pond. Portions of the Project would also be visible from the eastern shore of Akers Pond, and from the northern half of Lake Umbagog at greater distances (8 to 15 miles away (12.9-24.1 km)).

CAMPING AND YURT EXPERIENCE. There are several local campsites in the region including: the Notch View Country Inn and RV Resort in Colebrook, the Cedar Pond Campground in Milan, and the Log Haven Campground in Millsfield. Camping is also available at the Umbagog State Park, the Mollidgewock State Park in Errol, the Milan Hill State Park, and the Coleman State Park in Stewartstown. The Project would not be visible from any of the public campgrounds, but views of Dixville Peak are likely from the Notch View Campground and RV Resort in Colebrook.

Additionally, a local business, Phillips Brook Backcountry Recreation, has installed yurts at certain locations on the Bayroot Tract. These yurts are rented out to those wishing a remote, backcountry experience. The nearest yurts to the wind turbines are those in the vicinity of Dummer Pond. The Project does not anticipate any negative impacts on camping or yurt experiences.

HUNTING AND FISHING. There are many fishing opportunities in the vicinity of the Project including at Millsfield Pond and in Phillips Brook. The multitude of streams and ponds in the region provides an additional vast fishing resource in the area.

The Project is not expected to have a significant impact on hunting and fishing opportunities.

WILDLIFE AND BIRD WATCHING. Another recreational use of land in the region is for wildlife and bird watching. Route 26, to the north of the Project, has been deemed a "New Hampshire Scenic Byway". The stretch along Route 26 is only

a portion of the 98 mile (157 km) Moose Path Trail. Along this route south of Dixville Notch State Park and the Balsams Grand Resort Hotel, there is a wildlife viewing platform where motorists can stop and obtain information about area wildlife. The Project would not be visible nor would it inhibit birding or viewing wildlife from the platform. There would be other opportunities for views of the Project along portions of Route 26 between Signal Mountain Road and Errol. These are described in the Aesthetic Impacts Section (i)(1) along with views from other state and town highways.

ALPINE SKIING AND MOUNTAIN BIKING. The Balsams Grand Resort Hotel offers sixteen alpine skiing trails in the winter and allows trail access to mountain bikers in the summer. These trails and all development associated with this alpine ski area are on the northwest-facing slope, and face away from the Project site. Very limited views of the Project are possible from the top of lifts on Dixville Peak but these are not expected to interfere with the recreational experience. The Balsams Grand Resort Hotel manages a number of other mountain biking trails north of Route 26. There may be limited views from some of the trails toward the Dixville Peak turbines. These are described in the Aesthetic Impacts Section (i)(1).

Recreational users along Dixville Peak will experience minimal impacts on their recreational activities. Other outdoor recreational activities in the vicinity of the Project will not be disrupted or adversely impacted by the Project.

Indirect recreational effects, including views of wind turbines, will occur from vantage points along some trails and water bodies in the region, but none would result in unreasonable impacts on the recreational experience. A more detailed discussion of visual impacts is included in Section (i)(1) and in the Visual Assessment, included as Appendix 11. The Visual Assessment evaluated many of the recreational facilities and locations in the region including parks, lakes, ponds, rivers, state forests, trails and golf courses. At each of these locations, the Visual Assessment examined that place's documented significance, scenic quality, viewer's expectations, uniqueness of the visual resource, duration of view, proximity to the Project and number of turbines visible, among other criteria.

(2) LOCAL ECONOMY

The Coos County region is currently in a state of economic and social transition. Since 2000, Coos County has lost about 2,000 jobs. The local economy for nearly one hundred years centered on the region's paper mills, which were major sources of employment and income for the County. In 2006, both the Groveton Paperboard Mill and Fraser Paper's Burgess Pulp Mill closed, ending the paper manufacturing legacy in Coos County and initiating a new set of economic challenges. Economic impacts from the closures are expected to be significant and last past 2015. The New Hampshire Department of Employment Security reported in May 2006:

> In 2006, 21.4 percent of Coos County's gross regional product (GRP) is directly or indirectly attributable to pulp and paper manufacturing. Pulp and paper contributes, directly or indirectly, $2,223.93 to the average annual compensation (wages plus benefits) of Coos County workers in 2006 and was responsible for 4.9 percent of per capita real disposable income. [29]

[29] All data from the US Census Report State and County Quick Facts. Revised 31 August 2007. http://quickfacts.census.gov/qfd/states/33/33007.html

These estimates do not include potential economic impacts from the closing of the Wasau Paper Mill in Groveton which occured at the end of 2007. The closure of this mill left 303 people without work.

The U.S. Census Bureau estimates the current population of Coos County to be 33,019. The growth rate for the county from April 1, 2000 to July 1, 2006 was calculated to be -0.3%, compared with the 6.4% growth rate for the entire state of New Hampshire. In 2005, the Coos County population over 65 was 18.2%, as compared with 12.5% for the rest of New Hampshire. The 2004 Coos County median household income was $36,587, as compared with $53,770 for New Hampshire as a whole. The 2005 private non-farm employment for the County was 12,066 jobs. [33]

In the near future, Coos County has the opportunity to redefine itself as an innovative, prosperous region with a significant portion of its income deriving from the capital inflows associated with various renewable energy developments proposed in the County among other economic initiatives.

The Windpark will not require the use of significant local services during operation. Water use and discharge requirements will be minimal and accommodated on-site. It is anticipated that construction workers will be generally available in the region. In addition to the GRP Windpark, other projects are under various stages of development in Coos County. Skill-sets and knowledge gained during the GRP Project will be transferrable to surrounding projects.

Potential impact on local services is anticipated to be minimal, except for demand for lodging, food and sundries for the workforce during construction.

a. Economic effects of the Project

LOCAL EFFECTS: The Project will be an important first part of the development of the region's wind power resource. At 99 megawatts in size, the cost of the Project will be approximately $275 million, of which approximately $19.4 million will be infused into the surrounding economy for the purchase of local goods and services during construction activities.

In addition to the influx of construction dollars into the local economy, the Project will have substantial long-term economic benefits, including:

- Permanent employment for six or more site technicians
- Increased commerce in the region from the Project's purchases of local services as well as goods and services purchased by the Project's employees
- An annual payment of $495,000 dollars made by Granite Reliable Power to the Coos County government resulting from an agreement between the Coos County Commissioners and GRP
- In addition, the town of Dummer will receive additional tax revenue in the form of property taxes derived from the hosting of the interconnection power line

[30] All data from the US Census Report State and County Quick Facts. Revised 31 August 2007. http://quickfacts.census.gov/qfd/states/33/33007.html

- Improved sustainability of the existing forestry industry and related economic benefits through additional revenues to the landowners
- Increased economic diversification

STATEWIDE EFFECTS: In addition to these local and regional impacts, the Project will have a beneficial effect at the state, county and local levels by contributing to various taxes including: the statewide utility property tax (which is used to pay for education expenses), the business enterprise tax, and the business profits tax.

One final aspect of economic impacts that cannot be effectively analyzed using econometric models is the potential benefit to energy security and energy costs. The Project will sell electricity into the New England power market. This integrated electric power market is vulnerable to price spikes as a result of the increasing demand for fossil fuels worldwide. With over half of its energy generation coming from fossil fuels, the New England region, including New Hampshire, has experienced increases and periodic spikes in electricity prices. Due to its low operating cost, wind-produced electricity may help stabilize electricity prices in the New England electricity market.

b. Property values

Based on national studies, windparks have been shown to have no adverse impact on property values. One such study was conducted by the Renewable Energy Policy Project ("REPP") and is included as Appendix 30a: The Effect of Wind Development on Local Property Values. REPP assembled a database of real estate transactions adjacent to ten wind power projects in the United States that became operational between 1998 and 2001. Analysis of real estate transactions for three years before and five years after wind farm construction showed no negative effect on property values from existing wind farms in the communities' studies. Analysis for property sales data in Bennington County, Vermont within a 5 mile radius (8.4 km) view shed of the Searsburg Wind Power Facility showed that "monthly average sales grew faster in the view shed than in the comparable area, indicating that there is no significant evidence that the presence of the wind farms had a negative effect on residential property values." [31]

To present a more specific understanding of the actual effects of existing wind farms on property values and to address criticisms raised about the REPP Study, a master of science thesis was prepared by Ben Hoen of Bard College in 2006 to analyze transaction values of homes within 5 miles (8.4 km) of the existing Fenner (NY) Wind Farm that have views significantly affected by the presence of the wind farm. The Hoen-Bard College analysis "failed to uncover any statistically significant relationship between either proximity to or visibility of the windfarm and the sale price of homes."[32] This study is included as Appendix 30b: Impacts of Windmill Visibility on Property Values in Madison County, New York.

c. Tourism

Tourism is a major component of New Hampshire's economy. More specifically, tourism in Northern Coos County tends to be based around outdoor recreation activities, as described in Section (j)(1)b. There are no lodges, hotels, service stations, food or convenience stores in the vicinity of the Project.

[31] The Effect of Wind Development on Local Property Values. Renewable Energy Policy Project. May , 2003. Page 40.

[32] Impacts of Windmill Visibility on Property Values in Madison County, New York. Hoen, Ben. April 30, 2006. Page 34.

One regional tourist location, the Balsams Grand Resort Hotel, is situated north of the Windpark. As discussed in Section (j)(1)b, Project-related impacts at the Balsams are not expected to adversely affect the resort or the recreational activities it provides.

The Project has the potential to provide tourism benefits to the area for several years. This has been the case for the first utility-scale wind facility in New England, the Searsburg six MW facility built ten years ago in southern Vermont. This facility still receives over five hundred scheduled visitors each year. [33]

Similar situations are documented in New York State. Both the Fenner Wind Power Project and Madison Wind Power Project are listed as attractions on the Madison County Tourism website: www.madisontourism.com. In Prince Edward Island, Canada, a wind power project is prominently featured as a main attraction in the North Cape region on the government visitor's guide: **http://www.gov.pe.ca/photos/original/tou_nccd06.pdf**.

(3) LOCAL EMPLOYMENT

In order to quantitatively assess the Project's economic impact on the region, GRP performed a "Jobs and Economic Development Impact" ("JEDI") model through the use of econometric models together with construction and long-term economic data.

The JEDI modeling system was developed by the Wind & Hydropower Technologies Program, through the U.S. Department of Energy's Energy Efficiency and Renewable Energy office. [34] The JEDI model analyzes the economic impacts of constructing and operating wind power plants using parameters specific to the Project and its location.

The economic impacts of construction projects are somewhat different than the economic impacts of ongoing operations. Because of their relatively short duration, construction projects do not result in the creation of additional permanent jobs; rather, the construction activity and employment may be said to support wages and employment in the local economy as a result of the Project.

Construction of the GRP Windpark will result in the direct, indirect and induced employment of approximately 180-220 electrical workers, crane operators, equipment operators, carpenters and other workers county-wide with a total estimated payroll and benefits of $5.4 million. The employment and income figures noted here include both direct employment and wages (those people directly employed by GRP and its contractors) and the indirect and induced effects. Indirect effects are the employment and wages of firms supplying goods and services to GRP and its contractors. Induced effects occur when wages paid to the direct and indirect employees are spent in the local economy. Regional economic benefits during construction are estimated at $19.4 million, including: payrolls, supplies, materials, hotel stays, meals and economic multiplier effects.

During plant operations the Project expects to create six direct jobs, and will create an estimated 19 more indirect and induced jobs county-wide with a total estimated payroll and benefits of $800,000. **Table H** includes a summary of direct and induced jobs. These local economic benefits are estimated to be $2.2 million annually and include payrolls, supplies, materials, PILOT and Windpark lease payments. Total economic benefits, based upon regional multipliers applied to direct Project expenditures

[33] The Searsburg Wind Power Facility is not open to the public. The state permit allows scheduled site visits July through mid October.

[34] More information on JEDI modeling is available at http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=707

in original capital investment and ongoing operational expense, are estimated to be $63.4 million over 20 years.

Table H:
Results of the JEDI model for Granite Reliable Power

Phase	Direct Jobs	Induced and Indirect Jobs	Payroll and Benefits
Construction	10-130	70-100	$5,400,000
Operation	6	19	$800,000

(k) Consistency with State Energy Policy

The GRP Windpark is consistent with New Hampshire's State Energy Policy. RSA 378:37 states that it is the energy policy of this state "to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of nonrenewable resources; and consideration of the financial stability of the state's utilities." This Project, by providing clean, renewable electricity, will help to meet the needs of citizens and businesses of the state. The additional power provided by this Project will be used to meet current and future electricity demands via non-polluting generation. If approved, this will be the second commercial windpower facility in New Hampshire. This Project will triple the amount of installed windpower capacity in New England (49 megawatts as of this writing), and add to the diversity of electricity resources in the state and region. Adding another cost efficient source of electricity to the region will help to maintain or lower prices for all customers, since windpower will help to promote fuel diversity and a supply shift away from New England's historical reliance on natural gas. This serves to mitigate the price effect natural gas has on electricity pricing within the NE-ISO energy market.

By producing electricity from a source that does not contribute to greenhouse gases, the Project will help preserve the physical environment of the state from further degradation caused by certain air emissions. Finally, by adding a renewable source of electricity this Project will help New Hampshire utilities meet their requirements under the new Renewable Portfolio Standard ("RPS") law passed by the New Hampshire Legislature in 2007, Chapter 26, Laws of 2007, codified as RSA 362-F, and thereby maintain their financial stability. For all of these reasons, GRP, believes that this Project is consistent with the state energy policy. That energy policy is supported by the New Hampshire Office of Energy & Planning ("NHOEP") (Appendix 31: "Executive Summary" New Hampshire Energy Plan), and various state air quality and climate change initiatives and policies. [35]

The NHOEP has promoted policies to support the development of renewable energy sources. NHOEP provides information resources on the benefits of renewable energy, renewable energy incentives and programs and has included statements in support of renewable portfolio standards and increasing New Hampshire's fuel diversity in the 2002 New Hampshire Energy Plan.

[35] Can be found at: http://www.nh.gov/oep/programs/energy/StateEnergyPlan.htm

Furthermore, the Project is consistent with the purpose clause of the law creating the NH Site Evaluation Committee (RSA 162-H:1) as follows:

The legislature, accordingly, finds that the public interest requires that it is essential to maintain a balance between the environment and the need for new power sources; that electric power supplies must be constructed on a timely basis; that in order to avoid undue delay in construction of needed facilities and to provide full and timely consideration of environmental consequences, all entities planning to construct facilities in the state should be required to provide full and complete disclosure to the public of such plans; ...that the siting of electric generating plants and high voltage transmission lines should be treated as a significant aspect of land-use planning in which all environmental, economic and technical issues should be resolved in an integrated fashion, so as to assure the state an adequate and reliable supply of electric power in conformance with sound environmental utilization.

In 2002, New Hampshire laid the foundation for a cleaner environment. The passage of the Clean Power Act (House Bill 284), codified as RSA 125-O, focused on the growing need to reduce pollution associated with power generation. The goal to reduce emissions from the power generation sector was also emphasized in the New Hampshire Clean Power Strategy (included as Appendix 32). These policies put annual caps on emissions from power generation facilities, including the greenhouse gas, carbon dioxide, and pollutants such as mercury, sulfur dioxide and nitrogen oxides. Additionally, New Hampshire has already demonstrated commitment to the Regional Greenhouse Gas Initiative ("RGGI") program. The RGGI bill was signed into law by the Governor on June 11, 2008 as Chapter 182, Laws of 2008. Further information on New Hampshire policies encouraging the use of renewable energy through 2006 is included in Appendix 33.

In 2007, New Hampshire reached another significant milestone with the adoption of the state's RPS law, which had been implemented in most New England states prior to this. RSA 362-F requires New Hampshire to reach a goal of 25% of the electricity sold by retail suppliers in New Hampshire to come from renewable sources by 2025. The purpose section of that statute states: "Renewable energy generation technologies can provide fuel diversity to the state and New England generation supply through use of local renewable fuels and resources that serve to displace and thereby lower regional dependence on fossil fuels. It is therefore in the public interest to stimulate investment in low emission renewable energy generation technologies in New England and, in particular, New Hampshire, whether at new or existing facilities." RSA 362-F:1.

The Project, according to the law, will provide a significant new source of "Class 1" (new renewable energy generated by wind, geothermal, hydrogen derived from biomass fuels and a number of other eligible sources).

New Hampshire has also provided support for the development of wind power, hydropower and biomass renewable energy facilities through the adoption and modification of legislation authorizing Payment in Lieu of Tax ("PILOT") agreements. In 2006 the Legislature passed House Bill 1758 authorizing the use of PILOT agreements for renewable energy projects through a new statute, RSA 72:74. In 2007, the Legislature amended the new PILOT law by authorizing agreements between a developer and a

willing municipality for a period longer than five years.

All of the above state legislative incentives share some or all of the following goals regarding energy planning and policy:

- Reduce dependence on foreign and imported sources of energy
- Reduce risk and volatility in electricity costs
- Reduce air pollution, including greenhouse gas emissions (global warming)
- Encourage new local employment and foster new local employment and business development opportunities
- Improve system reliability
- Help diversify the NE-ISO's generation resources.

The GRP Windpark will help the State of New Hampshire achieve these goals.

(l) PREFILED TESTIMONY AND LIST OF PROPOSED EXHIBITS

(1) THE APPLICATION CONTAINS THE FOLLOWING PREFILED TESTIMONY.

a. PREFILED TESTIMONY of **Charles Readling** and **Pip Decker** addressing an overview of the Project, alternatives considered, impact on orderly development of region, consistency with state energy policy, and relevant factors bearing on whether the objectives of the SEC law would be served by the granting of a certificate;

b. PREFILED TESTIMONY of **Christopher Lowe** addressing financial capability to assure construction and operation of the Project in compliance with the certificate;

c. PREFILED TESTIMONY of **Daniel Mandli** addressing managerial and technical capability to assure operation in compliance with the terms and conditions of the certificate, and the Project's effect on air quality, public health and safety (ice throw, hazardous materials, lightning);

d. PREFILED TESTIMONY of **Phillip Beaulieu** addressing the Project's effect on public health and safety during construction, and the transportation of turbines and components;

e. PREFILED TESTIMONY of **Raymond Lobdell** addressing the Project's effect on the natural environment (wetlands, water quality, plant life), and the design and construction of the Project;

f. PREFILED TESTIMONY of **Steven Pelletier** and **Adam Gravel** addressing the Project's effect on the natural environment (wildlife, birds and bats);

g. PREFILED TESTIMONY of **Jean Vissering** addressing the visual impact, the Project's effect on aesthetics and the impact on the orderly development of the region;

h. PREFILED TESTIMONY of **Hope Luhman** addressing the Project's effect on historic sites;

i. PREFILED TESTIMONY of **David Hessler** addressing the Project's effect on the public health and safety (noise); and

j. PREFILED TESTIMONY of **Matthew Borkowski** addressingthe Project's effect on the public health and safety (shadow flicker).

(2) A LIST OF PROPOSED EXHIBITS IS INCLUDED AS APPENDIX 34