DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE

HOWARD WIND POWER PROJECT

Town of Howard, Steuben County, New York

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COMMONLY USED ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
BBA	Breeding Bird Atlas (New York State)
BBS	North American Breeding Bird Survey
dBA	decibels, A-rated
DEIS	Draft Environmental Impact Statement
EDR	Environmental Design & Research, Landscape Architecture, Environmental Services, Engineering and Surveying, P.C.
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
GIS	geographic information system
kV	kilovolt
kW	kilowatt
MW	megawatts
NAAQS	National Ambient Air Quality Standards
NHP	Natural Heritage Program (New York State)
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NYCRR	Official Compilation of Codes, Rules, and Regulations of the State of New York
NYISO	New York Independent Services Operators
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSA&M	New York State Department of Agriculture and Markets
OPRHP	Office of Parks, Recreation & Historic Preservation (New York State)
OSHA	Occupational Safety and Health Administration
O&M	Operations and Maintenance
PSC	Public Service Commission (New York State)
PILOT	payment in lieu of tax
RPS	Renewable Portfolio Stanard
SEQRA	State Environmental Quality Review Act
SHPO	State Historic Preservation Office (New York)
SPCC	Spill Prevention Control and Countermeasure Plan
SPDES	State Pollutant Discharge Elimination System

SWPP	Stormwater Pollution Prevention Plan
USACOE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
VIA	Visual Impact Assessment

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1.0 EXECUTIVE SUMMARY

This Draft Environmental Impact Statement (DEIS) is for a proposed action known as the Howard Wind Power Project (the Project). Provided below is a brief project description, along with summaries of the regulatory process; the Project's purpose, need, and benefit; its potential environmental impacts; and proposed mitigation measures. Alternatives to the Project and its effect on use and conservation of energy are also reviewed.

Project Description

Howard Wind, LLC (Howard Wind), a subsidiary of EverPower Renewables, is proposing to develop a wind-powered generating facility in the Town of Howard, Steuben County (Figure 1). The Project will consist of approximately 25 wind turbines, each with a maximum (or nameplate) capacity of 2.5 megawatts (MW), resulting in an anticipated generating capacity of approximately 62 MW. In addition to the wind turbines, the Project involves construction of associated components including two permanent meteorological tower, a system of gravel access roads, electrical collection and communication cable networks, an operation and maintenance (O&M) building, and an on-site collection substation and switchyard.

The Project will be developed on leased private land, totaling approximately 2,850 acres. Project construction is anticipated to occur in a single phase, starting in June 2008 and being completed by November 2008. Once built, the wind turbines and associated components will operate in almost completely automated fashion. The Project will, however, employ approximately six operations and maintenance personnel. The wind turbine currently proposed is the Clipper Liberty C99 (or an equivalent machine), with a minimum wind speed of approximately 4 m/s (13 mph) required to generate electricity. This turbine's maximum rotational speed is 15.5 rpm. Each wind turbine has a computer to control critical functions, monitor wind conditions, and report data.

Regulatory Process

This DEIS has been prepared by Environmental Design & Research, Landscape Architecture, Environmental Services, Engineering and Surveying, P.C. (EDR) of Syracuse, New York. The document is intended to facilitate the environmental review process and provide a basis for informed public comment and decision-making. This process is in accordance with the requirements of New York State's Environmental Quality Review Act (SEQRA). The Steuben County Industrial Development Agency (SCIDA) is acting as the lead agency pursuant to SEQRA.

Various plans and support studies have also been prepared in support of the Project, which provide detailed information on discrete topical areas in furtherance of the SEQRA evaluation. These studies include the following:

- Geotechnical Analysis
- Hydrogeologic Evaluation
- Cultural Resources Investigation (Phase IA and IB)
- Visual Impact Assessment
- Shadow Flicker Assessment
- Transportation Study
- AM and FM Broadcast Analysis
- Cellular/PCS Telephone Analysis
- Off-Air Television Reception Analysis
- Licensed Microwave Search & Worst Case Fresnel Zone Study
- Avian Risk Assessment
- Radar and Acoustic Surveys of Birds and Bats
- Wetlands Delineation Report
- Noise Analysis
- Socioeconomics Report

Purpose, Need, and Benefit

The purpose of the proposed action is to create a wind-powered electrical-generating facility that will provide a significant source of renewable energy to the New York State power grid. The Project would facilitate compliance with the Public Service Commission (PSC) "Order Approving Renewable Portfolio Standard Policy", issued on September 24, 2004. This Order calls for the use of renewable energy in the state to increase to 25% (from the then level of 19%) by the year 2013. The Project responds to objectives identified in the 2002 New York State Energy Plan and Final Environmental Impact Statement (State Energy Plan) (New York State Energy Planning Board, 2002), and the Preliminary Investigation into Establishing a Renewable Portfolio Standard in New York (NYSERDA, 2003). These objectives include stimulating economic growth, increasing energy diversity, and promoting a cleaner and healthier environment. The benefits of the proposed action include positive impacts on socioeconomics (e.g., payment-in-lieu of tax [PILOT] revenues to local municipalities and lease revenues to participating landowners), air quality (through reduction of emissions from fossil-fuel-burning power plants), and climate (reduction of greenhouse gases that contribute to global warming).

Summary of Potential Impacts

In accordance with requirements of the SEQRA process, potential impacts arising from the proposed action were evaluated with respect to an array of environmental and cultural resources. The analysis of potential impacts is summarized below.

Environmental Factor	Potential Impacts
Physiography, Geology, and Soils	Soil disturbance Soil erosion Soil compaction Loss of agricultural land
Water Resources	Temporary disturbance Siltation/sedimentation Stream crossings Wetland filling Alteration of private water supplies
Biological Resources	Vegetation clearing/disturbance Incidental wildlife injury and mortality Loss or alteration of habitat
Climate and Air Quality	Construction vehicle emissions Dust during construction Reduced air pollutants and greenhouse gases
Aesthetic/Visual Resources	Visual change to the landscape Visual impact on sensitive sites/viewers Shadow-flicker impact on adjacent residents
Cultural Resources	Visual impacts on architectural resources Disturbance of archaeological resources
Sound	Construction noise Operational impacts on adjacent residents
Transportation	Road wear/damage Traffic congestion/delays Road system improvements/upgrades
Socioeconomic	Host communities payment/PILOT Revenue to participating landowners Expenditures on goods and services Tourism Short-term and long-term employment
Public Safety	Construction concerns related to large equipment, falling objects, open excavations, electrocution Possible ice shedding concerns Project components catching fire

Environmental Factor	Potential Impacts
Communication Facilities	Temporary interference to communication signals Degraded reception to off-air television signals
Community Facilities and Services	Demands on police and emergency services Relocated utility distribution lines and poles
Land Use and Zoning	Adverse and beneficial impacts on farming Changes in community character and land use trends

Construction of the Project will result in disturbance of up to 144.5 acres of soil and 175.5 acres of vegetation, most of which is in agricultural fields. In addition, approximately 47.5 acres of forest and 0.293 acres of wetland could be disturbed by Project construction. However, most of this disturbance will be temporary. A total of approximately 18.7 acres of agricultural land will be converted to non-agricultural use/built facilities (e.g., roads, turbines, substation, etc.), and a total of approximately 6.2 acres of forest will be converted to built facilities. Permanent wetland impacts are estimated to be approximately 0.086 acre (not accounting for impacts that may occur due to public road improvements). Project construction will also result in some level of temporary disturbance and congestion on area roadways.

Project operation is expected to result in some level of avian and bat collision mortality. Based on data from other comparable sites, bird mortality is expected to be in the range of 0 to 7 birds per turbine per year. The turbines will be visible from many locations within the surrounding area, but will also be fully or partially screened from viewers in many locations (e.g., valley settings). The turbines will result in a perceived change in land use from some locations, but will likely help keep land in active agricultural use by supplementing farmers' incomes. Predicted noise and shadow flicker impacts are modest. Only two non-participating receptors have the potential to experience over 25 hours of shadow flicker annually, and turbine-related sound is not predicted to exceed 50 decibels at any adjacent residences. The Project is expected to generate approximately $300,000 to $400,000 per year (up to $8 million over 20 years) in PILOT revenues to local taxing jurisdictions, while requiring very little in terms of municipal services.

Summary of Mitigation Measures

Various measures will be taken to avoid, minimize and/or mitigate potential environmental impacts. General mitigation measures will include adhering to requirements of various local, state, and federal ordinances and regulations. Howard Wind will also employ environmental monitors to assure compliance with permit requirements and environmental protection commitments during construction. The proposed Project will result in positive impacts on socioeconomics (e.g., increased revenues to local municipalities and lease revenues to participating landowners), air quality (through reduction of emissions from fossil-fuel-burning power plants), and climate (reduction of greenhouse gases that contribute to global warming). By eliminating pollutants and greenhouse gases, the Project will also benefit ecological and water resources as well as human health. These benefits also serve to mitigate unavoidable adverse impacts associated with Project construction and operation.

Specific measures designed to mitigate or avoid adverse potential environmental impacts during Project construction or operation include:

- Siting the Project away from population centers and areas of residential development.
- Siting turbines primarily in open field areas to minimize required clearing of mature forest land to the extent practicable.
- Siting turbines and access roads so as to avoid impacts to wetlands and streams.
- Keeping turbines a minimum of 1,000 feet from residences to minimize noise, shadow flicker, and public safety concerns.
- Using existing farm/logging roads for turbine access whenever possible to minimize disturbance to agricultural land.
- Utilizing construction techniques that minimize disturbance to vegetation, streams, and wetlands.
- Adhering to the agricultural protection guidelines to avoid, minimize, or mitigate impacts on agricultural land and farm operations.
- Limiting turbine lighting to the minimum allowed by the Federal Aviation Administration (FAA) to reduce nighttime visual impacts, and following lighting guidelines to reduce the potential for bird collisions.
- Developing and implementing various plans to minimize adverse impacts to air, soil, and water resources, including a dust control plan, sediment and erosion control plan, and Spill Prevention, Control, and Countermeasure (SPCC) plan.
- Entering into a PILOT agreement with the local taxing jurisdictions to provide a significant predictable level of funding for the town, county, and school districts over the first 20 years of the Project's operations.
- Developing an emergency response plan with local first responders.

Alternatives

Alternatives to the proposed Project that were considered and evaluated include no action, alternative Project siting, alternative Project area, alternative Project design/layout, alternate Project size, and alternative technologies. Analysis of these alternatives revealed that both the size of the Project and the configuration of the turbines as currently proposed are necessary to produce a commercially feasible project that minimizes adverse environmental impacts to the extent practicable. A smaller project would not fully capture the available wind resource and would likely not generate enough power to be economically viable given the project development and construction costs, including the expense of connecting to the power grid. A larger facility might theoretically provide more economic return, but it would force location of towers into areas with more marginal wind power resources and greater proximity to residents, steep slopes, and/or forested areas. This would result in a greater number of potential adverse environmental impacts than currently anticipated. A larger number of smaller turbines, while perhaps reducing visibility from some areas, would not change the overall visual impact of the Project and would increase impacts associated with the more extensive road and interconnect systems required. Alternative technologies (e.g., different sources of generation) eliminate many of the environmental advantages associated with the proposed Project. In summary, the alternatives analysis concluded that the Project as proposed offers the optimum use of resources with the fewest potential adverse impacts.

Effects on Use and Conservation of Energy Resources

The proposed Project will have significant, long-term beneficial effects on the use and conservation of energy resources. Energy will be expended during the construction phases of the Project, as well as for the maintenance of the wind turbines and support facilities on-site. However, the operating Project will generate approximately 62 MW of electricity without consuming water or producing toxic emissions. This greatly exceeds the energy required to construct and operate the Project, and the output is enough to power approximately 20,000 homes in New York State, (on an average annual basis). The Project will add to and diversify the state's sources of power generation, helping to stabilize power prices currently subject to spikes in fossil fuel prices. Over the long term, the Project may displace some of the state's older, less efficient, and dirtier sources of power, and at a minimum will help to stave off the need to build new fossil fuel plants. The principal, overriding benefits of the Project are in complete accordance with the 2002 State Energy Plan (New York State Energy Planning Board, 2002), namely:

- “Stimulating sustainable economic growth”
- “Increasing energy diversity…including renewable-based energy”
- “Promoting and achieving a cleaner and healthier environment”

2.0 DESCRIPTION OF PROPOSED ACTION

This Draft Environmental Impact Statement (DEIS) is for a proposed action known as Howard Wind Power Project (the Project). The Project is described below in terms of its components, location, construction, and operation. The Project's purpose, need, and benefit, cost and funding, and permits and approvals are also discussed below, along with a description of the regulatory process and opportunities for public and agency involvement in that process.

2.1 INTRODUCTION

Howard Wind, LLC (Howard Wind), a subsidiary of EverPower Renewables, is proposing to develop a wind-powered generating facility in the Town of Howard, Steuben County (Figure 1). The Project will consist of approximately 25 wind turbines, each with a maximum (or nameplate) capacity of 2.5 megawatts (MW), resulting in a generating capacity of approximately 62 MW. As presently envisioned, the Project will use the Clipper Liberty C99 Turbine (or equivalent), which will include a three-bladed rotor, with a diameter of 99-meters (325-foot), mounted on an 80-meter (262-foot) tubular steel tower. Two meteorological towers will also be installed, along with an operations and maintenance (O&M) facility, a system of gravel access roads, buried gathering lines (electrical interconnect), and a substation adjacent to an existing New York State Electric and Gas (NYSEG) 115 kilovolt (kV) transmission line. The layout, location, and number of turbines evaluated in the DEIS presents a Project that is intended to optimize the benefits of the local wind resource while either avoiding or minimizing adverse environmental impacts, and assuring that the Project is commercially viable. All of the turbine sites are located a minimum of 400 feet from existing public roads and non-participating property lines, and all turbines are sited at least 1,000 feet from non-participating permanent residences.

While this DEIS establishes a specific site plan for the proposed turbines, these locations could be subject to minor adjustments to address landowner concerns, potential modifications during the permitting process, optimization due to energy yield studies, or unforeseen engineering/construction issues. However, any such adjustments will not change the affected resources, increase environmental impacts, or alter proposed mitigation, as described herein.

As of the release of this DEIS, The Town of Howard Planning Board has not been presented with any other major project plans, and no permits have been issued that would allow for the development of a major/large project. Aside from the Howard Wind Power Project, the only potential future development is the "Lake Demon" site, which is estimated to include between four and ten parcels (approximately 5 acres per parcel). However, none of these parcels have yet been sold.

Beyond this, there may be one or two homes built over the course of the next year, and as many as six homes may be built over the next few years (Bossard, pers. comm.).

2.2 PROJECT LOCATION

The Project is located in the Appalachian Plateau and the Finger Lakes Highlands physiographic regions of New York State, in the Town of Howard, Steuben County. The Project is approximately 2.7 miles northeast of the Village of Canisteo, 4 miles east of the Village of Hornell, and 6.1 miles southwest of the Village of Avoca (as measured to the nearest turbine). Located within the Town of Howard, the Project will occur on approximately 2,850 acres of private land (owned by 23 individual landowners) off of Burt Hill, South Woods, Turnpike, Hughes, Burleson, Stephens Gulch, and Buena Vista Roads (Figure 2). The Project site, as described in the DEIS and depicted on Figure 2, consists of parcels that are currently proposed to include project components, and parcels for which past and/or current lease agreement negotiations have taken place. Although included as participating parcels in Figure 2, no parcels west of South Woods Road are currently proposed to contain Project components.

The proposed Project site is located on rolling, elevated plateaus that are deeply dissected by ravines of tributaries to the Canisteo River. The majority of the upland area consists of open crop fields (primarily hay, corn, potato, and oats) and pastures, with forestland dominating the steep slopes that descend into adjacent valleys. The Project area also includes successional old field, hedgerow, successional shrubland, residential yards, farms, streams, and ponds. Existing built features include single-family homes, seasonal homes, communication towers, barns, silos, and other agricultural buildings.

2.2.1 Project Lease/Easement Terms and Conditions

Howard Wind will offer all participating/consenting landowners that agree to installation of wind turbines (and ancillary facilities) on their property, a standard form lease/easement agreement, that provides for compensation during the Project's development, construction and operation. These agreements will secure all the land rights necessary to develop, construct, and operate the wind turbine generators along with all ancillary facilities, and typically include the following provisions:

- a term of 20 years,
- lessee access rights as necessary to develop, build, and operate the wind project facilities,
- semi annual royalty payments for landowners hosting wind turbine towers, and one-time payments for easements,

- standard indemnification provisions that protect the lessor-landowner from any damages related to the construction or operation of the project facilities,
- a clean-up requirement of the lessee that obligates it to remove from the leased premises all refuse and other debris resulting from the development, construction or operation of the wind project facilities, and to maintain the cleanliness of these premises,
- a decommissioning requirement that obligates the lessee to remove all above-ground project facilities at the end of the Project's useful life, and to return the leased property to its original condition except for any facilities that are more than 36 inches belowground,
- other commercial terms that are typical of long-term leases.

2.3 PROJECT DESCRIPTION

The Project will consist of approximately 25 wind turbines, approximately 6.3 miles of access roads, 14 miles of 34.5 kV electrical interconnect, a substation, two meteorological towers, construction staging area(s), and an O&M facility.

The proposed location and spacing of the wind turbines and support facilities is based on a wind resource assessment and guidance provided by ecological and cultural consultants. Further, the Town of Howard has adopted a Wind Energy Facilities Law (Local Law No. 1) regulating the siting of wind energy facilities. Factors considered when siting the turbines included the following:

Wind resource assessment: Through the use of modeling software, meteorological data, and topographic data, the wind turbines are sited to optimize exposure to wind from all directions, with emphasis on exposure to the prevailing wind directions in the Project area.

Sufficient spacing: Siting turbines too close to one another can result in decreased electricity production due to the creation of wind turbulence. Each wind turbine creates turbulence in its wake. As the flow proceeds downwind, there is a spreading of the wake and recovery to free-stream wind conditions. Therefore, Project turbines need to be sited with enough space between them to minimize wake losses and maximize the capture of wind energy.

Distance from residences: In accordance with the Town of Howard Wind Energy Facility law, the turbine locations were selected in order to maintain a minimum setback of approximately 1,000 feet between the tower and the nearest nonparticipating permanent residence.

Distance from Non-participating Land Parcels: In accordance with the Town of Howard Wind Energy Facility law, the turbine locations have been selected to maintain a minimum setback of 400 feet from the boundary line of all non-participating local landowners.

Distance from roads: In accordance with the Town of Howard Wind Energy Facility law, the turbine locations were also selected to maintain a minimum setback of at least 400 feet from all public roads.

Environmental and Cultural Resources: Special consideration was given to siting project facilities to avoid environmental and cultural resource impacts to the greatest extent possible. For a more detailed discussion of minimizing/avoiding impacts to environmental and cultural resources, refer to Section 3.0 (Environmental Setting, Potential Impacts, and Proposed Mitigation).

Applying these factors, a proposed facility layout was prepared by the Project Sponsor. The proposed layout of all Project components is illustrated in Figure 3. These components are described individually below.

2.3.1 Wind Turbines

The wind turbines proposed for this Project are the Clipper Liberty C99 manufactured by Clipper Windpower, Inc. Detailed information regarding these turbines is included in Appendix A. Because the Project is not scheduled to be built until 2008, issues such as availability and cost could dictate use of an alternate turbine. However, any turbine ultimately selected will be roughly equivalent in terms of its dimensions, appearance, and electrical output. Each wind turbine consists of three major components; the tower, the nacelle, and the rotor. The height of the tower, or "hub height" (height from foundation to top of tower) will be approximately 262 feet. The nacelle sits atop the tower, and the rotor hub is mounted to the front of the nacelle. The total turbine height (i.e., height at the highest blade tip position) will be approximately 424 feet (see graphical depiction in Appendix A). Descriptions of each of the turbine components are provided below.

Tower: The tubular towers used for this Project are conical steel structures manufactured in multiple sections. The towers have a base diameter of approximately 15 feet and a top diameter of approximately 8 feet. Each tower will have an access door, internal lighting, and an internal ladder to access the nacelle. The towers will be painted off-white to make the structure visible to aircraft (viewing against the ground) but decrease visibility against the sky.

Nacelle: The main mechanical components of the wind turbine are housed in the nacelle. These components include the drive train, gearbox, and generator. The nacelle is housed in a steel reinforced fiberglass shell that protects internal machinery from the environment and dampens noise emissions. The housing is designed to allow for adequate ventilation to cool internal machinery. The nacelle is equipped with an external anemometer and a wind vane that signals wind speed and direction information to an electronic controller. Attached to the top of some of the nacelles, per specifications of the Federal Aviation Administration (FAA), will be a single, medium intensity aviation warning light. These lights are anticipated to be flashing red strobes (L-864) and to operate only at night. The nacelle is mounted on a bearing that allows it to rotate ("yaw") into the wind to maximize energy capture.

Rotor: A rotor assembly is mounted to the nacelle to operate upwind of the tower. Each rotor consists of three composite blades that will be approximately 48.2 meters (158 feet) in length (total rotor diameter of 99 meters or (325 feet). The rotor attaches to the drive train at the front of the nacelle. Hydraulic motors within the rotor hub feather each blade according to wind conditions, which enables the turbine to operate efficiently at varying wind speeds. Also, the rotor can spin at varying speeds to operate more efficiently at lower wind speeds. The wind turbines begin generating energy at wind speeds as low as 4 meters per second (m/s) (13 miles per hour [mph]) and cut out when wind speeds reach 25 m/s (82 mph) for ten minutes. The maximum rotor speed is approximately 15.5 revolutions per minute (rpm) (Clipper, 2005).

2.3.2 Electrical System

NYSEG conducted a Feasibility Study in October 2006 to evaluate the impact of the proposed Howard Wind Power Project on the reliability of the bulk power system, and to ensure that the resulting bulk power system would conform to all applicable planning standards and criteria (including those of New York State Reliability Council, Northeast Power Coordinating Council, and North American Reliability Council). The scope of the study was approved by the New York Independent System Operator’s (NYISO) Operating Committee in early December 2006. Power flow analysis indicated that if the system is dispatched to recognize security constraints, all facilities (transmission lines, transformers, etc.) within the study area were found within their ratings under normal (and contingency) conditions. No adverse system impacts were found as a result. The System Reliability and Impact Study (SRIS) is presently being reviewed by the NYISO and NYSEG. Approval is expected in February 2007.

The proposed Project will have an electrical system that consists of two parts. These include 1) a system of buried and overhead 34.5 kV shielded and insulated cables that will collect power from each wind turbine and 2) a substation that transfers the power from the 34.5 kV cables to the existing NYSEG Bennett-Bath 115 kV transmission line and regional power grid. Each of these components is described below.

Collector System:

A transformer located near the base of the tower will raise the voltage of electricity produced by the turbine generator up to the 34.5 kV voltage level of the collection system. From the transformer, cables will join the collector circuit and turbine communication cables (electrical interconnect) that will run underground (generally along Project access roads) and above ground (within the existing utility right-of-way [ROW]) along Turnpike Road. Because the existing overhead line does not run along the entire portion of Turnpike Road where overhead 34.5 kV line is anticipated, new utility ROW may be necessary. Howard Wind is negotiating an agreement with the Steuben Rural Electric Cooperative, Inc. (SREC), which allows use of the existing SREC utility ROW. In addition, Howard Wind is working closely with the SREC to determine the design of the 34.5 kV line in order to minimize impacts to local residences/landowners. Based upon correspondence with SREC personnel, it is currently anticipated that the existing 40-foot poles would generally be replaced with approximately 50-foot poles, and would include double circuit with 34.5 kV over 12.4 kV. The entire overhead 34.5 kV line (overbuild and new location) will be built and inspected to Rural Utilities Service (RUS) standard construction specifications. In those instances where overhead 34.5 kV line will be placed in new location (i.e., no existing 12.4 kV distribution), the poles will be a maximum of 45 feet in height.

The location of the proposed collection system is depicted on Figure 3. This buried and above ground 34.5 kV collection system will connect the individual turbines to the substation located east of South Woods Road. The total length of buried and above ground 34.5 kV collection lines carrying electricity to the substation will be approximately 14 miles. It is currently anticipated that approximately 2.7 miles of the 34.5 kV interconnects will be overhead and approximately 11.3 miles will be underground.

Substation:

The substation will be located off of South Woods Road in the Town of Howard, adjacent to the NYSEG Bennett-Bath115 kV transmission line. The substation will step up voltage from 34.5 kV to 115 kV to allow connection with the existing transmission line. The substation will include 34.5 and 115 kV busses, transformers, circuit breakers, towers, control houses, and related structures. It will be approximately 200 by 200 feet in size, enclosed within a chain link fence, and accessed by a new gravel access road.

2.3.3 Access Roads

The Project will require the construction of new or improved roads to provide access to the proposed turbines and substation site. The proposed location of Project access roads is shown in Figure 3. The total length of access road required to service all proposed wind turbine locations is approximately 6.3 miles, much of which will be upgrades to existing farm lanes. The roads will be gravel-surfaced and typically 16 feet in finished width (however, for impact calculation purposes a maximum finished width of 20 feet is assumed).

2.3.4 Meteorological Towers

Two 80-meter (262-foot) tall meteorological towers will be installed to collect wind data and support performance testing of the Project. The tower will be a galvanized tubular or lattice steel unguyed structures and will include wind monitoring instruments (see Appendix A for typical specifications). The location of the proposed wind measurement towers is currently not known, but they are anticipated to be located in an agricultural field within the boundaries of the current Project Site. However, as indicated in Table 1 (Impact Assumptions and Calculations), all impacts associated with meteorological towers, such as temporary and permanent disturbance to soils and agricultural communities, have been accounted for in the DEIS.

2.3.5 Staging Area

It is currently anticipated that construction of the Project will require the development of one construction staging area. This site will accommodate construction trailers, material storage, and parking for construction workers. The staging area is anticipated to total less than 5 acres in size, and will be located in an agricultural field southeast of the intersection of South Woods Road and Turnpike Road. No fencing or lighting of the staging area is currently proposed (but could be added if vandalism or similar problems are experienced).

2.3.6 Operations and Maintenance Building

An O&M building and associated storage yard will be constructed to house operations personnel, equipment, and materials and provide staff parking. The proposed facility is also anticipated to be located southeast of the Turnpike Road/South Woods Road intersection. While no architectural drawings have yet been prepared, it is anticipated that the structure will not exceed 5,000 square feet or permanently disturb an area of greater than two acres. It will either be a conversion of an existing building, or will be newly built to resemble an agricultural building, and similar in style to those found throughout the Project area (see Appendix A, which provides a photographic range of potential O&M Buildings).

2.4 PROJECT PURPOSE, NEED AND BENEFIT

The purpose of the proposed Project is to create a wind-powered electrical-generating facility that will provide a significant source of renewable energy to the New York State power grid to:

- Meet regional energy needs in an efficient and environmentally sound manner;
- Provide increased stability to the price volatility of fossil-fuel electricity generation in the region;
- Realize the full potential of the wind resource on the lands under lease;
- Promote the long-term economic viability of agricultural areas in New York State's Southern Tier; and
- Assist New York State in meeting its Renewable Portfolio Standard for the consumption of renewable energy in the State (see below).

The Project will facilitate compliance with Executive Order 111, issued by Governor George Pataki on June 10, 2001, which requires all New York State agencies to purchase 10% of their electricity from renewable energy sources by 2005 and 20% by 2010. The Project also responds to objectives identified in the 2002 State Energy Plan (New York State Energy Planning Board, 2002), and the Preliminary Investigation into Establishing a Renewable Portfolio Standard in New York (NYSERDA, 2003). The 2002 State Energy Plan required that the New York State Energy Research and Development Authority (NYSERDA) examine and report on the feasibility of establishing a renewable portfolio standard (RPS). NYSERDA's preliminary report found that an RPS can be implemented in a manner that is consistent with the wholesale and retail marketplace in New York and that an RPS has the potential to improve energy security and help diversify the state's electricity generation mix. The report also concluded that an RPS would likely spur increased economic development opportunities in the renewable energy industry, including the attraction of renewable technology manufacturers and installers to New York State. In September 2004, The Public Service Commission (PSC) approved the RPS and identified a renewable energy policy, which calls for an increase in renewable energy used in the State to 25% by the year 2013. (PSC, 2004)

The RPS started in January 2006 and according to the PSC, should reduce statewide air emissions of nitrogen oxide (NO_X) by 6.8%, sulfur dioxide (SO_2) by 5.9%, and carbon dioxide (CO_2) by 7.7%.

In addition, as a result of the RPS, the PSC anticipates that wholesale energy prices are likely to decline as the addition of substantial amounts of renewable energy offsets some of the program costs. The cumulative cost of premium payments, projected to range between $582 million and $762 million for renewable projects, is expected to be offset by approximately $362 million in wholesale energy cost reductions as New York reduces its reliance upon fossil fuels (PSC, 2004).

Electricity from wind power provides a clean source of energy from which green attributes can be bought and sold in a commodity market as Renewable Energy Credits (RECs). In addition, wind power, which requires only the wind to generate electricity, is natural hedge against ever increasing and volatile fuels prices. As a result, the demand for electricity from wind power projects is increasing. The market options are numerous and include bilateral agreements between wind projects and environmentally conscious corporations, municipal and investor owned utilities that want long term fixed price electricity, federal and state agencies that must meet renewable energy mandates, utilities that must meet state mandated renewable portfolio standards, electicity brokers, financial investment institutions who need a fuel and electricity hedge, as well as sales into the wholesale spot market.

Specific to the Howard Wind Power Project, Howard Wind is currently pursuing a number of options pertaining to the sale of the Project's electricity. One option is to sell the electricity to the SREC, which would help to stabilize local electricity prices through a long term electricity purchase agrrangement that is not subject to escalating fuel prices.

The benefits of the proposed action also include positive impacts on socioeconomics (e.g., increased revenues to local municipalities and lease revenues to participating landowners, short-term and long-term employment, and purchase of local goods and services), air quality (by off-setting generation from fossil-fuel-burning power plants), and climate (reduction of greenhouse gases that contribute to global warming). By eliminating pollutants and greenhouse gases, the Project will also benefit ecological and water resources as well as human health. Additional information on the socioeconomic and air quality benefits of the proposed Project is included in Sections 3.9 and 3.4 respectively.

2.5 PROJECT CONSTRUCTION

Project construction is anticipated to occur in a single phase. It is scheduled to start in the June 2008 and be completed by November 2008. Although a detailed schedule has not yet been developed, Project construction is anticipated to proceed in the following sequence:

- Grading of the field construction office and collection substation areas;
- General clearing and construction of access roads, crane pads and turn-around areas;
- Construction of turbine tower foundations;
- Installation of the electrical collection system;
- Assembling and erection of the wind turbines;
- Construction and installation of the collection substation;
- Plant commissioning and energization; and
- Final grading and drainage
- Restoration activities

Prior to the initiation of construction, various environmental protection and control plans will be developed and shared with the town. These will include a construction routing plan, road improvement plan, dust control plan, public safety plan, and complaint resolution procedures. These plans and procedures are described in greater detail in Section 3 of the DEIS. Actions included in these plans and procedures will be reviewed, coordinated, and approved by the town and county prior to implementation, to assure that the impacts of Project construction on local residents are avoided, minimized, or mitigated to the greatest extent practicable. The following section describes the various activities that will occur as part of Project construction. Representative photographs of wind power Project construction activities are included in Figure 4. Typical construction details are included in Appendix A.

2.5.1 Pre-construction Activities

Before construction commences, a site survey will be performed to stake out the exact location of the wind turbines, access roads, electrical cables, and substation areas. Once the surveys are complete, a detailed geotechnical investigation will be performed to identify subsurface conditions and allow development of final design specifications for the access roads, foundations, underground trenching, and electrical grounding systems. The geotechnical investigation involves use of a drill rig to obtain subsurface samples, followed by field and laboratory analysis of such samples to identify the subsurface soil and rock types and strength properties. Testing is also done to measure the soil's electrical properties to ensure proper grounding and electrical collection system design. A geotechnical investigation is generally performed at each turbine location, at the substation location, and at the O&M building site.

Using all of the data gathered for the Project (including geotechnical information, environmental conditions, site topography, etc.), Howard Wind will develop a set of site-specific construction plans and specifications for the various components of the Project. The design specifications will comply with applicable construction standards established by various industry practice groups such as:

- American Concrete Institute (ACI)
- Institute for Electrical and Electronic Engineers (IEEE)
- National Electric Code (NEC)
- National Fire Protection Agency (NFPA)
- Construction Standards Institute (CSI)

The Project engineering team will ensure that all aspects of the specifications, as well as the actual on-site construction, comply with all applicable federal, state, and local codes and good industry practice.

To assure compliance with various environmental protection commitments and permit conditions, Howard Wind will hire environmental monitors to oversee construction (and post-construction) activities. Prior to the start of construction at any given site, an environmental monitor, the contractor, and Howard Wind representatives will conduct a walk-over of areas to be affected, or potentially affected, by proposed construction activities. This pre-construction walk-over will identify sensitive resources to avoid (e.g., wetlands, archeological, or agricultural resources), as well as the limits of clearing, location of wetland and stream crossings, location of drainage features (e.g., culverts, ditches), location of underground utilities and tile lines, and layout of sedimentation and erosion control measures. Upon identification of these features, they will be marked in the field (by staking, flagging, fencing, etc.), specific construction procedures will be determined, and any modifications to construction methods or locations will be proposed before construction activities begin. Landowners and agency representatives will be included on these walk-overs or consulted as needed.

2.5.2 Staging Areas

The construction staging area will be developed by stripping and stockpiling the topsoil and grading and compacting the subsoil. It is currently anticipated that geotextile fabric and a minimum of 8 inches of gravel will then be installed to create a level working yard. Electric and communication lines will be brought in from existing distribution poles to allow connection with construction trailers. At the end of construction, utilities, gravel, and geotextile fabric will be removed from staging areas that do not overlap with the proposed O&M facility and the sites restored to their preconstruction condition.

2.5.3 Site Preparation

Actual Project construction will be initiated by clearing woody vegetation as necessary from all tower sites, access roads, and interconnect routes. The work area will be cleared with a chainsaw or brush hog. Trees cleared from the work area will be cut into logs and removed, while limbs and brush will be chipped and spread on-site. For the purposes of this DEIS, it is assumed that a 200-foot radius will be cleared around each tower, a 75-foot-wide corridor will be cleared along access roads, and a 15-foot-wide corridor will be cleared along all underground electric interconnect routes. The actual cleared area will vary on a case-by-case basis, and will depend on factors such as topography and vegetation.

2.5.4 Access Road Installation

Wherever feasible, existing roads and farm drives will be upgraded for use as Project access roads in order to minimize impacts to both active agricultural areas and wetland/stream areas. Where an existing road or farm drive is unavailable or unsuitable, new gravel- surfaced access roads will be constructed. Road construction will involve topsoil stripping and grubbing of stumps, as necessary. Stripped topsoil will be stockpiled along the road corridor for use in site restoration. Any grubbed stumps will be removed, chipped, or buried. Following removal of topsoil, subsoil will be graded, compacted, and surfaced with 8 to 12 inches of gravel or crushed stone, and a geotextile fabric or grid will be installed beneath the road surface (if necessary)., to provide additional support. To the extent practicable, local sources will be used to obtain gravel (and other construction materials that may be needed such as sand) in support of Project construction. These local sources may include AL Blades & Sons located in the Town of Avoca and the Town of Howard, and/or Knight Settlement Sand & Gravel LLC located in the Town of Bath, New York. See Section 3.8 and Appendix N for additional detail, including an approximation of quantities needed to support the construction of this Project, and related truck traffic.

The typical finished access road will be 16 feet in width, with occasional wider pull-offs to accommodate passing vehicles, and earthen shoulders on either side to accommodate crane traffic. Maximum permanent road width will be 20 feet. Appropriately sized culverts (minimum 12 inch) will be placed in any wetland/stream crossings in accordance with state and federal permit requirements. In other locations, culverts may also be used to assure that the roads do not impede cross drainage. Where access roads are adjacent to, or cross, wetlands, streams or drainage ditches/swales, appropriate sediment and erosion control measures (e.g., silt fence) will be installed.

During construction, access road installation and use could result in temporary disturbance of a maximum width of 40 feet, with temporary road horizontal radii of 200 feet. In agricultural areas, topsoil will be stripped and wind-rowed along the access road to prevent construction vehicles from driving over undisturbed soil and adjacent fields. Once construction is complete, temporarily disturbed areas will be restored (including removal of excess road material, de-compaction, and rock removal in agricultural areas) and returned to approximately their pre-construction contours. Typical access road details are included in Appendix A. Photos of access road construction are included in Figure 4.

2.5.5 Foundation Construction

Once the roads are complete for a particular group of turbine sites, turbine foundation construction will commence on that completed access road section. Foundation construction occurs in several stages including hole excavation, outer form setting, rebar and bolt cage assembly, casting and finishing of the concrete, removal of the forms, backfilling and compacting, and site restoration. Excavation and foundation construction will be conducted in a manner that will minimize the size and duration of excavated areas required to install foundations.

Initial activity at each tower site will involve removing vegetative cover and grading topsoil within a 200-foot radius around each tower (approximate area of disturbance of 2.9 acres). In agricultural land, the topsoil within a 200-foot radius of each tower will be stripped and stockpiled in accordance with NYS Department of Agriculture and Markets (NYSA&M) Guidelines. Backhoes will then be used to excavate a foundation hole. In agricultural areas excavated subsoil and rock will be segregated from topsoil. If bedrock is encountered it is anticipated to be ripable, and will be excavated using mechanical means. If the bedrock is not ripable, it will be excavated by pneumatic jacking, hydraulic fracturing, or blasting. If blasting is required, it will be conducted in compliance with a Blasting Plan (see Section 3.1 for additional detail), and in accordance with all applicable laws to avoid impacts to sensitive receptors. If necessary, dewatering of foundation holes will involve pumping the water to a discharge point, which will include measures/devices to slow water velocities and trap any suspended sediment. Dewatering activities will not result in the direct discharge of water into any streams or wetlands.

The foundation is anticipated to be one of two designs; either a concrete caisson or a spread footing (see Appendix A for typical details). It is currently anticipated that the spread foot foundation will be used (the same foundation design used on existing projects such as the Fenner Wind Farm). This foundation type is approximately 10 feet deep, approximately 50 to 60 feet in diameter, and requires approximately 300 cubic yards (cy) of concrete. Once the foundation concrete is sufficiently cured, the excavation area around and over it is backfilled with the excavated on-site material. Mortenson, a potential Project contractor who has conducted a preliminary site investigation, indicated that it is their preference to use a local plant to provide the necessary concrete, and thus avoid using an on-site concrete batch plant. However, Mortenson also indicated that if an on-site plant is necessary it would require a temporary area of approximately 3.5 acres. Ultimately, the decision to use an existing, local plant versus using a temporary on-site batch plant will be determined by the Project contractor. See Section 3.8 and Appendix N for an approximation of concrete quantities needed to support the construction of this Project, and related truck traffic.

The top of the foundation is a nominal 18-foot diameter pedestal that typically extends 6 to 8 inches above grade and is surrounded by a 6-foot wide gravel skirt. A caisson footing would be placed in a nominal 22-foot diameter excavation to a depth of around 30 feet. At the base of each tower an area approximately 100 feet by 60 feet will be developed as a level crane pad.

2.5.6 Buried Cable Installation

As mentioned previously, electrical interconnects will generally follow Project access roads, but will also follow field edges and cut directly across fields in places. The proposed layout of the interconnect system is illustrated in Figure 3. Where buried cable is proposed to cross active agricultural fields, the location of any subsurface drainage (tile) lines will be determined (through consultation with the landowner), if possible, to avoid damaging these lines during cable installation. Direct burial methods through use of a cable plow, rock saw, and/or trencher will be used during the installation of underground interconnect lines whenever possible. Direct burial with a cable plow will involve the installation of bundled cable (electrical and fiber optic bundles) directly into a “rip” in the ground created by the plow blade. The rip disturbs an area approximately 24 inches wide with bundled cable installed to a minimum depth of 36 inches (see photos in Figure 4 and typical detail in Appendix A). An area up to 15 feet wide must be cleared of tall-growing woody vegetation and will be disturbed by the tracks of the installation machinery. However, this disturbance does not involve excavation of the soil. Generally, no restoration of the rip is required, other than surficial compaction and smoothing. Similarly, surface disturbance associated with the passage of machinery is typically minimal. Should additional surface restoration be required, a small excavator or small bulldozer will closely follow the installation, smoothing the area.

Direct burial with a trencher involves the installation of bundled cable in a similar fashion to cable plow installation. The trencher or rock saw uses a large blade or "saw" to excavate an open trench. A 24-inch-wide trench is generally opened with a sidecast area immediately adjacent to the trench. Similar to cable plow, this direct burial method installs the cable a minimum of 36 inches deep (48 inches in active agricultural fields) and requires only minor clearing and surface disturbance (up to 15 feet wide for the installation machinery and access).

In active agricultural land, a maximum of two parallel circuits can be installed by trenching without the need to strip and segregate topsoil (in accordance with NYSA&M guidance). Sidecast material will be replaced by a small excavator or small bulldozer. All areas will be returned to pre-construction grades, and restoration efforts will be as described above for cable plow installation. Where three or more cables run parallel through active agricultural fields, the topsoil will be stripped and stockpiled prior to cable installation, and replaced, regraded, and stabilized by seeding and mulching following installation. Any tile lines that are inadvertently cut or damaged during installation of the buried cable will be repaired as part of the restoration effort.

Installation of utility lines in an open trench will be used only in areas where the previously described direct burial methods are not practicable. At this time, no open trench installation is proposed unless conditions at the time of construction make direct burial unfeasible. Areas appropriate for open trench installation will be determined at the time of construction and may include areas with unstable slopes, excessive unconsolidated rock, and standing or flowing water. Open trench installation will likely be performed with a backhoe and will generally result in a disturbed trench 36 inches wide and a minimum of 36 inches deep. The overall temporary footprint of vegetation and soil disturbance may be a maximum of 15 feet due to machinery dimensions and backfill/spoil pile placement during installation. In agricultural areas, all topsoil within the work area will be stripped and segregated from excavated subsoil. Replacement of spoil material will occur immediately after installation of the buried utility. Subgrade soil will be replaced around the cable, and topsoil will be replaced at the surface. Any damaged tile lines will be repaired, and all areas adjacent to the open trench will be restored to original grades and surface condition. Restoration of these areas will be completed through seeding and mulching of all exposed soils.

2.5.7 Overhead Cable Installation

As indicated in Section 2.3.2, it is currently anticipated that approximately 2.7 miles of the 34.5 kV interconnects will be overhead. Howard Wind has a pending agreement with the SREC, which will allow use of the existing SREC utility ROW. In addition, Howard Wind is working with the SREC to design the overhead 34.5 kV line in the most sensitive way practicable. Based upon correspondence with SREC personnel, it is currently anticipated that the existing 40-foot poles would generally be replaced with approximately 50-foot poles, and would include double circuit with 34.5 kV over 12.4 kV. Poles in new location will be a maximum of 45 feet in height. This overhead line will be built and inspected to Rural Utilities Service (RUS) standard construction specifications.

Howard Wind intends to utilize SREC services for the permitting, design, construction, operation and maintenance, and ultimate ownership of the above ground 34.5 kV electrical interconnect associated with the Howard Wind Power Project. In addition, SREC provided Howard Wind with a copy of the United States Department of Agriculture (USDA) Rural Electrification Administration (REA) Bulletin 50-4, which addresses "Specifications and Drawings for 34.5/19.9 kV Distribution Line Construction". As indicated in this bulletin, "the 1987 or latest edition of the National Electrical Safety Code (NESC), ANSI C2, shall be followed except where local regulations are more stringent, in which case local regulations shall govern" (USDA, 1986).

Preliminary consultation with an electrical engineering firm indicated that the overhead 34.5 kV line will require a maximum cleared width of 30 feet. Based upon on-site investigations conducted by EDR personnel, the majority of the 2.7 -mile overhead interconnect route consists of non-forested vegetative communities (e.g., agriculture, old field, scrub shrub). However, approximately 0.67 mile of this route will traverse forested communities. In addition, on-site investigations concluded that the existing SREC ROW is not cleared. Therefore, this DEIS assumes that the entire 30-foot wide corridor will require clearing (see Section 3.3. for additional detail).

There is only one location along this overhead interconnect route that is in close proximity to large, mature shade trees. Near the intersection of Turnpike Road and Palmer Road, the existing SREC distribution line is approximately 25 feet from the outermost branches of large shade trees. Project-related overbuild is not anticipated to result in any impacts (i.e., clearing, trimming) to these shade trees. Therefore, all clearing activities are anticipated to occur to natural communities only.

2.5.8 Wind Turbine Assembly and Erection

Beyond the tower, nacelle, and rotor blades, other smaller wind turbine components include hubs (center portion of the rotor assembly), cabling, control panels and internal facilities such as lighting, ladders, etc. All turbine components will be delivered to the Project site on flatbed transport trucks, and the main components will be off-loaded at the individual turbine sites. Turbine erection is performed in multiple stages including setting of the bus cabinet and ground control panels on the foundation, erection of the tower (usually in 3 to 4 sections), erection of the nacelle, assembly and erection of the rotor, connection and termination of the internal cables, and inspection and testing of the electrical system prior to energization.

Turbine assembly and erection involves mainly the use of large track-mounted cranes, smaller rough terrain cranes, boom trucks, and rough terrain fork-lifts for loading and off-loading materials. The tower sections, rotor components, and nacelle for each turbine will then be delivered to each site by specialized trailers and unloaded by crane. A large erection crane will set the tower segments on the foundation, place the nacelle on top of the tower, and following ground assembly, place the rotor onto the nacelle (see photos in Figure 4).

The erection crane(s) will move from one tower to another along a designated crane path. This path will generally follow Project access roads, but in a few places may traverse open fields without any permanent roads. In such areas, a proof roller will be used to test soil stability and level and compact the soil prior to crane passage. If this approach is not feasible, topsoil will be stripped and stockpiled and 40-foot-wide temporary roads will be installed in these areas. In some places, the crane will be partially disassembled and carried from one tower site to another by a specialized flatbed tractor-trailer. This mode of crane transport will not require a 40-foot-wide travel surface, but could require some additional clearing and grading adjacent to the roads to accommodate the width of the crane tracks (which will extend well beyond the edges of the trailer). Upon departure of the crane from each tower site, all required site restoration activities will be undertaken. Restoration of crane paths will include removal of all temporary fill/road materials. In agricultural fields, restoration will also include subsoil de-compaction (as necessary) and rock removal, spreading of stockpiled topsoil, and reestablishing pre-construction contours. Exposed soils at restored tower sites and along roads and crane paths will be stabilized by seeding, mulching, and/or agricultural planting.

2.5.9 Substation

Substation construction will begin with clearing the site and stockpiling topsoil for later use in site restoration. The site will be graded, and a laydown area for construction trailers, equipment, materials, and parking will be prepared. Concrete foundations for major equipment and structural supports will be poured, followed by the installation of various conduits, cable trenches, and grounding grid conductors. Above-ground construction will involve the installation of structural steel, bus conductors and insulators, switches, circuit breakers, transformers, control buildings, and wiring. The final steps involve laying down crushed stone across the stations, erecting a chain link perimeter fence, connecting the high voltage links, and testing the control systems.

To summarize the anticipated construction activities previously discussed in Section 2.5, Project components and their construction will result in disturbance to soil and vegetation and result in minor land use or conversion. Assumptions used for the purposes of the SEQRA evaluation are outlined below in Table 1.

Table 1. Impact Assumptions and Calculations

Project Components	Typical Area of Vegetation Clearing	Area of Total Soil Disturbance (temporary and permanent)	Area of Permanent (fill/structures) Disturbance
Wind Turbines and Workspaces	200’ radius per turbine	200’ radius per turbine	0.2 acre (pedestal plus crane pad)
Access Roads	75’ wide per linear foot of road	40’ wide per linear foot of road	20’ wide per linear foot of road
Buried Electrical Interconnects	15’ wide per linear foot of cable	15’ wide per linear foot of cable	none
Overhead 34.5 kV Line	30’ wide per linear foot of cable	< 1 acre	< 0.1 acre
Meteorological Tower	1 acre per tower	1 acre per tower	0.1 acre per tower
O&M Building (5,000 sf) and associated storage yard	2.5 acres	2.5 acres	2 acres
Staging Areas	5 acres	5 acres	none
Substation	3 acres	3 acres	1.75 acres

During all aspects of Project construction, the contractor and/or construction manager will minimize fugitive dust and airborne debris to the maximum extent practical by implementing appropriate control measures. These measures will include (but are not limited to) the application of mulch, water, stone, or an approved chemical agent on any public roads, access roads, exposed soils, or stockpiled soils when dry and windy conditions exist. Other mechanisms to initiate dust control procedures include a determination from the Environmental Monitor that control measures shall be implemented, and a complaint by a landowner or local resident. A watering vehicle shall be available for use for the duration of Project activities, including restoration. No chemical dust control measures will be implemented in the vicinity of organic farms (if applicable).

2.6 OPERATIONS AND MAINTENANCE

Operation of the wind turbines and associated components is almost completely automated. However, the Project is anticipated to employ a staff of approximately six O&M personnel (4 wind technicians, a project manager and an administrative support person). For the wind turbines anticipated for this Project, a minimum wind speed of approximately 13 mph is required to initiate generation. High-speed shutdown occurs at around 82 mph. The turbines are equipped with two fully independent braking systems that allow the rotor to be brought to a halt under all foreseeable conditions. The system consists of aerodynamic braking by the rotor blades and by a separate hydraulic-disc brake system. Both braking systems operate independently, such that if there is a fault with one, the other can still bring the turbine to a halt. Each wind turbine has a computer to control critical functions, monitor wind conditions, and report data back to the Supervisory Control and Data Acquisition (SCADA) system.

O&M staff will be on duty during core operating hours (eight hours a day, five days per week) with weekend shifts and extended hours as required. In the event of turbine or facility outages, the SCADA system will send alarm messages to on-call technicians to notify them of the outage. The Project will always have two on-call local technicians available to provide quick response in the event of any emergency. The wind turbines selected for this Project have been chosen in part for the manufacturers high functional reliability. Each wind turbine manufacturer studies and reports on the frequency of operation problems and malfunctions that arise when the turbines are generating electricity. Data on the turbines' reliability is summarized by the manufacturer in the turbine's availability rating, which estimates the percentage of time that the turbine will function. More detailed specifications on the wind turbines being proposed for the Project are included in Appendix A.

Each wind turbine will receive regular scheduled preventive maintenance inspections during its lifetime. Howard Wind estimates that once operational, individual wind turbines will require maintenance and repair calls an average of three to six times per year in addition to their scheduled inspections. In certain circumstances, heavy maintenance equipment, such as a lifting crane, may need to be brought in to repair turbine problems (such as nacelle component replacement). During Project operation, a thorough analysis will be conducted prior to initiating any major repair to assure that any potential environmental impacts are avoided or minimized. At the very minimum, all major repairs (and associated activities) will adhere to the requirements of appropriate governing authorities, and will be in accordance with the conditions of all applicable federal, state, and local permits. If new permits are required, these will be obtained prior to initiating the necessary activities. In addition, the Project operator will work with the Town of Howard and any potentially affected landowner(s) to assure that impacts are avoided and/or minimized, and any specific concerns are accounted for.

The Howard Wind Power Project is expected to have an average annual capacity of approximately 30%, which is comparable to other commercial wind farms in New York State. Total net generation delivered to NYSEG's high-voltage grid is expected to be 157,000 MWh, which is the average annual consumption of approximately 20,000 homes (assuming the average home requires 8,000 MWh per year). (By way of comparison, the 2000 census indicated a total of 46,132 housing units within Steuben County). The Howard Wind Power Project will be connecting into the grid on an existing 115 kV transmission line. The high voltage transmission system within New York State is overseen by the NYISO who in turn is overseen by the Federal Energy Regulatory Commission (FERC). At the local level, the Howard Wind Power Project will be interconnecting into the grid in New York State Gas and Electric's (NYSEG) service territory.

The electrical grid is a dynamic system with electricity flow towards the path of least resistance. Transmission line/conductors have an infinite design capacity and current limiting conditions are based on supply and demand on the conductors. The Howard Wind Power Project will not have an adverse impact on the New York Transmission system within the general area of interconnection if pre-disturbance generation dispatch in the area is appropriately adjusted to recognize the transmission security constraints. In the event that additional wind projects were to be proposed, new transmission facilities would likely need to be built to accommodate additional capacity. Construction of new transmission lines fall under Federal, State, and local oversight, which include (but are not limited to) FERC, the New York State Public commission (PSC), the NYISO, and NYSEG.

2.7 DECOMMISSIONING

At the start of construction, a financial instrument (e.g., a reserve account) will be in place to ensure that sufficient funds are available for removal of equipment and associated material at the end of its operational life. Prior to the granting of local approvals (e.g., Wind Facilities Permit) for Project development, the Applicant shall formulate a Decommissioning Plan cooperatively with the Howard Township, or demonstrate that the private land leases provide adequate requirements for this plan. Unless otherwise agreed between the town and Howard Wind, and unless Howard Wind can show that its land leases adequately address this issue, the Decommissioning Plans shall include:

- Provision describing the triggering events for decommissioning of the Project.
- Provisions for the removal of structures, and debris but not below-ground cable.
- Provisions for the restoration of the soil and vegetation.
- A timetable approved by the town for site restoration.
- An estimate of decommissioning costs certified by a Professional Engineer.
- Financial Assurance, secured by Howard Wind, for the purpose of adequately performing decommissioning, in an amount equal to the Professional Engineer's certified estimate of decommissioning cost, less the expected salvage cost of the wind farm components.
- Identification of procedures for the town to access financial assurances.
- A provision that the terms of the Decommissioning Plan shall be binding upon Howard Wind or any of their successors, assigns, or heirs.
- A Provision that the town shall have access to the site, pursuant to reasonable notice, to inspect the results of complete decommissioning.
- Removal of machinery, equipment, tower, and all other materials related to the Project is to be completed within one year of decommissioning.
- All town, county or state roads, impacted by Project activity, if any, will be restored to original condition upon completion of decommissioning.

Megawatt-scale wind turbine generators typically have a life expectancy of 20 to 25 years. The current trend in the wind energy industry has been to replace or "re-power" older wind energy projects by upgrading older equipment with more efficient turbines. However, if not upgraded the turbines will be decommissioned. Decommissioning would consist of the following actions: all turbines, including the blades, nacelles and towers will be disassembled, and transported off site for reclamation and sale. All of the transformers will also be transported off-site for reuse or reclamation. All underground infrastructure at depths less than 36 inches below grade will be removed. All underground infrastructure at depths greater than 36 inches below finished grade (including the subsurface collection conductors, and foundations) will be abandoned in place. Areas where subsurface components are removed will be graded to match adjacent contours, stabilized with an appropriate seed mix, and allowed to re-vegetate naturally. All road materials will be allowed to remain on-site. All decommissioning and restoration activities (and any major repair activities) will adhere to the requirements of appropriate governing authorities, and will be in accordance with all applicable federal, state, and local permits, including any approved schedule for decommissioning.

As mentioned, a decommissioning plan that details the process, estimated cost, salvage value, and site restoration will be provided to (and approved by) the Town of Howard prior to Project operation. All decommissioning and restoration activities will be in accordance with all applicable federal, state, and local permits and requirements and will include the following:

- **Turbine removal**. Cranes and/or other machinery will be used for the disassembly and removal of the turbines. Electronic components and controls, and internal cables will be removed. The rotor and nacelle will be lowered to the ground for disassembly. The tower sections will be lowered to the ground where they will be further disassembled for transporting. The rotor, nacelle, and tower sections will either be transported whole for reconditioning and reuse or dissembled into salvageable, recyclable, or disposable components.

- **Turbine foundation removal**. Turbine foundations will be removed down to a level 36 inches below grade. The remaining excavation will be filled with clean sub-grade material, compacted to a density similar to surrounding sub-grade material, and finished with topsoil.

- **Underground collection cables**. All cables buried less than 36 inches will be removed. All cables buried deeper than 36 inches, will be kept in place if it is determined that their presence does not adversely impact land use and they do not pose a safety hazard.

- **Access roads and crane pads**. At the discretion of the landowner, gravel will be removed from access roads and crane pads and transported to a pre-approved disposal location. Any drainage structures will be removed and backfilled with sub-grade material (if necessary). The ground will be de-compacted (in agricultural areas only), surfaced with topsoil, contoured, and re-vegetated.

- **Monitoring**. In accordance with the guidelines of the New York State Department of Agriculture and Markets, a monitoring and remediation period of two years immediately following the completion of any decommissioning and restoration activities in agricultural land will commence. Any remaining agriculture impacts can be identified during this period and follow-up restoration efforts will be implemented.

- **Substation**. The Project substation is generally valuable to the local transmission owner. As per the interconnection rules of the NYISO the Project substation reverts to the ownership of the transmission owner and thus Howard Wind does not have the authority to plan for the decommissioning of the substation.

2.8 PROJECT COST AND FUNDING

The approximate one million dollar cost of developing/permitting the Project has been provided by its sponsor, Howard Wind. The Project will be funded as a commercial, for-profit enterprise with the expected $100 million capital cost supplied by private lenders and investors. Howard Wind intends to own and operate the Project, and its generation will be sold either on the wholesale spot market or under power purchase agreements.

2.9 PERMITS AND APPROVALS REQUIRED

Implementation of the Project will require certain permits and/or approvals from local, state, and federal agencies. The permits and approvals that are expected to be required are listed in Table 2.

Table 2. Anticipated Permits and Approvals for the Howard Wind Power Project.

Agency	Description of Permit or Approval Required
Town	
Town of Howard	Approval of Wind Facilities Permit.
Town of Howard Departments (Public Works, Codes, etc.)	Issuance of building permits. Review and approval of highway work permits.
Steuben County	
Steuben County Industrial Development Agency	Acceptance of DEIS, FEIS, and issuance of findings (as Lead Agency under SEQRA).
Steuben County Industrial Development Agency	Approval and administration of PILOT.
Department of Public Works	Highway work permits.

Agency	Description of Permit or Approval Required
New York State	
Department of Environmental Conservation	Article 24 Permit for disturbances to state jurisdictional wetlands. Article 15 Permit for disturbance of protected streams. SPDES General Permit. Section 401 Water Quality Certification.
Department of Transportation	Special Use Permit for oversize/overweight vehicles. Highway work permit. Use and occupancy permit.
Department of Agriculture & Markets	Review Notice of Intent for work in an Ag. District.
Federal	
U.S. Army Corps of Engineers	Section 404 Nationwide Permit for placement of fill in federal jurisdictional wetlands/waters of the U.S. NEPA compliance.
Federal Aviation Administration	Approval of Obstruction Lighting Plan

2.10 PUBLIC AND AGENCY INVOLVEMENT

Extensive agency interaction and public outreach have preceded the formal submittal of this DEIS. As indicated in the Howard Outreach Activity summary provided in Appendix B, Howard Wind has placed a high-level of importance on the community outreach component of this Project. From the inception of the proposed Project Howard Wind has not only provided the interested landowners with information on wind power and Project plans, but have taken steps to educate those in the community as to the benefits of wind power. The following summarizes the actions undertaken to date as well as planned future activities:

- Information Kiosks – Howard Wind has placed information stations at the Howard Public Library and the Howard Café. Both of these locations offer high traffic areas and visible locations for the promotion of wind power.

- Comprehensive Outreach Plan – In September, 2005, Howard Wind worked with Trieste Associates, Inc. to develop an outreach program. The plan outlines interested groups and outreach activities that are planned.

- Newsletter – The first of a series of periodic newsletters that will be distributed to promote correspondence with the public was released in the spring of 2005. To date four issues have been released, and the most recent is the fall 2006 issue.

- Fenner Wind Project Site Visit – On July 6, 2005, Howard Wind hosted a visit to the Fenner Wind Project in Fenner, New York. The purpose of the visit was to show the town leaders, landowners, and other interested parties a working wind farm so that they can more accurately form opinions on the proposed project in Howard.

- Howard Wind Project Open House – On October 22, 2005, Howard Wind hosted an open house for the Howard Wind Farm. The open house was held at the Town Fire Hall and was intended to give residents a chance to meet Howard Wind personnel and learn about the project.

- Sample Handouts and Educational Materials – At the open house and in other meetings with local authorities, landowners, and residents, Howard Wind uses a number of handouts, which provide valuable third–party information. These materials have also been placed in a number of locations throughout the Town of Howard and are delivered directly to individual interested parties as needed.

- Educational Video – In collaboration with a selection of wind industry participants and McMulti, Inc, Howard Wind contributed to the production of a video that addresses many of the common issues in wind project development. Titled *New York Wind Power,* the video is meant to inform residents, officials, and other interested parties about the facts surrounding wind projects.

- Howard Wind Project Website – In order to better inform Howard residents and officials, Howard Wind launched a website (www.howardwind.com) containing basic information on wind energy, the development process, and the current status of the Howard Wind Project. This website will continue to be updated as the project progresses.

- Fenner Wind Project Site Visit #2 – On April 9, 2006, Howard Wind hosted a second visit to the Fenner Wind Project in Fenner, New York. The purpose of the visit was to invite residents of the Town of Howard to experience a working wind farm. While the first visit to the Fenner Project on July 6, 2005 was intended to educate Howard officials, this visit was open to all resident and any other interested parties.

- Howard Town Meetings – Howard Wind has continued working with local governments to keep them informed and involved at every step of the process. Kevin Sheen from EverPower has been present at most town board meetings (held monthly). The meetings serve as opportunities to update the town supervisors and to make EverPower/Howard Wind accessible to the community.

- Howard Community Days - On September 16, 2006 EverPower/Howard Wind participated in the Howard Community Days. EverPower had a booth and distributed general information about wind power to all interested residents. EverPower representatives were on hand to answer questions and listen to comments by the residents of Howard. Over 80 people stopped by the booth and made positive comments to EverPower about the proposed Howard Wind Project.

- Letters to concerned residents – While reaction from the residents of Howard has been overwhelmingly positive, there are a few residents with concerns. When EverPower learns of these people the company always tries to reach out to them to further engaged their concern.

- The Alliance for Clean Energy New York (the NY Wind Working Group) – EverPower is an active member of this group and regularly participates in meetings and community outreach events throughout New York.

- Meetings with residents in Howard – EverPower/Howard Wind makes every effort to meet with residents regarding the proposed Howard Wind Farm, and a number of these meetings have already taken place and will continue to take place. These smaller, informal meetings are an important part of reaching out to those that live in Howard.

EverPower/Howard Wind will continue to work in the community to promote the project. All efforts are intended to allow the community to participate in the development process and feel some ownership of the project.

In addition, Howard Wind has also engaged agency personnel during Project development. For example, protocol for the on-site avian (and bat) studies conducted for this Project was developed in consultation with the NYSDEC, and the results of these studies were provided to both the NYSDEC and the USFWS (See Appendix C for Agency Correspondence).

2.10.1 SEQRA Process

The Steuben County Industrial Development Agency (SCIDA) received an application for assistance from Howard Wind/EverPower relative to the proposed Howard Wind Power Project. Therefore, SCIDA is an involved agency pursuant to the State Environmental Quality Review Act (SEQRA) and the implementing regulations (6 NYCRR Part 617). SCIDA initiated the environmental review process by performing a coordinated revew with the other involved or interested agencies. Specifically, on May 19, 2006 SCIDA circulated a letter to the known involved agencies and interested parties proposing that SCIDA assume the designation as Lead Agency. On June 22, 2006, SCIDA passed a resolution that indicated SCIDA will act as the Lead Agency for the environmental review of the Howard Wind Power Project under SEQRA regulations.

Parts 2 and 3 of a Full Environmental Assessment Form (EAF) addressing the proposed wind power project was submitted to SCIDA on July 14, 2006. A Positive Declaration was issued by SCIDA (as Lead Agency) on July 26, 2006, requiring the preparation of this DEIS. A draft Public Scoping Document was accepted by SCIDA on July 26, 2006, which was issued to involved agencies and interested parties, and a public comment period was opened from July 26 through August 18, 2006. SCIDA subsequently passed a resolution on August 24, 2006 that allowed extending the timeframe for issuing the final written scope (from 60 days to 94 days). Following review of all comments received, the scoping document was updated and on October 26, 2006 SCIDA accepted the Final Scoping Document for the Howard Wind Power Project (see Appendix C for a compilation of agency correspondence).

The remainder of the SEQRA process for the Project is anticipated to include the following actions and time frames:

- Submission of DEIS.
- DEIS accepted by lead agency (SCIDA).
- Lead Agency files notice of completion of DEIS and notice of public hearing and comment period.
- Public hearing on DEIS (must be held at least 14 days after public notice is published).
- A minimum 30-day public comment period.
- Prepare a Responsiveness Summary to address substantive/relevant comments received.
- Complete Final EIS (FEIS); document accepted by Lead Agency.
- File notice of completion of FEIS.
- 10-day public consideration period.

- Lead Agency issues Findings Statement and provides necessary publications and notifications completing the SEQRA process.
- Involved agencies issue Findings Statements.

This DEIS, along with a copy of the public notice, will be distributed for review and comment to the public and to the agencies and parties listed in Table 3 below.

2.10.2 Agency and Public Review

Opportunities for detailed agency and public review will continue to be provided throughout the SEQRA process, as well as in conjunction with the review of applications for the other permits and approvals needed for the Project. With respect to the completion of the SEQRA process, the DEIS will be available for public review and agency comment as outlined above. In addition to a public comment period (during which time written comments will be accepted), a duly noticed public hearing concerning the DEIS will be organized and held, in accordance with SEQRA requirements.

Table 3. Involved and Interested Agencies and Public DEIS Repositories

Town of Howard	
Town of Howard Town Board 3725 Mills Road Avoca, NY 14809	Town of Howard Highway Department 3725 Mills Road Avoca, NY 14809
Howard Town Clerk 3725 Mills Road Avoca, NY 14809	Howard Public Library 3607 County Route 70A Hornell, NY 14843
Steuben County	
Steuben Co. Industrial Development Agency Attention: Mr. James Sherron Executive Director 7234 Route 54 Bath, New York 14810-0393	Steuben County Planning Department 3 East Pulteney Square Bath, New York 14810
Steuben County Highway Department 3 East Pulteney Square Bath, New York 14810	Steuben County Legislature Attention: Philip J. Roche Chairman 3 East Pulteney Square Bath, NY 14810

New York State	
NYS Dept. of Environmental Conservation 635 Broadway Albany, New York 12233-1011	NYS Department of Public Service Three Empire State Plaza Albany, New York 12223-1350
NYS Dept. of Environmental Conservation Region 8 Attn: Regional Permit Administrator 6274 East Avon-Lima Road Avon, New York 14414	NYS Department of Transportation 50 Wolf Road 6th Floor Albany, New York 12232
NYS Department of Agriculture and Markets Attention: Mr. Michael Saviola 158 Main Street Mt. Morris, New York 14510-1595	NYS Energy Research and Development Authority Corporate Plaza West 286 Washington Ave. Ext. Albany, New York 12203-6399
NYS Department of Transportation Region 6 107 Broadway Hornell, New York 14843	NYS Office of Parks, Recreation and Historic Preservation Field Services Unit Peebles Island Waterford, New York 12118

3.0 EXISTING CONDITIONS, POTENTIAL IMPACTS, AND MITIGATION MEASURES

3.1 GEOLOGY, SOILS, AND TOPOGRAPHY

3.1.1 Existing Conditions

Information regarding topography, geology, and soils was obtained from on-site observations and existing published sources, including the Steuben County Soil Survey (U.S. Department of Agriculture [USDA], 1978), U.S. Geological Survey (USGS) topographic mapping, statewide bedrock geology mapping (NYS Museum/NYS Geological Survey, 1999a), and New York State surficial geology mapping (NYS Museum/NYS Geological Survey, 1999b). In order to provide a detailed characterization of the soils occurring within the Project Site, maps from the county soil surveys were digitized and overlaid with the project layout utilizing ArcGIS software. In addition to a literature review of publicly available data, GZA GeoEnvironmental of New York (GZA) also contacted local and state agencies requesting information pertaining to bedrock and groundwater conditions in the Project area. As the last aspect of determining the geological conditions at the site, GZA conducted a detailed on site geotechnical investigation performing 6 test borings across the site area. Their preliminary engineering letter report is provided in Appendix D.

3.1.1.1 Topography

The Project Site is located in the glaciated portion of the Allegheny Plateau physiographic province (USDA, 1978). This area is characterized as a mature, eroded plateau with gently rolling uplands and valley topograpy. Valleys in the vicinity of the Project Site are associated with Stephens Creek, Taylor Hollow, and Baker Creek. Slopes generally range from 0 to 20 percent.. Elevations in the project vicinity range from approximately 1,500 feet above mean sea level (amsl) within the Steven's Creek Ravine to approximately 2,180 feet amsl in several locations in the southeast portion of the Site. No turbines are proposed in the valley portions of the area.

3.1.1.2 Geology

The bedrock within the Project Site was formed from deltaic deposits and is composed of sandstone, shale, and siltstone sedimentary rocks of the Devonian Age (USDA, 1978). The major bedrock formation in the Project Site is the Machais Formation of the Canadaway Group (NYS Museum/NYS Geological Survey, 1999a). Depth to bedrock generally ranges from 20 inches to greater than 60 inches for the majority of the project area, but can range from 0 to 20 inches in some areas (USDA, 1978). Surface geological materials are primarily glacial till (NYS Museum/NYS Geological Survey, 1999b; USDA, 1978). GZA states that bedrock outcropping was observed along Coots Road (deemed to be the result of road construction rather than a naturally occurring outcrop) and that natural outcroppings are expected to be found along streambeds and steep slopes. However, GZA also reports that no outcrops were observed in upland areas or in the vicinity of proposed wind turbine locations.

3.1.1.3 Soils

The Surficial Geologic Map of New York (1988) identifies the soils in the study area as predominantly glacial till with smaller areas of kame deposits. These till soils are identified as variable textured (e.g. clay, silt-clay) with thicknesses ranging from one to 50 meters. The Steuben County Soil Survey has mapped general soil associations and soil types within the county (see Tables 4 and 5). The soil survey indicates that three soil associations and approximately 10 soil series and 2 soil subgroups are present within the Project Site. Of these, Hornell, Fremont, Mardin, Kanona, and Lordstown are the dominant soil series. Table 4 lists the soil associations found within the Project Site and their characteristics. Table 5 summarizes the characteristics of the dominant soil series found within the Project Site.

Table 4. Soil Associations Within the Project Site.

Soil Association	Main Characteristics
Hornell-Fremont-Mardin	• Moderately well drained deep soils that have a fragipan • Somewhat poorly drained moderately deep soils • On uplands
Hornell-Lordstown	• Moderately steep and very steep • Well drained, moderately deep soils overlying hard sandstone bedrock • Somewhat poorly drained, deep soils overlying soft shale bedrock • On uplands
Mardin-Volusia-Lordstown	• Gently sloping to steep, moderately well drained and somewhat poorly drained, deep soils that have a fragipan • Moderately steep to very steep, well drained, moderately deep soils overlying hard sandstone bedrock • On uplands

Table 5. Dominant Soil Series Within the Project Site.

Soil Series	Main Characteristics
Hornell Series	• Somewhat poorly drained • Formed in shaly glacial till • Found on gently sloping to steep uplands • Depth to bedrock is 20 to 40 inches
Fremont Series	• Somewhat poorly drained • Formed in glacial till derived from shale, siltstone, and sandstone • Nearly level to steep, found on broad hilltops in uplands • Depth to bedrock is 40 to 60 inches
Mardin Series	• Moderately well drained • Formed in glacial till derived from sandstone and shale • Gently sloping to moderately steep • Fragipan at a depth of 14 to 23 inches • Depth to bedrock is greater than 60 inches
Kanona Series	• Poorly drained and somewhat poorly drained • Formed in glacial till drived mainly from shale • Nearly level to moderately steep on uplands • Depth to bedrock is greater than 60 inches
Lordstown Series	• Well drained • Formed in glacial till • Found on gently sloping to very steep bedrock-controlled ridges, hilltops, and steep valley sides • Depth to bedrock is 20 to 40 inches

Soils in the Project Site are primarily silt loams but channery silt loams and silty clay loams are also present. Erosion hazard ranges from slight to severe with approximately 40 percent of the project Site classified as having a slight erosion hazard, 35 percent moderate, and 25 percent severe. Soil drainage is dominantly somewhat poorly drained, with approximately 75 percent of the soils within the Project Site somewhat poorly or poorly drained, 10 percent moderately well drained, and 15 percent well drained. Based upon a listing provided by the Steuben County Soil and Water Conservation (SCSWCD), the Project site does not contain any soil types classified as prime farmland soils (SCSWCD, pers. comm.).

Some agricultural fields within Steuben County contain soils contaminated with Golden Nematode, which infects and destroys potato plants. Correspondence with the USDA Animal and Plant Health

Inspection Service (APHIS) Plant Protection and Quarantine (PPQ) program revealed that the Town of Howard does not have a history of golden nematode infestation (Dan Kepich, personal communication).

3.1.2 Potential Impacts

3.1.2.1 Construction

Project components have been sited to avoid or minimize either temporary or permanent impacts to physiography, geology, and soils to the extent practical. The project is not anticipated to result in any significant impacts to geology, but depth to bedrock in the Project Site is variable and it is possible that some turbine foundations will be set into bedrock. If bedrock is encountered it is anticipated to be ripable, and will be excavated with a backhoe. If the bedrock is not ripable, it will be excavated by pneumatic jacking or hydraulic fracturing. Although not anticipated, if blasting is required, given the proposed turbines' distance from adjacent development (each turbine is at least 1,000 feet from the nearest permanent residence), there should be no significant blasting-related impacts on wells, foundations, etc. In addition, a pre-blast survey will be conducted for all structures within 1,500 feet of the blast site if blasting is necessary. Only temporary, minor impacts to physiography and geology are expected as a result of construction activities. For example, some cut and fill or addition of fill will be required at some turbine sites and along some access roads; however, the impact to overall topography will be minor.

The primary impact to the physical features of the Project Site will be the disturbance of soils during installation of foundations, underground 34.5 kV cable, and access roads. Based on the assumptions outlined in Section 2.5, these activities will disturb approximately 133 acres of ground. The actual impact of this work will likely be less than these calculations indicate, due to conservative calculation methods and the proposed use/upgrade of existing farm lanes to access most turbines sites. A temporary staging area will disturb approximately 5 acres of soil, while construction of a meteorological tower, O&M building, and substation will disturb approximately 6.5 acres of soil. Soil disturbance from all anticipated construction activities will total approximately 144.5 acres. Of this total, only approximately 26.5 acres will be converted to built facilities (roads, cranepads, structures), while the remaining will be restored and stabilized following completion of construction.

Soils at the proposed access road and turbine locations generally do not present significant engineering or development constraints. According to GZA, the native fine grained overburden soils deeper than 48 inches are likely suitable for support of turbines on shallow foundations. However, written correspondence received from Jeffrey Parker of the Steuben County Soil and Water

Conservation District (SWCD) revealed a concern regarding potential soil drainage impacts (Appendix C). Soils in the area typically have a fragipan layer, which inhibits vertical infiltration of water, resulting in predominantly lateral subsurface drainage. Therefore, existing flow patterns can be disrupted/impeded by construction activities. Where subsurface drainage follows construction trench-lines, this disruption can create wet areas. Where access roads divert drainage to existing roadways, the disruption can create excess run-off to town and county road systems. Mr. Parker indicates that negative impacts to soil drainage patterns can be avoided/minimized through careful planning. These considerations will be taken into account during the development of a soil erosion and sedimentation control plan and in accordance with State Pollution Discharge Elimination System (SPDES) requirements.

Additionally, earth moving and general soil disturbance will increase the potential for wind/water erosion and sedimentation into surface waters. Construction on steep slopes (i.e., in excess of 15 percent) was avoided wherever possible, however, a portion of the access road east of Turbine 14 is sited on a hillside with a slope greater than 15 percent as is the buried interconnect between the substation and South Woods Road. The soils on these slopes are classified as having a severe erosion hazard. Additionally, although slopes do not exceed 15 percent, soils in the Project area of Turbine 9 are also classified as severe erosion hazard soils. Construction activity also has the potential to impact soil in agricultural fields through rutting, mixing of topsoil and subsoil, and soil compaction.

In addition to soils with erosion hazard and potential drainage constraints, the Project site contains several soil units generally considered acidic (having a pH of 4.5 to 7.3). These soils are likely to be corrosive to bare steel or concrete. Bare steel may need a protective coating and concrete may require additives in the mixture to protect against corrosion. Detailed design requirements will be determine during the engineer phase of the project.

The area of disturbance calculations presented above assume that significant soil disturbance will occur in all areas in which construction occurs. This assumption is very conservative. Actual disturbance will be highly variable based on the specific construction activity, the construction techniques employed, and soil/weather conditions at the time of construction. For instance, in many locations, installation of the buried electrical interconnects will involve relatively minor soil disturbance, restricted to a 2 to 3 foot wide trench when utilizing a rock saw or cable plow. However, because use of a backhoe and soil segregation cannot be ruled out, a 15 foot wide corridor of disturbance is assumed along all interconnect routes.

3.1.2.2 Operation

Overall, the project will result in permanent conversion of approximately 26.5 acres of land into built facilities (0.2-acre of crane pad and foundation at each tower site, maximum 20-foot-wide permanent access roads, a 1.75-acre substation, a 2-acre O&M building, and a 0.1-acre met tower). Beyond occasional soil disturbance associated with project maintenance and repair, impacts caused by the operation of this project on physiology, geography, and soils are expected to be minimal.

3.1.3 Proposed Mitigation

Impacts to physiography or geology have been largely avoided by siting Project components so as to minimize disturbances to steep slopes, sensitive soils, and bedrock. Nevertheless, geotechnical investigations consisting of soil boring tests have been conducted in 6 test boring locations across the site to verify depth to bedrock and to perform a pre-construction evaluation of surficial and bedrock geology (see details in Appendix D). Based on the findings it is not expected that blasting will be employed for the excavation of tower foundations. In the event that blasting in select locations are required, mitigation measures will include the development and implementation of a blasting plan that limits offsite impacts. This plan will address blast size, timing, and sequencing to focus force within the area of excavation. All necessary blasting will receive oversight by an environmental monitor. In addition, pre-notification signs and warnings to affected landowners, use of best management practices, and compliance with applicable permit requirements will be instituted as mitigation measures.

Additional potential impacts associated with soil disturbance (erosion, sedimentation, compaction) have been minimized by siting turbines in relatively level locations where practicable and using existing roads for turbine access wherever possible. Impacts to soils will be further minimized by the following means:

- Public road ditches and other locations where runoff is concentrated will be armored with rip-rap to dissipate the energy of flowing water and to hold the soils in place.
- Prior to commencing construction activities, erosion control devices will be installed between the work areas and downslope surface waters or wetlands, to reduce the risk of soil erosion and siltation.
- During construction activities, hay bales, silt fence, or other appropriate erosion control measures will be placed as needed around disturbed areas and stockpiled soils.
- Following construction, all temporarily disturbed areas will be stabilized and restored in accordance with approved plans.

Impacts to soil resources will be minimized by adherence to “best management practices” that are designed to avoid or control erosion and sedimentation, stabilize disturbed areas, and minimize the potential for spills of fuels or lubricants. In general, erosion, sedimentation, and soil drainage impacts during construction will be minimized by the implementation of an erosion and sedimentation control plan developed as part of the SPDES General Permit for the Project (see Typical Details in Appendix A). Erosion and sediment control measures shall be constructed and implemented in accordance with an erosion and sediment control plan. The plan will:

- Describe the temporary and permanent structural and vegetative measures that will be used to control erosion and sedimentation for each stage of the project.
- Provide a map showing the lowing of erosion and sediment control measures.
- Provide dimensional details of proposed erosion and sediment control facilities as well as calculations used in the siting and sizing of any sediment basins.
- Identify any temporary erosion and sediment control facilities that will be converted to permanent stormwater management facilities.
- Provide an implementation schedule for staging temporary and permanent erosion and sediment control facilities.
- Provide a maintenance schedule for soil erosion and sediment control facilities and describe maintenance activities to be performed.
- Erosion and sediment control measures shall be constructed prior to beginning any other land disturbances. The devices will not be removed until the disturbed land areas are stabilized.

Mitigation measures to protect and restore agricultural soils will be undertaken during and after construction. These will include full restoration of temporarily disturbed agricultural land in accordance with NYSA&M Agricultural Protection Guidelines (Appendix E). For example, topsoil will not be stripped and cranes will not cross fields during saturated conditions when such actions would damage agricultural soils. Existing access roads will be used for access to farmland to the extent practicable. However, for any new access roads that are required, topsoil in the work area will be stripped and stockpiled outside the area of disturbance, yet within the property from which it was removed. All vehicular movements and construction activity will be restricted to areas where topsoil has been removed. Approximately 118 acres of temporarily disturbed soils will be restored following construction, including approximately 67 acres of agricultural land. Restored areas will include tower sites, road edges, temporary roads, and staging areas. This process will generally involve the following sequence of activities:

1. Removal of gravel or other temporary fill.
2. Decompaction of compacted subsoils using a deep ripper.
3. Disking and removal of stones from decompacted subsoil.
4. Spreading of stockpiled topsoil over decompacted subsoil. Respreading of topsoil so as to reestablish pre-construction contours to the extent practicable.
5. Disking and removal of stones from respread topsoil.
6. Seeding and mulching topsoil. Seed selection in agricultural fields will be based on guidance provided by the landowner and the NYSA&M.

Additional details regarding proposed agricultural soil protection measures are included in Appendix E. Soil impacts during construction will also be minimized by providing the contractor and all subcontractors with copies of the final construction documentation and plans, which will contain all applicable soil protection, erosion control, and soil restoration measures. One or more pre-construction meetings will be held with the contractor and a representative of the NYSA&M, and, during construction, the environmental monitors will assure compliance with the construction plans and soil protection measures described above and included in Appendix E. A Notice of Intent to Undertake an Action within an Agricultural District will be filed with the NYSA&M and the Steuben County Agriculture and Farmland Protection Board. In addition, an Agricultural Data Statement will be filed pursuant to Section 305-a of the Agricultural and Markets Law. A Preliminary Notice of Intent and the procedures for processing an Agricultural Data Statement are also provided in Appendix E.

To mitigate for potential blasting-related impacts, if basting is necessary it will be conducted in accordance with a written pre-blast survey and a final blasting plan. A preliminary blasting plan has been provided by GZA, and is included in Appendix D. At a minimum, the written pre-blast survey and final basting plan will conform to the following:

- Structures within a minimum distance of 1,500 feet from any blasting activity shall be surveyed as part of the pre-blast survey. The extent beyond the 1,500-foot minimum shall be determined by the contractor, their blasting subcontractor, and their insurance companies. (wind turbine set backs are 1,000 feet for residential dwellings). A pre-blast well survey will also be completed if a well is located within 1,000 feet. This well pre-blast survey will include yield and turbidity measurements.

- The final blasting plan shall addresses air-blast limits, ground vibrations, and maximum peak particle velocity (PPV) for ground movement; including provisions to monitor and assess compliance with the air-blast, ground vibration and PPV requirements established.

- The blasting plan shall meet criteria established in Chapter 3 (Control of Adverse Effects) in the Blasting Guidance Manual of the United States Department of the Interior Office of Surface Mining Reclamation and Enforcement.

Additional detail regarding blasting can be found in GZA report provided in Appendix D.

3.2 WATER RESOURCES

The Project Site is located in the Tioga and Chemung River drainage basins (USGS Hydrologic Units 2050104 and 2050105, respectively). The Tioga River drainage basin includes the majority of the Project Site and the Chemung drainage basin includes the eastern edge of the Project Site. Both basins drain into the upper Susqehanna River which ultimately drains to the Atlantic Ocean. On-site surface waters, wetlands, and groundwater resources are described below.

3.2.1 Existing Conditions

3.2.1.1 Surface Waters

The Cohocton River and the Canisteo River are the dominant hydrologic features in the vicinity of the Project Site. The Project is located on the uplands between these two river valleys, approximately 6 miles southwest of the Cohoton River and approximately 1.5 miles north of the Canisteo River at the closest point. Both the Cohocton River and the Canisteo River flow in a southeasterly direction to their confluence with the Tioga/Chemung River. The Cohocton River (located approximately 6 miles northeast of the Project) flows southeast to its confluence with the Chemung River, and ultimately drains into the Atlantic Ocean. The Canisteo River is located approximately 1.5 to 2 miles south of the Project, Keuka Lake is located approximately 6.5 miles east of the Project, and Canandaigua Lake is located approximately 5.5 miles north of the Project. Both of these Finger Lakes drain north, ultimately to Lake Ontario.

The Project Site contains a small number of ponds and streams. According to USGS mapping, the only named stream that occurs within the Project boundary is Stephens Creek. Streams contiguous to the Project Site include Baker Creek, Campbell Creek, Goff Creek, Cunningham Creek, and unnamed tributaries to Big Creek. Stephens Creek, Baker Creek, Big Creek, and Cunningham

Creek flow south/southwest to the Canisteo River. Within or immediately adjacent to the Project site, FEMA-mapped, 100-year floodplains are associated with Stephens Creek and Goff Creek (see Figure 6).

Unnamed streams north of the Project Site flow north to Big Creek, which also flows to the Canisteo River. Campbell Creek and Goff Creek flow east/northeast to the Cohocton River. Although no NYSDEC protected streams occur within the Project Site, portions of streams contiguous to the Project Site including Baker Creek, Campbell Creek, and Goff Creek are considered protected waters by the NYSDEC.

Streams in the area, both named and unnamed, are highly variable, ranging from steep-gradient streams in deeply cut wooded ravines to low-gradient streams that meander through pastureland, wetlands, and valley settings. All of these streams are generally less than 15 feet wide, with substrate ranging from rock/gravel to silt/mud, and aquatic vegetation typically lacking. Water depths are typically 1 to 4 inches in riffles, with pool depths of 1 to 2 feet. Most of the streams have well-defined and abrupt banks, with the exception of low-gradient streams that flow through wetlands.

A few small farm ponds are found in the vicinity of the Project Site. Generally, they are found in open field settings or adjacent to houses and barns. Typically, these ponds are excavated or diked, and are less than 0.5 acres in size. Banks are typically well-defined and emergent wetland vegetation tends to be limited or lacking. Although not verified, water depths are expected to be consistent with excavated ponds that are used as a source of water for livestock as well as for fishing and aesthetic purposes, which are typically a minimum of four feet deep.

3.2.1.2 <u>Wetlands</u>

Wetlands within the Project Site have been examined through review of existing state and federal mapping, aerial photography interpretation, field reconnaissance, and on-site wetland delineation.

3.2.1.2.1 Existing Information

The U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) has mapped wetlands in the proposed Project Site (see Appendix F). The four wetlands mapped within the proposed Project Site are very small, ranging from 0.14 acre to approximately 0.62 acres in size, for a total of approximately 1.24 acres. Three of the four wetlands mapped by the NWI are palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh) wetlands. The fourth wetland is classified as a palustrine, emergent, persistent / scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated (PEM1/SS1E) wetland. Significant tracts of NWI mapped wetlands occur contiguous to the Project Site along Stephens Creek, Goff Creek, and Campbell Creek.

NYSDEC freshwater wetland maps indicate the presence of state-mapped wetlands contiguous to the Project Site in the same locations as the larger NWI mapped wetlands along Stephens Creek, Goff Creek, and Campbell Creek (see Appendix F). State wetland CS-3 is a Class II wetland totaling 61.9 acres in size located along Stephens Creek. The southern end of wetland CS-3 intersects the Project boundary with approximately 0.15 acre of the mapped wetland occurring within the Project Site.

A review of the National Hydric Soil List for New York State indicates that portions of the Project Site contain hydric soils, as determined by the NRCS (NRCS, 2005). Hydric soils are poorly drained, and their presence is also indicative of the likely occurrence of wetlands. Hydric soils found in the Project Site include Alden silt loam (Aa), Chippewa channery silt loam (Ck), and Fluvaquents and Ochrepts (FL). These soils are located in patches throughout the Project Site totaling approximately 53 acres, and are commonly associated with stream channels, floodplains, and/or wetlands identified by EDR ecologists. The Project also contains four soil series with the potential for hydric inclusions (Fremont, Hornell-Fremont Complex, Tuller, and Volusia) (NRCS, 1989).

3.2.1.2.2 Field Delineation

On-site wetlands were delineated by EDR ecologists in the summer and fall of 2006. EDR performed field delineations only on those parcels that may be subject to the proposed Project (participating parcels or Project Site). Additionally, reconnaissance-level surveys were conducted on public roadways that may be used by construction vehicles/equipment to inventory wetlands in the vicinity of anticipated public roadway improvements. On-site delineations were conducted in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987) and the 1985 New York State Freshwater Wetlands Delineation Manual (Brown *et al.* 1995). Wetland boundaries were defined in the field with pink surveyor flagging, and these boundaries were subsequently mapped using Trimble Global Positioning System (GPS) Pathfinder® Pro technology with reported sub-meter accuracy. This methodology was applied to all areas in the vicinity of proposed Project components, including turbines, turbine workspaces, access roads, and the buried electrical interconnect route. In addition, detailed data was collected and USACE Routing Wetland Determination forms were completed for each delineated wetland. All of this information is presented in Appendix F. The 2006 delineation effort identified 18 wetland areas within the Project Site. Figure 5 (and Appendix F) provides the locations of all delineated wetlands in the Project Site.

3.2.1.2.3 Wetland Community Types

Based on field review, wetlands within the Project Site are one of the following five types: 1) forested wetland, 2) scrub-shrub wetland, 3) wet meadow, 4) emergent marsh, or 5) streams/ephemeral drainages. Descriptions of each of these communities are presented below, and further information along with representative photographs are included in the Wetland Delineation Report (Appendix F). Scientific names of identified vegetation and wildlife species are provided in Appendix F.

Forested wetland – Forested wetland communities are generally dominated by trees that are 20 feet or taller, but also include an understory of shrubs and herbs (Tiner, 1999). The forested wetlands on the Project Site are commonly dominated by red maple and green ash in the overstory, with a midstory either absent or consisting of red maple/green ash saplings and shrub species such as willow shrubs. The herbaceous vegetation commonly includes species such as sensitive fern, spotted jewelweed, sedges, tear thumb, and late goldenrod (see photos in Appendix F).

Scrub-shrub wetland – Scrub-shrub wetlands are generally dominated by stands of woody vegetation less than 20 feet tall (Tiner, 1999). Though limited in number within the study area, scrub/shrub wetlands are typically dominated by shrubs such as silky dogwood, and willow shrubs. Late goldenrod, spotted jewelweed, reed canary grass, and sedges typically dominate herbaceous vegetation in these areas. Other herbs include sensitive fern, Joe Pye Weed, boneset, and broad-leaved cattail (see photos in Appendix F). These areas are characterized by periodic inundation/saturation (through flooding, surface runoff, and seasonal high groundwater).

Wet meadow – Wet meadows are the most common wetland community found throughout the Project Site and are usually found in poorly drained, low-lying depressional areas or along logging roads through mature woodlots. These wetlands may resemble grasslands and are typically drier than other marshes, except during periods of seasonal high water. They generally lack standing water for most of the year, though snow melt, stormwater runoff, and/or a high water table allows the soil to remain saturated for a significant portion of the growing season. These wetlands are dominated by herbaceous species, with some areas having high vegetative diversity, while others are almost monotypical (i.e. dense stands of spotted jewelweed). Prevalent hydrophytic vegetation found in wet meadows on-site include sedges, late goldenrod, reed canary grass, Joe-Pye weed, and broad-leaved cattail (see photos in Appendix F).

Emergent marsh – Emergent marsh wetlands occur in limited numbers within the study area, and where they are found, they are found within some of the wet meadow systems, where surface water collects in shallow basins, and/or adjacent to open water. These wetlands are characterized by more persistent and/or deeper inundation than wet meadows, often containing soils that remain inundated throughout the year. Emergent marshes on-site are dominated by herbaceous species such as broad-leaved cattail, boneset, late goldenrod, and sedges (see photos in Appendix F).

Streams/ephemeral drainages – One stream and two mixed wetland/drainages were delineated on-site. The delineated stream had a moderate to gentle gradient and flow rate. Widths typically ranged from 2 to 4 feet, and water depth ranged from 1 to 2 inches. One of the mixed wetland/drainages located on the Project Site is associated with a wet meadow wetland community dominated by green bulrush, sedges, and late goldenrod. The other drainage is associated with a forested wetland (see photos in Appendix F).

Many of the wetlands in the Project Site provide limited functions, and therefore value, due to 1) their small size, 2) their location within or adjacent to agricultural fields, 3) their lack of structural diversity, and 4) past or on-going physical disturbances (e.g., agriculture).

3.2.1.3 <u>Groundwater</u>

USGS Ground Water Atlas of the United States, the Project Site is not situated on a principal aquifer, but is located in an area where glacial deposit aquifers overlie bedrock aquifers in many areas (USGS, 1995). The Steuben County Soil Survey states that the majority of non-municipal drinking water in this area comes from dug or drilled wells and spring water and, similarly, municipalities obtain their water from developed springs, drilled wells, and reservoirs (USDA, 1978). The Environmental Protection Agency's (EPA) Safe Drinking Water Information System lists the primary source of drinking water for the nearby Village of Canisteo ground water, and only one contaminant-related violation is on record for an exceedance of coliform bacteria in 1995 (EPA, 2006).

ESS Group, Inc. (ESS Group) conducted a desktop hydrogeologic evaluation of the Project Site (Appendix G). This evaluation includes an analysis of a private well survey distributed by the Client. This analysis revealed that the depth to groundwater within private wells installed in bedrock ranges from 20 to 160 feet below grade, and depth to groundwater within private wells installed in unconsolidated deposits ranges from 7 to 25 feet below grade. Private wells located within the

Project Site are used primarily for domestic drinking water, but also for dairy farming purposes. Groundwater yields reported in this survey ranged from 6 to 55 gallons per minute.

3.2.2 Potential Impacts

3.2.2.1 Construction

3.2.2.1.1 Surface Waters and Wetlands

To avoid or minimize the overall permanent impact on streams and wetlands, Project design was guided by the following criteria during the siting of wind turbines and related infrastructure:

- Large built components of the Project, including staging areas, wind turbine generators, and the substation, are sited to avoid wetlands to the greatest extent practicable.
- Number and overall impacts due to access road crossings were minimized by routing around wetlands whenever possible and utilizing existing crossings and narrow crossing locations to the greatest extent practicable.
- Buried electric interconnect lines are sited to cross wetlands at narrow points whenever possible and will utilize installation techniques that minimize temporary wetland impacts.

Other on-site environmental or logistical constraints, such as agricultural fields or steep slopes, made further avoidance of wetlands and streams unfeasible.

During construction, potential direct or indirect impacts to wetlands and surface waters may occur as a result of the installation of access roads, the upgrade of local public roads, the installation of buried electrical interconnects, and the development and use of temporary workspaces around the turbine sites. Direct impacts, including clearing of vegetation, earthwork (excavating and grading activities), and the direct placement of fill in wetlands and surface waters, are typically associated only with the development of access roads and workspaces. The construction of access roads, and possibly the upgrade of local public roads, are anticipated to result in both permanent (loss of wetland/surface water acreage) and temporary impacts to wetlands. The development and use of temporary workspaces will result in only temporary impacts to wetlands/streams. The installation of buried electrical interconnects will temporarily disturb streams and wetlands during construction as a result of clearing (brushogging, or similar clearing method not requiring removal of rooted woody plants), and soil disturbance from burial of the electrical interconnects. Indirect impacts to wetlands and surface waters may result from sedimentation and erosion caused by construction activities (e.g., removal of vegetation and soil disturbance). This indirect impact may occur at wetlands adjacent to work areas where no direct wetland impacts are anticipated, including areas adjacent to proposed access road upgrade/construction, buried electrical interconnect, turbine sites, staging area, met towers, or the substation. Construction activities within FEMA-mapped floodplains may occur during pole replacement for the overhead 34.5 kV line. However, no significant impacts are anticipated as a result of this activity.

A total of 12 areas of wetland impact, including 2 stream/ditch crossings, are anticipated to occur due to Project construction (not including impacts that may result from any public road improvements). These impacts will involve temporary and permanent placement of fill to accommodate proposed Project access road construction, the temporary placement of fill in turbine work spaces, and temporary soil disturbance associated with the installation of buried electrical interconnects. None of these impacts are anticipated to occur within the jurisdictional limits of state-regulated wetlands or wetland buffers. It should be noted that all locations identified as potential road improvement locations (see Appendix N) were visually investigated by EDR ecologists in order to inventory potential wetland areas. However, because landowner negotiations (and corresponding property access) are not yet complete, wetlands could not be delineated in these locations. The information obtained by EDR was provided to Howard Wind to assure that wetland impact avoidance and minimization is considered when negotiating public road improvements.

For the purposes of temporary wetland impact calculations, it is assumed that impacts resulting from installation of access roads will disturb a width of 20 feet (fill area), and installation of buried electrical interconnects will typically disturb an area of 15 feet (clearing area and soil disturbance). Wherever feasible, buried electrical interconnects are installed co-linear with access roads to minimize disturbance to wetlands. Direct temporary impacts to wetlands and surface waters anticipated during construction are summarized below in Table 6. It is not currently anticipated that impacts to wetlands will result from public roadway improvements, which may be necessary to accommodate construction activity.

Table 6. Estimated Temporary Impacts to Wetlands and Surface Waters

EDR Wetland ID	Wetland Covertype[1]	Crossing Type	Width of Crossing (ft.)	Temporary Impact (A)
A	SS/WM/ agricultural swale	Access Road/ Interconnect	20	0.020
D	WM/ agricultural swale/ditch	Access Road/ Interconnect	20	0.004

EDR Wetland ID	Wetland Covertype[1]	Crossing Type	Width of Crossing (ft.)	Temporary Impact (A)
E	WM/ agricultural swale/ditch	Access Road	20	0.003
J	WM/SS	Access Road/ Interconnect	20	0.037
L	FO/SS	Access Road/ Interconnect	20	0.011
Q	WM/ agricultural swale/ditch	Access Road/ Interconnect	20	0.011
B	WM/ agricultural swale/ditch	Interconnect	15	0.004
I	FO/Stream	Interconnect	15	0.007
O	FO/Stream	Interconnect	15	0.003
C		Turbine Workspace	200’ radius	0.004
K	FO/SS	Turbine Workspace	200’ radius	0.185
N	FO/SS	Turbine Workspace	200’ radius	0.004

Note[1]: Wetland covertypes noted are based upon the Cowardin *et. al.* classification system: EM- emergent marsh; WM - wet meadow; SS – scrub shrub; FO - forested; ST – stream

In summary, total temporary impact to wetlands/streams is anticipated to be 0.293 acres. The construction of access roads is anticipated to result in 6 temporary wetland/stream impacts (totaling 0.086 acre), 5 of which include installation of the buried electrical interconnect within the limits of access roads, thus reducing overall temporary impacts. Additional installation of buried electrical interconnect (i.e., not within the footprint of access roads) is anticipated to result in 3 temporary wetland/stream impacts (totaling 0.014 acre). In addition, the 200-foot workspace around turbines is anticipated to result in 3 temporary impacts to wetlands/streams (totaling 0.193 acres); however, many of these impacts may be totally avoidable through minor alterations to the workspace layout/geometry.

Following Project construction, temporarily impacted wetland areas will be restored, which is anticipated to include the following:

- 200-foot radius turbine workspaces will be reduced to a permanent footprint of 0.2 acre (60-foot by 100-foot gravel crane pad, 18-foot diameter turbine pedestal, and a 6-foot wide gravel skirt around the tower base).
- 40-foot wide access roads will be reduced to maximum width of 20 feet (except where unstable soil conditions or severe erosion hazard preclude restoration).

- buried electrical interconnect routes will be allowed to regenerate naturally.

Permanent impacts to surface waters and wetlands (loss of surface water/wetland acreage) will result from the footprint of permanent access roads necessary to accommodate long-term maintenance and operation activities. Other long-term impacts to wetlands will occur as a result of clearing activities (e.g. brushhogging buried electrical interconnect routes) in forested wetlands. This activity will not result in a loss of wetland acreage, but will result in the conversion of forested wetlands to communities dominated by shrub and herbaceous vegetation (scrub-shrub/wet meadow/emergent).

The permanent footprint of access roads (assumed to be a maximum of 20 feet wide) is anticipated to result in 6 permanent impacts to wetlands, for a total impact of 0.086 acre. The wetlands include wet meadow, scrub-shrub, and forested vegetation.

Table 7. Estimated Permanent Impacts to Wetlands and Surface Waters

EDR Wetland ID	Wetland Covertype	Crossing Type	Width of Crossing (ft.)	Permanent Impact (A)
A	SS/WM/ agricultural swale	Access Road	20	0.020
D	WM/ agricultural swale/ditch	Access Road	20	0.004
E	WM/ agricultural swale/ditch	Access Road	20	0.003
J	WM/SS	Access Road	20	0.037
L	FO/SS	Access Road	20	0.011
Q	WM/ agricultural swale/ditch	Access Road	20	0.011

3.2.2.1.2 Groundwater

As previously mentioned, the Project will add only small areas of impervious surface, which will be dispersed throughout the Project Site, and will have a negligible effect on groundwater recharge. However, construction of the proposed Project could result in certain localized impacts to groundwater. These impacts could include:

- Bedrock deformation as a result of turbine foundation installation if blasting is required;
- Water table penetration and minor localized disruption of groundwater flows down-gradient of proposed turbine foundations;
- Soil compaction and minor modification to surface runoff or stream-flow, thereby affecting groundwater recharge characteristics;
- Minor degradation of groundwater chemical quality from installation of concrete foundations and application of herbicides; and

- Minor impacts to wetlands, which function as groundwater recharge/discharge areas.

Installation of turbine foundations has the greatest potential for impacts to groundwater. Although not anticipated, if blasting is necessary, it can generate seismic vibrations, fracture bedrock, and impact groundwater levels. However, ESS Group concludes that based on the 1,000-foot turbine setback from residences, and the assumption that private wells are typically located within 100 feet of residences, it is not anticipated that blasting (if necessary) would physically damage private wells or affect the well yields (Appendix G).

The construction process could also potentially impact groundwater should excavation (or blasting) occur below the water table. However, as indicated in the ESS Group report, depth to groundwater is anticipated to be greater than 7 feet and, with the anticipated depth of excavations needed, dewatering of excavations is not anticipated to be necessary.

In addition to impacts to groundwater due to turbine foundation installation, minor impacts could result from other Project activities. Soil compaction from the use of construction equipment can limit the efficiency of surface water infiltration to groundwater. When soils are compressed, the pore spaces within the soil are decreased, which reduces water percolation and can cause a localized deficiency in groundwater supply. Construction of access roads will result in minor increases in storm water runoff that otherwise would have infiltrated into the ground at the road locations. Buried transmission lines may facilitate groundwater migration along trench backfill in areas of shallow groundwater. Overhead transmission lines will generally have no effect on groundwater. Construction of Project components that traverse wetlands may also have an impact on groundwater as many wetlands serve as groundwater recharge areas.

A final potential impact to groundwater is the introduction of pollutants to groundwater from the use of herbicides or the discharge of petroleum or other chemicals during construction. Such discharges could occur in the form of minor leaks from fuel and hydraulic systems, as well as more substantial spills that could occur during refueling or due to mechanical failures and other accidents.

3.2.2.2 Operation

3.2.2.2.1 Surface Waters and Wetlands

Impacts to surface waters and wetlands primarily occur during Project construction. The operation of the constructed facility is not anticipated to have significant adverse impacts to wetlands, streams, or other surface waters within the Project Site. Vehicular access to the turbines, substation, met towers, and O&M facility will be completely established during Project construction, and routine operation and maintenance procedures are not anticipated to result in significant adverse impacts. Minor and isolated incidences of impact may occur, which could have a minimal impact to surface waters or wetlands in or adjacent to the Project Site, including buried electrical interconnect maintenance, access road washouts, culvert replacement/maintenance, or accidental fuel/chemical spills.

The proposed Project will not result in wide-scale conversion of land to built/impervious surfaces. Tower bases, crane pads, access roads, and the substations in total will add approximately 26.5 acres of impervious surface to the 2,850-acre Project Site (i.e., conversion of less than 1%). Consequently, no significant changes to the rate or volume of stormwater runoff are anticipated. However, installation of permanent Project components could result in localized changes to runoff/drainage patterns.

3.2.2.2.2 Groundwater

Most impacts to groundwater will occur during construction only. Over the long term, addition of small areas of impervious surface to the Project Site in the form of permanent access roads, crane pads, the O&M building, and the substation will have a minimal effect on groundwater recharge. The migration of groundwater along buried interconnect trenches could have a minor effect on groundwater flow paths, and a continued risk of chemical spills during operation/maintenance may also affect groundwater.

3.2.3 Proposed Mitigation

To mitigate for unavoidable permanent wetland and stream impacts associated with the Project, the Applicant will undertake a suitable on-site or off-site compensatory mitigation project, likely through the creation of in-kind wetland at a ratio of 1.5 to 1 (mitigation to impact). This suitable compensatory mitigation project will be developed in consultation with the USACE and NYSDEC during the Joint Application for Permit process.

No mitigation for indirect or temporary impacts to wetlands or streams is proposed, given the fact that these impacts will not result in any loss of wetland acreage. However, temporary impacts to wetlands/streams will be minimized during construction as discussed below.

The direct impacts of wetlands/streams will be minimized by utilizing existing or narrow crossing locations whenever possible. Upgrading existing crossings that are under-maintained/undersized will have a long-term beneficial effect on water quality, as it will help to keep farm equipment and other vehicles out of surface waters. Special crossing techniques, equipment restrictions, herbicide use restrictions, and erosion and sedimentation control measures will be utilized to reduce adverse impacts to water quality, surface water hydrology, and aquatic organisms. In addition, clearing of vegetation along stream banks and in wetland areas will be kept to an absolute minimum.

Where crossings of surface waters and wetlands are required, the Applicant will employ the Best Management Practices associated with particular, applicable streamside and wetland activities, as recommended by the NYSDEC and the USACE, and required by the issued wetland/waters permits. Specific mitigation measures for protecting wetlands and surface water resources will include the following:

- No Equipment Access Areas. Except where crossed by permitted access roads, wetlands, streams, waterbodies will be designated “No Equipment Access,” thus prohibiting the use of motorized equipment in the areas.
- Restricted Activities Area. A buffer zone of 100 feet, referred to as “Restricted Activities Area”, will be established where Project construction traverses streams, wetland and other bodies of water. Restrictions will include:
    - No deposition of slash within or adjacent to a waterbody;
    - No accumulation of construction debris within the area;
    - Herbicide restrictions within 100 feet of a stream or wetland (or as required per manufacturer’s instructions);
    - No degradation of stream banks;
    - No equipment washing or refueling within the area; and
    - No storage of any petroleum or chemical material.
- Access Through Wetlands - When crossing wetlands, routing around edges, utilizing higher ground, and crossing the narrowest portion of the wetland will be the preferred crossing options. Wherever feasible, low impact crossing methods will be used such as timber mats or similar materials. Geotextile mats, corduroy, and/or gravel may also be used to create temporary wetland road widening. Where permanent roadways are installed and impoundment of water is possible, the installation of culverts will maintain the natural water levels/flows on each side of the road.
- Streams – The Applicant will adhere to any permit special conditions pertaining to low-impact stream crossing techniques, including seasonal restrictions and/or alternative stream

crossing methods, such as temporary bridging and installation of crossings "in the dry" on protected streams. Open-bottomed or elliptical culverts could be required on certain streams to minimize loss of aquatic habitat and restriction of fish passage. Adherence to these restrictions should avoid or minimize any adverse impacts on fish and other aquatic organisms.

- Sediment and Siltation Control – A soil erosion and sedimentation control plan will be developed and implemented as part of the SPDES General Permit for the Project. To protect surface waters, wetlands, groundwater and stormwater quality, silt fence, hay bales, and temporary siltation basins will be installed and maintained throughout Project development. The location of these features will be indicated on construction drawings and reviewed by the contractor and environmental monitor prior to construction. The environmental monitor will also inspect these features to assure that they function properly throughout the period of construction, and until completion of all restoration work (final grading and seeding).

The wetland impacts previously described will be re-evaluated during the state and federal wetland permitting process. This process, referred to as the Joint Application process, will involve the following steps:

1. Submission of a final wetland delineation report to USACE and NYSDEC, along with request for jurisdictional determination by these agencies.
2. Site visits by USACE and NYSDEC representatives to both verify the boundaries of delineated wetlands and determine which wetlands are under the jurisdiction of each agency (pursuant to Section 404 of the Clean Water Act and Article 24 of the Environmental Conservation Law).
3. Evaluation of opportunities for further wetland impact avoidance and minimization through minor adjustments in the proposed location of Project components.
4. Preparation of a Joint Application for Permit, including an analysis of wetland functions and values, a description and quantification of wetland and stream impacts (temporary and permanent), an alternatives analysis, and suggested mitigation plans. Wetland mitigation will involve in-kind replacement of all permanently impacted wetlands at a ratio of at least 2 to 1 (mitigation to impact).
5. USACE and NYSDEC processing/review of the permit application, including public notice and consultation with other state and federal agencies (SHPO, EPA, USFWS).
6. Permit issuance, including conditions for wetland protection, impact minimization, mitigation, and monitoring.

7. Preparation and submittal of final wetland mitigation plans to the agencies.

To assure compliance with proposed mitigation measures during construction, the Applicant will provide the construction contractor copies of all NYSDEC and USCOE permits (Section 404), and site specific plans detailing construction methodologies, sediment and erosion control plans, and required natural resource protection measures. Howard Wind will also employ one or more environmental monitors during construction to ensure compliance with all plans and permit conditions.

The contractor will adhere to any special conditions of permits issued by the NYSDEC and USACE, which may include low impact stream crossing techniques, seasonal restrictions, and/or alternative stream crossing methods. Wetlands temporarily disturbed during construction will be restored to their original grade. This will allow wetland areas to redevelop naturally following construction.

Any increase in stormwater runoff will be negligible, as Project construction will result in limited addition of impervious surface. Nevertheless, specific means of avoiding or minimizing stormwater-related adverse impacts during construction and operation of the Project include adhering to a detailed soil erosion and sedimentation control plan, as described previously. Additionally, a Final Spill Prevention, Containment, and Countermeasure (SPCC) Plan that outlines procedures to be implemented to prevent the release of hazardous substances into the environment will be developed and implemented. This plan will not allow refueling of construction equipment within 100 feet of any stream or wetland, and all contractors will be required to keep materials on hand to control and contain a petroleum spill. These materials will include a shovel, tank patch kit, and oil-absorbent materials. Any spills will be reported in accordance with NYSDEC regulations. Contractors will be responsible for ensuring responsible action on the part of construction personnel.

To avoid localized drainage problems, the environmental monitor will identify the need for ditches, water bars, culverts, and temporary sediment retention basins at each road and tower site prior to the initiation of construction. If drainage problems develop during or after construction, the environmental monitor will evaluate the problem (in consultation with the contractor, landowner, and/or agency representative) and recommend a solution. Corrective actions will be taken by the contractor after receiving the recommendation.

The exact location of private water supply wells within the Project Site will be determined and clearly marked to avoid potential damage during construction and operation of the Project. Although groundwater is not anticipated to be encountered during construction, a dewatering plan will be developed as part of the SPDES permit as a conservative groundwater protection measure. This plan will outline the procedure for infiltrating the pumped water back into the ground, including specifications on the required capacity and substrate of the infiltration basins as well as proposed locations of infiltration basins. If blasting is necessary for construction of any wind turbine foundations, blasting will be done in compliance with a blasting plan designed with appropriate charge weights and delays to localize bedrock fracturing to the proposed foundation area, minimizing the already unlikely chance of impacting water levels in residential wells. However, as previously stated, blasting is not expected to be required. As a further groundwater well mitigation measure, the Applicant will conduct structural, water quality, and water quantity inspections of all wells occurring within 500 feet of proposed wind turbines before and after construction. Any impacts identified through these inspections will be dealt with on a case by case basis and appropriately mitigated.

The Project has been sited and designed consistent with the NYSA&M Guidelines for Agricultural Mitigation for Wind Power Projects. Therefore, topsoil removal and decompaction will be conducted in areas where soil restoration is necessary to protect future agricultural uses. These practices will also mitigate any potential impacts that soil compaction could have on infiltration of rain and snow melt, thus preserving the existing local water table levels. For non-agricultural lands, the construction footprint will be minimized by defining/delineating the work area in the field prior to construction, and adhering to work area limits during construction. This will limit the potential impacts of soil compression on normal infiltration rates.

3.3 BIOLOGICAL RESOURCES

3.3.1 Existing Conditions

3.3.1.1 Vegetation

Plant species and communities found within the Project Site were identified and characterized during field surveys conducted by EDR during the spring and summer of 2006. A total of 71 plant species were documented within the Project Site during these field surveys. A list of these species, as well as others likely to occur in the area, (including scientific names) is included in Appendix H. All of the plant species identified during the course of field surveys are common to the region and the state.

3.3.1.1.1 Ecological Communities

Vegetative communities within the Project Site were mapped based on interpretation of aerial photography and field verification. Community boundaries were then digitized, and approximate acreages were calculated through the use of Geographic Information System (GIS) analysis. All identified ecological communities within the Project Site are depicted on Figure 7. Inventoried wetlands within the Project Site have been quantified and described separately (see Section 3.2).

All of the major plant communities found within the Project Site are common to New York State. Agricultural fields and forestland are the dominant community types within the Project Site, while successional lands (shrub/scrub and old field), open water, and developed/disturbed communities occur to a lesser extent. Brief descriptions of these ecological community types, as classified and described in Ecological Communities of New York State (Reschke, 1990), are provided below.

Forest constitutes the largest ecological community type within the Project Site, comprising approximately 1,425 acres (50.0%) of the land. Hardwood forests within the Project Site resemble the Appalachian oak-hickory forest and the pine-northern hardwood communities described by Reschke (1990). Forests typically occur on steeper hillsides and narrow valleys, or as woodlots adjacent to agricultural areas. Tree species vary based on the orientation of the slope, but dominant or codominant species in most locations include white oak, northern red oak, white pine, black walnut, shagbark hickory, sugar maple, and red maple. On north-facing slopes and in narrow wooded valleys white pine and Norway spruce often are the dominant or co-dominant tree species, along with red maple, yellow birch, black cherry, American beech and sugar maple. The forest understory ranges from sparse to very dense depending upon density of the overstory, with common species including saplings of the overstory trees, along with ironwood, striped maple, honeysuckle, multiflora rose, buckthorn, raspberry, asters, thistle, goldenrod, grasses, and ferns such as bracken fern and wood fern.

Also included within the Forest ecological community are some conifer plantations that were planted for the cultivation and harvest of timber products, or to provide wildlife habitat, soil erosion control, windbreaks, or Christmas tree production. Plantations typically occur as either a monoculture or a mixed stand with two or more codominant species, such as Norway spruce, Scotch pine, Eastern hemlock, red pine, white pine, and European larch. Plantations within the Project area are typically mature stands (over 60 years old). Ground layer vegetation in the more mature plantations is sparse, and typically consists of mosses, ground pine, and various ferns.

Agricultural Land constitutes the second largest community on the Project Site, with approximately 1,040 acres (36.5%) of the land in row crops, field crops, or pastureland. Corn is the primary row crop, while other crops include alfalfa and small grains. Hayfields are typically rotated into (and out of) row crop production (typically corn), and less often into pastureland. Consequently, the percentage in each agricultural type is constantly changing. Pastureland is used for the grazing of dairy cows and horses, and is typically characterized by mixed grasses and broad-leafed herbaceous species, including clovers, plantains, and dandelion.

Successional Shrubland occurs on approximately 295 acres (10.4%) on the Project Site, and is frequently associated with old fields and young forestland on the periphery of agricultural areas. Shrubland areas are commonly found in poorly drained areas, on steep slopes, or other areas that limit agricultural production. Areas of young trees and shrubs are also intermixed with some forested areas. Herbaceous species similar to those found in successional old fields occur in this community. However, shrub species such as honeysuckle, raspberry, multiflora rose, gray dogwood, hawthorn, and wild grape dominate this community. Shrub-dominated wetlands were described in Section 3.2, and are dominated by species such as willow and silky dogwood.

Successional Old Field constitutes approximately 65 acres (2.3%) of the Project Site, and is defined by Reschke (1990) as “a meadow dominated by forbs and grasses that occurs on sites that have been cleared and plowed (for farming or development), and then abandoned.” This ecological community is scattered throughout the Project Site, primarily along field edges or in abandoned agricultural fields. Species found in these areas include typical old-field grasses such as orchard grass, timothy, and perennial rye. Broad-leaved herbaceous species found in old fields include goldenrods, red and white clover, milkweed, thistles, asters, Queen Anne’s lace, and burdock. Shrubs (including honeysuckle, raspberry, gray dogwood, and brambles) and saplings from adjacent forestland, are also typically components of this community, but represent less than 50% of total vegetative cover. Areas of emergent marsh and wet meadow that are dominated by herbaceous vegetation also occur within the Project Site. These communities were described in Section 3.2.

The Project Site also includes approximately 25.0 acres (0.9%) of Disturbed/Developed land. This community is a combination of several "cultural communities" defined by Reschke (1990), and is characterized by the presence of buildings, paved areas, and lawns. It includes residential yards, farmyards, storage yards, and roads.

3.3.1.1.2 Significant Natural Communities/Rare Plant Species

Written requests for information regarding listed threatened and endangered plant species and unique or significant natural communities were sent to the United States Fish and Wildlife Service (USFWS) and the NYS Natural Heritage Program (NHP) on February 16, 2006. According to the response from the NYSDEC, the NHP database indicates records for one New York State listed threatened plant species; nodding onion (*Allium cernuum*) in the vicinity of the Project Site. No unique or significant natural communities have been documented in the area, according to the NHP data base. A response from the USFWS on May 17, 2006 indicated that no federally-listed threatened or endangered plant species (or any proposed for listing) have been documented on the Project Site (see Appendix C for Agency Correspondence).

The potential occurrence of nodding onion on site was determined by consulting existing data sources and conducting reconnaissance-level field surveys. EDR performed ecological field surveys within the Project area during May and July, 2006. The field surveys included a search of all areas of suitable habitat for this species, including areas identified in the NHP database as locations where this species had been observed (outside the Project Site). The July field surveys were designed to coincide with the bloom period for nodding onion, which occurs between early July and late August (Newcomb, 1977). However, field surveys did not reveal the presence of this species within or adjacent to the Project Site.

Field investigations conducted by EDR during the course of ecological surveys and wetland delineations confirmed that the Project Site is dominated by common ecological communities. No listed threatened and endangered plant species, or unique or significant natural communities were observed on the Project Site. Although the timing of the surveys (late spring and summer) did not allow for identification of all plant species, typical indicators or possible rare plant occurrence (e.g., rich woodlands, prairie remnants, limestone outcrops, fens, etc.) were not observed.

3.3.1.2 <u>Fish and Wildlife</u>

Fish and wildlife resources within the Project Site were identified through analysis of existing data sources, on-site field surveys, correspondence received from the NHP, an avian and bat information summary and risk assessment prepared by Woodlot Alternatives, Inc. (Woodlot, 2006, Appendix I).

A total of 84 wildlife species (or sign of these species, such as identifiable tracks and/or scat) were observed within the Project Site during on-site field surveys conducted during 2005 and 2006. However, based on existing data sources and observed habitat conditions, it is estimated that over

240 different species could potentially be found at some time within the Project Site. These species of wildlife, including scientific names, are listed in Appendix H. More specific information regarding birds, mammals, herptifauna (reptiles and amphibians), listed threatened and endangered species, and wildlife habitat within the Project area is presented below.

3.3.1.2.1 Birds

To determine the type and number of bird species present within the Project area, existing data sources were consulted and on-site field surveys were conducted. Sources of information included the following:

- NYS Breeding Bird Atlas (BBS).
- USGS Breeding Bird Survey (BBS).
- On-site raptor migration surveys conducted by Woodlot during 2005 and 2006 (Appendix I).
- Radar surveys on night-migrating songbirds conducted by Woodlot during the fall of 2005 and Spring of 2006 (Appendix I).
- Avian and Bat Information Summary and Risk Assessment prepared by Woodlot (Appendix I).
- On-site observations by EDR ecologists during the summer of 2006.

Protocol for the on-site avian (and bat) studies conducted by Woodlot was developed in consultation with the NYSDEC (see Revised Workplan for 2005 Avian and Bat studies provided in Appendix I), and the results of these studies were provided to both the NYSDEC and the USFWS (see Appendix C for Agency Correspondence). The risk assessment conducted for the Howard project relied on procedures similar to those presented in the USFWS Interrim Guidelines, as well as others that exceed what is usually requested by the USFWS. The standard Avian Risk Assessment process incorporates the study protocols and site evaluation process suggested by the USFWS, particularly those that have been shown to be scientifically valid. Thefore, the risk assessment presented in Appendix I fulfills the intent of the guidance and recommendations document to avoid or minimize impacts to wildlife, specifically birds and their habitats.

Based on existing data, on-site investigations, existing habitat conditions, and species range, it appears that approximately 150 avian species could use the Project Site at some time throughout a given year (Appendix I). Details on the site's avian community are presented below:

Breeding Birds

The BBS, which is directed by the USGS, is a long-term avian monitoring program that tracks the status and distribution of North American avian populations. There is one BBS survey routes within approximately 25 miles of the Project Site (Sauer, 2005). BBS survey data from 1966 to 2005 were analyzed by Woodlot to determine likely breeding birds within the Project area. BBS survey data documented 124 species of bird likely breeding in the vicinity of the Project Site. The most commonly observed species included red-winged blackbird, American robin, common grackle, American crow, European starling, song sparrow, house sparrow, and common yellow throat. State-listed species observed on the BBS route included northern harrier (threatened), Cooper's hawk (special concern), sharp-shinned hawk (special concern), red-shouldered hawk (special concern), upland sandpiper (threatened), horned lark (special concern), Henslow's sparrow (threatened), grasshopper sparrow (special concern), and vesper sparrow (special concern). The species data reflect the habitat conditions within the Howard area, which include agricultural fields, mixed deciduous and evergreen forest, and small patches of wooded wetland.

The BBA is a comprehensive, statewide survey that indicates the distribution of breeding birds in New York State. BBA survey block 2868B, which covers much of the Howard Project Site, was analyzed by Woodlot. This block totaled 69 species, of which, 25 were confirmed as breeding birds, seven were recorded as probable breeding birds, and 37 were recorded as possible breeding birds (Appendix H). The species composition indicated by the BBA is very similar to that indicated by the BBS, with the majority of the species being typical of the agricultural and mixed agricultural/forest habitat that dominates the Project area. Listed species documented in the area by the BBA included northern harrier and Cooper's hawk.

An on-site breeding bird survey was conducted by Woodlot during the summer of 2005 to provide site-specific information on nesting birds in the Project area. Surveys, modeled after the USGS BBS (Sauer *et al.,* 2005), involved counting the number of individuals of each species located at each of 31 of survey points, including six points in hayfields, 10 along woodland-field edges, 12 within mixed woods, and three points in early successional woods. All of the major habitat types were sampled, generally in proportion to their abundance in the Project area. All birds seen or heard at each of the sampling points during five-minute periods between 5:30 and 9:30 a.m. (the period of peak songbird activity) were documented.

During the survey periods, 59 species were observed at 31 points (see Appendix I). The relative abundance of observed species varied across the four major habitat types: hayfield (13.0 species), woodland/field edge (9.7 species), mixed woods (7.7), and early successional (7.2). Species richness (number of observed breeding species at single survey points) ranged from 5 to 14 species. The most abundant species, when averaged across all survey points and habitat types, were red-winged blackbird, bobolink, ovenbird, European starling, song sparrow, red-eyed vireo, and common yellowthroat. The high relative abundance of ovenbird and wood thrush reflect the abundance of forest habitat on site.

No birds listed as endangered, threatened, or species of special concern by the NYSDEC were confirmed to be breeding in the Project area. However, sharp-shinned hawks (special concern) were observed flying over the Project site on three separate occasions.

<u>Migrating Raptors</u>

Diurnal raptor migration surveys were conducted in the Project area by Woodlot during the fall of 2005 and the spring of 2006. The sites selected for diurnal migrant observations were chosen from a limited number of sites with landowner approval, and most sites where turbines have been proposed are poorly suited for conducting migration studies (i.e. limited visibility, access issues). Consequently, implementation of the field work was slightly modified from the NYSDEC-approved work plan to take advantage of the areas with the best view of the airspace as diurnal migrants approached the Project area. As depicted on the survey location maps (Figure 2-1 in the fall 2005 and Figure 2-5 in the spring 2006 survey reports [Appendix I]), those sites tended to be near the northern or southern end of the Project area and in locations that had unobstructed views toward the direction from which raptors would be approaching.

While this method is slightly different than that identified in the work plan, it is a method that has been accepted by NYSDEC at a number of other projects that Woodlot has surveyed, and is in accordance to standard survey methods used by the Hawk Migration Association of North America (HMANA). In the case of established HMANA protocols, hawk watch surveys throughout the country are conducted during the same time frame and from one survey site per watch. This approach allows for standardization and comparison of hawk counts from site to site.

Days with favorable flight conditions were targeted, and surveys were typically conducted from approximately 9:00 am to 3:00 pm each day. All raptors observed were recorded and attempts were made to distinguish between migrating and resident birds. In addition, flight height of raptors was estimated based on the height of nearby objects.

These surveys documented a total of 206 raptors representing 12 different species, the most common of which were turkey vultures and red-tailed hawks. The majority of raptors observed

(64%-85%) were flying below the rotor-swept area of the proposed turbines (<125m, or 410 feet). According to the Woodlot report, the total number of raptors observed (and the observation rates) are low compared to those seen at other sites in the region, which include observation rates 7 to 13 times greater then those reported at the Howard site (Woodlot, 2006). The low numbers and observation rate are not unexpected, as there are no known raptor migration corridors in the vicinity of the Project site. Listed species observed during the raptor survey included northern harrier, osprey (special concern), sharp-shinned hawk, Cooper's hawk, and red-shouldered hawk. Based on flight behavior, most of the individuals observed appeared to be migrants rather than residents of the Project area.

Migrating Songbirds

Woodlot conducted on-site nocturnal radar surveys during the fall of 2005 and spring of 2006 to characterize songbird migration. The surveys were conducted between April 15 and May 30 (42 nights of radar), and between September 1 and October 15 (39 nights).

Results of these surveys revealed that nightly passage rates at Howard varied from 18 targets/kilometer/hour (t/km/hr) to 2,270 t/km/hr. The overall mean for the entire fall survey was 481 t/km/hr, while mean passage rate for the entire spring survey was 440 t/km/hr (Woodlot, 2006). Average nightly flight height of targets at Howard ranged from 351 m (1,158 feet) to 746 m (2,462 feet) during the fall (seasonal mean of 481 m or 1,578 feet), and from 120 m (393 feet) to 732 m (2,400 feet) during the spring (seasonal mean of 440 m or 1,443 feet). The percent of targets flying below 125 m (i.e., the height of the proposed turbines) varied from 0-52%, with a fall seasonal average of 5% and a spring seasonal average of 13%. Mean flight direction in the fall was to the south, and in the spring was to the northeast. These results indicate that nighttime migration characteristics at the Howard site include high flight heights relative to the proposed turbines and natural landscape features as well as uniform movement across the radar display. This indicates that migration over the Project Site is likely to occur as a broad front movement and that landscape features are not causing night-migrating birds to concentrate at any specific locations. When compared to other surveys using similar methods, the results from both seasons fall within the range of those other studies (see Table 3-3 in the Risk Assessment in Appendix I).

Waterbirds

Waterfowl and wading birds are not well represented amongst the breeding birds documented within or adjacent to the Project Site. The Project Site is not located adjacent to any large bodies of water (including large marshes and rivers) that would be expected to attract high numbers of migrating waterbirds. The nearest large water bodies are Keuka Lake and Canandaigua Lake (located approximately 15 miles to the NE and 24 miles to the north, respectively), which the NHP database indicates are winter concentration areas for waterfowl (Ketcham, pers. comm.). While available literature (such as Drennan [1980]) does not reference significant waterbird migration through this region, Bellrose (1976) suggests that there are minor migration corridors for ducks and Canada geese through Central New York. However, these corridors are approximately 60 to 70 miles wide, which suggests rather broad front migration of ducks and Canada geese through the area. Waterfowl, such as mallard and wood duck, as well as wading birds, such as great blue heron, are likely to use small waterbodies in the area (farm ponds, wetlands, etc.), and during the fall migration large numbers of Canada geese forage in harvested corn fields, which are common within the Project site. The NHP database indicates the occurrence of a great blue heron rookery off of Salmon Creek Road in the Town of Wheler (Krahling pers. com.). However, this site is well removed from the Howard site.

<u>Wintering Birds</u>

Use of the Project Site by wildlife during the winter months is limited due to severe winter weather and lack of cover in the agricultural fields that accommodate the majority of the proposed Project components. Those bird species that can be expected to consistently occur within the Project area (i.e. occur during most winters), such as snow buntings, are generally common and abundant both on a regional (in winter) and continental (year-round) scale. Irruptive species, such as short-eared or snowy owls, generally have smaller populations but their presence in the area is inconsistent and often brief.

3.3.1.2.2 Mammals

Due to a lack of existing data regarding mammals within the Project Site, the occurrence of mammalian species was documented entirely through on-site field surveys and evaluation of available habitat. This effort suggests that up to 39 species of mammal could occur in this area. Field surveys conducted by EDR documented the presence of seven species (or sign of their occurrence) within the Project Site. These species included whitetail deer, eastern chipmunk, red fox, raccoon, striped skunk, woodchuck, and gray squirrel. Species not observed, but likely to occur in the area, include opossum, beaver, muskrat, mink, weasels, and a variety of small mammals (mice and shrews). All of the observed species are common and widely distributed throughout New York State.

To characterize and document bat activity within the Project Site, Woodlot conducted acoustic bat surveys using Anabat II detectors, which record bat vocalizations. These surveys were conducted during the summer and fall of 2005 and the spring of 2006, and included both mobile (active) and stationary (passive) Anabat surveys.

A total of 1,821 bat call sequences were recorded during the three seasons of survey. Of the 218 bat call sequences recorded during the summer 2005 survey, 100 (46%) were identified as *Myotis* species, 64 (29%) as big brown bat, 13 (6%) as eastern red bat, four (2%) as hoary bat, two (2%) as silver-haired, and 36 (16%) as unknown. Of the 1,553 calls recorded during the fall 2005 survey, 1,047 (20%) were identified as *Myotis* species, and 403 (26%) were identified as big brown bat. Other calls were attributed to eastern red bat, hoary bat, silver-haired bat, and unknown bats. The *Myotis* call sequences recorded during the summer and fall surveys at the Howard site most closely resembled those of the little brown bat and northern long-eared bat, but identification to species is uncertain given the similarity of their calls.

During the spring 2006 survey, a total of 50 call sequences were recorded. Of these, the majority of calls (52%) were identified as unknown. Of the remaining 24 calls, four (8%) were identified as being within the myotid guild, and 20 (40%) within the big brown/silver-haired/hoary bat guild. Additional detail is provided in the Risk Assessment included in Appendix I.

The proposed Howard Wind Power Project is located in Steuben County, which does not border any counties containing hibernacula, and is located west and north of the normal mapped range of the Indiana myotis (*Myotis sodalist*). As described in the avian/bat work plan, mist netting would occur on three nights following a night with potential Indiana bat calls. Additionally, the work plan described the difficulty in identifying between species of the genus *Myotis,* and as recommended by Al Hicks of NYSDEC, software functions designed by Eric Britzke would be used to make the assessment of the potential occurrence of Indiana bats. Although Eric Britzke was not available for consultation, some of his initial work on this subject was reviewed by Woodlot, and call sequences were identified with visual comparisons of call sequences with reference libraries of known calls using the Anabat system. The reference library used was collected by nationally known bat experts Chris Corben (Designer of the Anabat systems) and Lynn Robbins.

To the extent practicable, other resources that could help increase the effectiveness of identifications within the *Myotis* genus, such as published accounts of trends in call sequence signatures, were also used to assist in identification. An important note among all techniques is that each call sequence used for identification must be of high quality. High quality calls are typically ‘clean’, or free from high frequency interference, and consist of more than 5-7 call pulses, in order to provide a clear picture of the pulse-to-pulse variation of the call emitted by an anima.

With the use of the call sequence reference library and experience of a Woodlot bat biologist, high quality calls within the *Myotis* genus were identified as only likely to be little brown bat (*Myotis lucifugus*) and northern long-eared bat (*Myotis septentrionalis*), while lower quality calls were labeled unknown. No calls identified within the genus *Myotis* were suspected of being Indiana bats, and therefore mist netting was not considered necessary.

Additionally, NHP data identifies that there are 10 known Indiana bat hibernacula in New York State. These are reported to be located in Albany (1), Essex (2), Jefferson (1), Onondaga (1), Ulster (4), and Warren (1) Counties. The nearest known Indiana bat hibernaculum to the Howard Project is the Onondaga hibernaculum, which is approximately 120 miles northeast. This distance is generally longer than published records of the dispersal distance for this species. Additionally, telemetry studies conducted by the USFWS and the NYSDEC in the spring of 2006 indicate that the bats from this hibernaculum travel northwest, toward the lake plain of Lake Ontario.

Finally, the last line of evidence indicating that the likelihood of Indiana bats occurring in the project area was low was the fact that none have been documented historically in the Project area, in the Town of Howard, or Steuben County.

3.3.1.2.3 Reptiles and Amphibians

Reptile and amphibian presence within the Project Site was determined through field survey and review of the New York State Amphibian and Reptile Atlas. The Atlas Project was a ten-year survey (1990 through 1999) designed to document the geographic distribution of the state's herptofauna. Atlas data was collected and organized according to USGS 7.5-minute quadrangles (NYSDEC, 2006). Based on this data, along with documented species ranges and existing habitat conditions, it is estimated that over 30 reptile and amphibian species could occur in the area (Appendix H). However, only three of these species were actually documented on site (American toad, and northern brown snake, eastern garter snake). Egg masses observed in kernel pools during the spring, appeared similar to those of the spotted salamander but could not be identified with certainty. Species not observed, but likely to occur in the Project Site based on existing habitat conditions, include red-backed salamander, painted turtle, northern water snake, bullfrog, and spring peeper. All of these species are common and widely distributed throughout New York State.

Correspondence from the NYSDEC indicated that longtailed salamander (special concern) and timber rattlesnake (threatened) have been documented in the area by the NHP database. Field surveys conducted by EDR failed to reveal the presence of these listed species. Their habitat requirements and likelihood of occurring on site are discussed in Section 3.3.1.1.5. To obtain additional information on the timber rattlesnake, EDR consulted with Art Kirsch, a NYSDEC (Region 8) wildlife biologist familiar with the life cycle and habitat preferences of the species. Mr. Kirsch accessed the NHP database and indicated that there are numerous records of timber rattlesnake in the general proximity of the Project Site since 1988, but no record within the Project Site boundaries. Generally speaking, all of the sightings occurred on south facing, relatively steep (30-40% grades), shale/limestone outcroppings within the Canisteo River Valley. Most of the sightings of record occurred between 10 and 15 miles from the Project boundaries. The closest records were three different sightings approximately 2.5 miles southeast, 3.7 miles southeast, and 7.0 miles south-southeast of the Project Site(A. Kirsch, pers. comm.).

3.3.1.2.4 Fish

Ponds and streams within and adjacent to the Project Site likely support both warm water and cold water fish populations (some native and some stocked). Although no fisheries data has been obtained or field surveys conducted, fish species such as, brook trout, largemouth bass, sunfish, creek chub, shiners, and dace most likely occur in ponds and streams within and adjacent to the Project site. There are not any state-classified trout streams or trout spawning streams that occur in the Project area. Ponds within the area likely support a warm water fish community (e.g., bass, sunfish, and shiners). Most of the ponds and streams within the Project Site are located on private property and lack any provisions for public access (i.e., public fishing easement).

3.3.1.2.5 Wildlife Habitat

As previously described, the Project Site includes a variety of ecological community types. The value of these communities to various wildlife species is summarized below.

<u>Forest Habitat</u>

Large areas of contiguous woodland within the Project Site (e.g., Burt Hill State Forest) provide habitat for forest wildlife species such as wood thrush, veery, eastern wood pewee, ovenbird, red-eyed vireo, black-and-white-warbler, black-capped chickadee, great crested flycatcher, and pileated woodpecker. Mammals that utilize forest habitat include gray squirrel, eastern chipmunk, and whitetail deer.

Hayfields, Successional Old Field, and Wet Meadow Habitats

These grass/forb dominated areas provide preferred nesting and foraging habitat for open country bird species such as bobolink, red-winged blackbird, horned lark, eastern meadowlark, northern harrier, eastern bluebird, and savannah sparrow. The vegetation in these areas provides forage in the form of seeds and foliage, which is utilized by sparrows, finches, small mammals (mice, shrews, etc.), woodchucks, whitetail deer, and eastern cottontail. Birds of prey, such as red tail hawk, and mammalian predators, such as red fox and eastern coyote, also use open fields as hunting areas.

Successional Shrubland and Scrub-Shrub Wetland Habitats

Shrub-dominated habitats (both wetland and upland) provide nesting and escape cover for a variety of wildlife species. Various songbirds, such as gray catbird, American goldfinch, indigo bunting, and yellow warbler, require low brushy vegetation for nesting and escape cover. Whitetail deer and eastern cottontail are also typically found in brushy edge habitat. In addition, many of the shrub species found in these areas produce berries, which provide food sources for birds and mammals such as raccoon, striped skunk, and opossum.

Emergent Marsh and Open Water Habitats

Emergent marsh and open water habitats in the Project Site are used as a source of food, water, and/or cover by waterfowl, shorebirds, aquatic mammals, and many of the upland species mentioned previously. Many of these water bodies support fish, amphibians, and a diversity of insects and aquatic invertebrates. They are preferred foraging areas for aerial insectivores, including songbirds and bats. In addition, these areas provide habitat for various wetland/aquatic wildlife species, including great blue heron, mallard, wood duck, painted turtle, bullfrog, spring peeper, mink, muskrat, and beaver.

3.3.1.2.6 Threatened and Endangered Species

Written requests for listed species documentation were sent to the USFWS and the NHP. In addition, existing data sources, including the NYS Amphibian and Reptile Atlas, the BBS, and the BBA were consulted to assess the potential presence of state- and/or federally-listed threatened and endangered species.

According to a letter of May 23, 2006 from the NYSDEC, the NHP database indicates two occurrence of longtail salamander adjacent to the Project site. This state-listed special concern species has been observed in two locations in the Town of Canisteo (approximately 1.5-2.5 miles form the nearest proposed turbine). This species is a brook salamander that typically occurs under rotting logs, under stones, in shale banks near seepages, under rocks at streamside and frequently in caves (Conant, 1958). Field review by EDR, focusing on the most suitable available habitat for this species (under logs and stones along stream banks) failed to document the presence of longtail salamander on site. The NYSDEC letter also indicated the presence of timber rattlesnakes within 1.5 miles of the Project Site (follow up correspondence with the NYSDEC indicated that the closest record is approximately 2.5 miles southeast of the Project Site), and an eastern small-footed bat colony within 10 miles of the site in Livingston County. Timber rattlesnakes utilize south-facing cliffs, tallus slopes, or other assemblages of loose rock as winter denning areas (hibernacula), and disperse into forested habitat during summer. Small-footed bat also use rock crevices in caves, cliffs and tallus slopes as winter hibernacula and as roosting sites/maternity colonies during the summer. Neither of these species or areas they might use as denning/roosting sites were observed during on-site field surveys. However forested areas and field edges within the site could be used as summer foraging habitat by both these species.

The May 17, 2006 response from the USFWS indicates that no federally-listed threatened or endangered wildlife species (or any proposed for listing) have been documented on the Project Site.

BBS survey data indicate that three state-listed threatened species (northern harrier, upland sandpiper, and Henslow's sparrow) and six state-listed special concern species (Cooper's Hawk, sharp-shinned hawk, red-shouldered hawk, horned lark, grasshopper sparrow, vesper sparrow) have been recorded in the general area of the Project Site. According to the BBA data, two state-listed species have been documented within, or adjacent to, the Project Site. These species are northern harrier and Cooper's hawk.

The presence of state- and/or federally-listed threatened and endangered species was also assessed during site-specific avian and bat studies conducted by Woodlot. Five listed species were observed during the raptor migration surveys conducted on-site. These included, northern harrier (state-listed threatened), sharp-shinned hawk, osprey Cooper’s hawk, and red-shouldered hawk (all state-listed special concern). Woodlot indicated that most of the observed individuals appeared to be migrants rather than residents of the Project area. The on-site breeding bird survey did not document any listed species as nesting within the Project area, although sharp-shinned hawks were observed flying over the site on three separate occasions. Forested areas on site could provide suitable nesting habitat for this species, as well as Coopers hawk, while open field areas could provide nesting habitat for grassland species such as northern harrier, horned lark, grasshopper sparrow, vesper sparrow, and Henslow’s sparrow. A summary of listed bird species documented in the area is presented in Table 8, below.

Table 8. Documented State-listed Species in the Vicinity of the Project Area[1]

Common Name	Scientific Name	NYS Legal Status
Red-Shouldered Hawk*	*Buteo lineatus*	Special Concern
Northern Harrier*	*Circus cyaneus*	Threatened
Cooper's Hawk*	*Accipiter cooperii*	Special Concern
Sharp-shinned Hawk*	*Accipiter striatus*	Special Concern
Grasshopper Sparrow	*Ammodramus savannarum*	Special Concern
Horned Lark	*Eremophila alpestris*	Special Concern
Osprey*	*Pandion haliaetus*	Special Concern
Vesper Sparrow	*Pooecetes gramineus*	Special Concern
Upland Sandpiper	*Bartramia longicauda*	Threatened
Henslow's Sparrow	*Ammodramus henslowii*	Threatened

[1]Source: BBA, BBS, Agency Correspondence, and On-site Surveys
*Observed on site

Although not mentioned in agency correspondence regarding the Project, the NYSDEC and the USFWS have expressed concerns regarding potential impacts to Indiana bat from wind power projects. The Indiana bat is a state- and federally-listed Endangered species. Approximately 42,000 Indiana bats reside within New York State and the population appears to be growing (A. Hicks, pers. comm.). These bats winter (hibernate) in 10 known locations (caves and mines) throughout the state. They emerge in the spring and disperse on average up to 30 miles to their summer range. The nearest wintering cave (hibernacula) used by Indiana bats is located approximately 80 miles northeast of the Project Site, in Onondaga County.

Bat surveys (acoustic monitoring) conducted by Woodlot did not reveal the presence of Indiana bat or any other listed bat species (Woodlot, 2006), although, as stated previously, because their calls are difficult to distinguish from other *Myotis* species, their possible presence cannot be ruled out. No other rare mammal species were observed during EDR's field surveys, and based on review of existing habitat conditions, such species are not anticipated to occur on site.

3.3.2 Potential Impacts

3.3.2.1 Construction

3.3.2.1.1 Vegetation

Project construction will result in temporary and permanent impacts to vegetation within the Project Site. However, no plant species occurring in the Project Site will be extirpated or significantly reduced in abundance as a result of construction activities.

Construction-related impacts to vegetation include cutting/clearing, removal of stumps and root systems, and increased exposure/disturbance of soil. Along with direct loss of (and damaged) vegetation, these impacts can result in a loss of wildlife food and cover, increased soil erosion and sedimentation, and a disruption of normal nutrient cycling. Impacts to vegetation will result from site preparation, earth-moving, and excavation/backfilling activities associated with construction/installation of staging areas, access roads, foundations, and buried and overhead electrical interconnect. Based on the area of impact assumptions described in Section 2.5 (Project Construction), these activities will result in disturbance to approximately 103.2 acres of agricultural land, 11.1 acres of successional shrubland, and 56.2 acres of forest. An additional 7.5 acres of disturbance will occur within the public road ROW, but is not anticipated to impact undisturbed roadside vegetation. As stated previously, impacts to agricultural land are likely to be smaller than these disturbance calculations would indicate, due to the proposed use of existing farm lanes for many of the turbine access roads. As indicated in Table 9, the majority of the calculated impacts will be temporary, and native vegetation will be allowed to regenerate following restoration of areas disturbed during construction. Construction-related impacts to wetlands were previously discussed in Section 3.2.

Table 9. Impacts to Vegetative Communities (Acres)

Community[1]	Total Disturbance	Temporary Disturbance	Permanent Loss
Agricultural Land	103.2	84.5	18.7
Successional Old Field	0	0	0
Successional Shrubland	11.1	9.5	1.6
Forest	56.2	0	56.2[2]
Disturbed/Developed	7.5	7.5	0
TOTAL	**178.0**	**101.5**	**76.5**

[1]Excludes wetland and open water communities
[2]Of the 56.2 acres of impacted forestland, 6.2 acres will be converted to built facilities, 31.8 acres will be maintained as succesional shrubland or old field communities, and 18.2 acres will be allowed to regenerate naturally.

3.3.2.1.2 Fish and Wildlife

In general, construction-related impacts to wildlife will be minimal as a result of siting Project components away from sensitive habitat such as streams, wetlands, and mature forest. Construction-related impacts to wildlife are anticipated to be limited to incidental injury and mortality due to construction activity and vehicular movement, construction-related silt and sedimentation impacts on aquatic organisms, habitat disturbance/loss associated with clearing and earth-moving activities, and displacement of wildlife due to increased noise and human activities. Each of these potential impacts are described below.

Incidental injury and mortality should be limited to sedentary/slow-moving species such as small mammals, reptiles and amphibians, that are unable to move out of the area being disturbed by construction. If construction occurs during the nesting season, wildlife subject to mortality could also include the eggs and young offspring of nesting birds, as well as immature mammalian species that are not yet fully mobile. More mobile species and mature individuals should be able to vacate areas that are being disturbed.

Earth-moving activities associated with Project construction have the potential to cause siltation and sedimentation impacts downslope of the area of disturbance. Although most Project components have been sited well away from wetlands and streams, soil disturbance along several sections of buried interconnect and access road, and at three turbine worksites, could adversely affect water quality and aquatic habitat (see additional discussion in Section 3.2.2).

The majority of Project components are sited in or adjacent to agricultural land, which in general provides habitat for only a limited number of wildlife species. In addition, these areas are already subject to periodic disturbance in the form of mowing, plowing, harvesting, etc. However, hayfields and pastureland do provide habitat for open country/grassland avian species (such as bobolink, red-winged blackbird, and savannah sparrow), and will be disturbed by Project construction. Successional shrubland and forestland will experience less construction-related disturbance, but approximately 53.7 acres of forest and 11.1 acres of shrubland will be directly impacted by Project construction.

Some wildlife displacement will also occur due to increased noise and human activity as a result of Project construction. The significance of this impact will vary by species and the seasonal timing of construction activities. However, the species most likely to be disturbed/displaced by Project construction include grassland bird species such as bobolink, eastern meadowlark, red-winged blackbird, and savannah of sparrow.

None of the construction-related impacts described above will be significant enough to affect local populations of any resident or migratory wildlife species.

3.3.2.1.3 Threatened and Endangered Species

The NHP database indicates an historical record (August 27, 1947) of Nodding Wild Onion in the Town of Canisteo. Although this is an historical record, EDR ecologists conducted a survey to determine if this species is present within the Project Site. This survey did not reveal the presence of Nodding Wild Onion, and no other rare plant species or unique natural communities were identified within the Project Site. Therefore, impacts to listed threatened and endangered plant species are not anticipated.

According to written correspondence received from the NYSDEC, longtail salamander (special concern) and timber rattlesnake (threatened) have been documented in the vicinity of the Project area. However these species were not observed on the Project site, and critical habitat for both these species does not occur within or adjacent to areas that could be disturbed by Project construction. The streamside forest habitat preferred by longtail salamander will only be impacted by buried interconnect installation. This activity will result in a temporary disturbance to this habitat through vegetative clearing. Although this area will be allowed to grow back, it will not immediately return to forested habitat. However, because all interconnect installation will be perpendicular to streams, this disturbance will be minimal. Forest habitat used by timber rattlesnakes during the summer season could be impacted by clearing and earth moving activities associated with construction of nine turbines that are located in forest sites. This activity could result in incidental injury or mortality, and will convert the habitat to an early successional community, which is generally not preferred by this species. However, timber rattlesnakes prefer forested habitat adjacent to south facing steep slopes with rock outcroppings, and the Project as currently proposed will not impact the type of habitat. In addition, the amount of forest habitat being affected is relatively small. Further, NYSDEC correspondence indicated that the closest sighting of the species (2.5 miles southeast of the Project Site, recorded in September 2005) is likely not close enough to raise concern over potential impacts to the individual (or group of) timber rattlesnake (A. Kirsch, pers. comm.).

BBA and BBS data indicate that several listed grassland bird species could occur within the Project area, including northern harrier, upland sandpiper, grasshopper sparrow, horned lark, vesper sparrow, and Henslow's sparrow. None of these species were documented during the on-site breeding bird survey. However, because the proposed Project will occur in or adjacent to hayfields that could represent habitat for some grassland birds, construction-related impacts to these species are possible. Disturbance/displacement, habitat loss, and/or mortality impacts to eggs or young of these species could occur. However, given the relatively small area of grassland habitat that is being directly or indirectly impacted by Project construction, any impacts will be minor and largely temporary.

Listed raptors observed within the Project area include, one state-listed threatened species (northern harrier), and four state-listed species of special concern (osprey, red-shouldered hawk, sharp-shinned hawk, and Cooper's hawk). No federally-listed species were documented on the Project

Site, and based on existing habitat conditions, are not considered likely to occur. Based upon observations made during the on-site raptor surveys, Woodlot determined that it is likely all of the listed raptors observed were migrants. In addition, other than fly-over observations of sharp-shinned hawks, no listed raptors were documented during the on-site breeding bird survey. The open water habitat required by ospreys, and the large riparian/floodplain forests preferred by red-shouldered hawks do not occur within the Project site. However, as mentioned previously, Project construction will impact the open country/grassland habitat preferred by northern harrier, and upland forest habitat that could be used by Cooper's hawk and sharp-shinned hawk. Therefore, disturbance/displacement, habitat loss, and/or mortality impacts to these species could occur. However, given the relatively small area of habitat that is being directly or indirectly impacted by Project construction, any impacts to these species, will be minor and largely temporary.

3.3.2.2 Operation

3.3.2.2.1 Vegetation

As indicated in Table 1, Project construction will result in permanent impacts to 76.5 acres of vegetated land within the Project Site. This total will include approximately 18.7 acres of agricultural land, 1.6 acres of successional shrubland and 56.2 acres of forest. It should be noted that for vegetation, permanent impact includes both conversion of natural communities to built facilities, and conversion of one vegetative community to another (e.g., forest to successional shrubland or old field). This conversion to successional communities will occur to any forest that is within the 200-foot radius of the tower sites, within the 75-foot width of clearing for access roads, and along the buried and overhead 34.5 kV lines. A total of 31.8 acres of forestland will be converted to successional communities for the duration of Project operation due to these activities. Of the remaining 24.4 acres of impacted forest, 6.2 acres will be converted to built facilities and 18.2 acres will be allowed to regenerate naturally. Other than minor disturbance associated with routine maintenance and occasional repair activities, other disturbance to plants and vegetative communities are not anticipated as a result of Project operation. Permanent impacts to wetlands were previously discussed in Section 3.2.

3.3.2.2.2 Wildlife

As with construction-related impacts, operational impacts to wildlife are expected to be limited to minor loss of habitat, possible forest fragmentation, wildlife displacement due to the presence of the wind turbines, and some avian and bat mortality as a result of collisions with the wind turbines. Each of these potential impacts are described below.

Habitat Loss

A total of 26.5 acres of wildlife habitat will be permanently lost from the Project Site (i.e., converted to built facilities). As mentioned in the previous section, the majority of this loss (approximately 18.7 acres) will occur in agricultural lands, which have limited wildlife habitat value. In addition, approximately 50 acres of forest will be cleared and either maintained as a successional community (old field, shrubland, or saplings) for the life of the Project or will be allowed to regenerate naturally. However, the cumulative habitat loss/conversion resulting from Project development is not significant.

Forest Fragmentation

The proposed Project will result in permanent loss or conversion of 56.2 acres of forest habitat to successional communities. The forested habitat being impacted by the Project generally occurs as woodlots adjacent to open agricultural fields, which should limit forest fragmentation associated with the proposed Project. However, the on-site breeding bird survey did document nesting by several forest-interior bird species (e.g., oven bird and wood thrush), which suggests that forest clearing could adversely affect such species (either through direct habitat loss or increased likelihood of nest parasitism by brown-headed cowbirds).

Disturbance/Displacement

While wildlife will likely become habituated to the presence of wind turbines within a few years, the rate (and degree) of habituation, is currently unknown because long-term studies have not been conducted. Forest and forest edge birds should not be significantly disturbed because these species are familiar with tall features (i.e., trees) in their habitat. However, evidence indicates that some grassland species do not respond favorably to the presence of tall structures in their habitat. Studies conducted at the Buffalo Ridge wind power project in southwest Minnesota and the Foote Creek Rim Project in Wyoming, revealed that grassland nesting birds are found in reduced numbers as the proximity to wind turbines increases (Johnson *et. al.*, 2000; Leddy *et. al.*, 1999). Assuming similar behavior by grassland species within the Project Site, the completed Howard Project may result in a reduced number of grassland species in open fields that contain wind turbines.

The potential impacts of the Project on foraging Canada geese will not be significant. Kerlinger (2005) indicates that Canada geese often habituate rapidly to man-made structures, and that geese have been observed foraging in fields that contain operating wind turbines at the Fenner Wind Power Project in Madison County, New York. This observation is also supported by a study conducted by the Iowa Cooperative Fish and Wildlife Research Unit at the Top of Iowa Wind Farm located in Worth County, Iowa. Due to its proximity to three state-owned Wildlife Management Area's (WMA), the Top of Iowa Wind Farm experiences very high use by waterfowl (over 1.5 million duck and goose use days per year). Observations at that site revealed that the wind turbines did not affect the use of the fields by Canada geese or other species of waterfowl. In addition, over the two year course of the study, no turbine-related waterfowl or shorebird mortality was documented (Koford *et. al.*, 2005). Based on these study results, and observations at other wind power projects, the proposed Howard Project is not anticipated to have a significant, long-term displacement or mortality effect on resident or migrating Canada geese.

Landowners are also often concerned over the potential displacement effect of wind turbines on game species such as deer and wild turkey. While habituation to the presence of the turbines may not be immediate, species such as deer and wild turkey generally adapt quickly to the presence of man-made features in their habitat (as evidenced by the abundance of these species in suburban settings). Significant displacement of game species from a wind power site has not been reported, and the primary landowner at the existing Madison Wind Power Project in Madison County, New York, has indicated that he has not detected any apparent decline in game species on his property (C. Stone, pers. comm.).

<u>Collision</u>

Collision with man-made structures has been documented as a potentially significant source of songbird mortality (Erickson *et. al.*, 2001). According to the Avian Risk Assessment (ARA) prepared by Woodlot (Appendix I), an estimated 33,000 birds were killed at about 15,000 wind turbines in the United States in 2001 (Erickson et al. 2001). Fatalities ranged from zero to about 6 birds per turbine per year, yielding an average of approximately 1.83 to 2.19 (national averages without California and with California respectively) birds per turbine per year. The highest mortality rates were observed in California. Studies from the Eastern United States generally reveal slightly higher fatality levels than those observed in the midwest. A study conducted in 2003 at the Mountaineer Wind Energy Center in West Virginia found an average mortality rate of about 4 birds per turbine per year (Kerns and Kerlinger 2004). A study at the Top of Iowa Wind Power Project site revealed no fatalities to Canada Geese or other waterfowl (Koford et al. 2005). Fewer than 1.5 birds per turbine per year were found to be killed at that site.

As these study results illustrate, bird collisions are relatively infrequent events at wind farms. No federally-listed endangered or threatened species have been recorded, and outside of California, only occasional raptor, waterfowl, or shorebird fatalities have been documented. In the Midwestern and Eastern United States, night migrating songbirds have accounted for a majority of the fatalities at wind turbines. In general, the documented level of fatalities has not been large in comparison with the source populations of these species, and minor when compared to other potential sources of avian mortality (Erickson, et al. 2001).

Although collision risk is likely to be low, data on nesting birds and avian migration at the Project Site were collected to determine if site-specific characteristics might suggest an elevated level of risk relative to other sites. Fall 2005 and spring 2006 radar surveys documented the passage of night migrating birds through the Project area and the breeding bird surveys documented the community of nesting birds within the Project area. The overall level of activity and species composition documented during those surveys is within the range of other similar surveys that have been conducted over the past several years. Consequently, the Project area is not believed to be a particularly important migration corridor or an area of concentrated migration activity. As indicated in Table 10 (and Table 3-3 in the Risk Assessment in Appendix I), radar data collected at the Howard site are similar to data from other sites in New York, in terms of passage rates, flight altitudes, and flight directions. Perhaps most important, in terms of the potential for collision impacts, is the flight altitude of migratory birds. Data from radar studies at proposed and existing wind power project sites across the Eastern United States consistently show mean flight altitudes well above the height of the proposed wind turbines. Radar data from Northeastern sites typically show mean songbird flight altitudes in the range of 1,200 to 2,000 feet with between 1% and 20% flying below the 125-meter (410 foot) altitude. Data collected at the Howard site are consistent with these observations.

Table 10. Summary of Results from Radar Studies Conducted in the Eastern United States since 2000.

Site	Season	Topography/Elevation	Targets/Km/Hr	Mean Altitude of Flight (AGL)	Percent Targets <100-125m	Mean Flight Direction
Howard, NY	Fall	Hilltop/Ridge	481	491 m (1,610 ft)	5% below 125m	185°
	Spring	Hilltop/Ridge	440	426 m (1,397 ft)	13% below 125 m	27°
Chautauqua, NY	Fall	Hilltop/Ridge	238	532 m (2,366 ft)	4% below 125m	199°
	Spring	Hilltop/Ridge	395	528 m (1,830 ft)	4% below 125 m	29°
Flat Rock, Lewis County, NY	Fall	Hilltop/Ridge	158	415 m (1,362 ft)	8% below 125m	184°
Prattsburgh, NY (Ecogen)	Fall	Hilltop/Plateau	200	365 m (1,198 ft)	9% below 125 m	177°
	Spring	Hilltop/Plateau	170	370 m (1,213 ft)	18% below 125 m	22°
Jordanville, NY	Fall	Hilltop/Ridge	380	440 m (1,444 ft)	6% below 125 m	208°
	Spring	Hilltop/Ridge	409	317 m (1,217 ft)	21% below 125 m	40°
Dairy Hills, Wyoming County, NY	Fall	Hilltop/Ridge	94	466 m (1,528 ft)	10% below 125 m	180°
	Spring	Hilltop/Ridge	117	397 m (1,302 ft)	15% below 125 m	14°
Marble River, Clinton County, NY	Fall	Plain/Plateau	152	438 m (1,437 ft)	5% below 120 m	193°
	Spring	Plain/Plateau	254	422 m (1,384 ft)	11% below 120 m	40°
Top Notch, Herkimer County, NY	Fall	Hilltop/Plateau	691	516 m (1,692 ft)	4% below 125 m	198°
	Spring	Hilltop/Plateau	509	419 m (1,374 ft)	20% below 100 m	44°
Average[1]						

[1]Average excludes those percentages that are reported below 100 meters (Searsburg, VT).

Sources: Howard, NY (Woodlot 2006), Chautauqua, NY (Cooper, 2003, 2004), Flat Rock (Mabee et al., 2004), Prattsburgh, NY (Mabee et al., 2005), Jordanville, NY (Woodlot, 2005a), Dairy Hills (WEST, 2005), Marble River (Woodlot 2005b), Top Notch (Woodlot, 2005c).

Because there currently is no predictive model available to quantify expected avian collision mortality as a result of wind power project operation, risk assessments must be based on pre-construction indices and indicators of risk (e.g., breeding bird survey and radar data) at the proposed Project Site, along with empirical data from operating projects (e.g., avian mortality surveys). Because pre-construction surveys at the Howard site revealed no indicators of elevated risk (e.g., abundance of rare species, unusually high numbers, unusually low flight altitude, habitat that would act as an ecological magnet), it appears that avian collision mortality rates at the site should be similar to the relatively low national average rates (i.e., 1.83 to 2.19 fatalities per turbine per year). Using the national average of 2.19 birds killed per turbine per year, the 25 turbine Howard Project would result in a total of 55 bird deaths per year. Even if as many as 6 birds per turbine per year are killed (i.e., the high end of what has been observed at other projects), total annual collision mortality for the Project would be approximately 150 birds. Although this number may appear large, as the radar data indicate, it is a tiny fraction of the population that migrates through the area, and is not considered a biologically significant impact.

With the exception of the Altamont Pass project in California, documented raptor fatalities at wind power projects are virtually non-existent. In fact, just more than 10 raptor fatalities have been documented from all the mortality studies conducted outside of California (R. Roy, pers. comm.). In addition, studies conducted at operating wind power projects that are near concentrated hawk migration corridors indicate that raptors rarely collide with wind turbines (DeLucas *et. al.*, 2004; Kerns and Kerlinger, 2004). On-site surveys determined that raptor passage rates at the Howard site are low, and that migration occurs across a broad front (Woodlot, 2006). The anticipated mortality of raptors at the Howard Wind Power Project is expected to be similar to that observed at other modern facilities at which mortality surveys have occurred. Specifically, raptor fatalities are expected to be uncommon even though a relatively high percentage of raptors were observed flying below the proposed turbine height. Of the mortality surveys that have occurred over the past five years, very few raptor fatalities have been reported. The belief behind this is that because of their day-time habits and the slow moving blades of modern large turbines, raptors are aware of the spinning blades and avoid them. The Howard Wind Power Project is no different from those other facilities and, consequently, the risk of raptors colliding with the proposed turbines is anticipated to be low. This assessment of low risk to raptors includes migrating raptors as well as raptors that are resident or nesting locally within and in the vicinity of the Project area.

The northern harrier (threatened) could nest within the Project Site, as indicated by BBA data, and on-site observations. These birds are at some risk of collision with turbines, although documented fatalities involving northern harriers at wind power facilities are relatively rare. The foraging flight of these birds is generally below the rotor-swept height, but their aerial displays ("sky dancing") during the nesting season may put them at rotor height and at increased risk of collision.

Similar to raptors, very few waterfowl or water birds have been found during mortality surveys at existing wind energy developments, despite the characteristics of some species that might actually make them seem to be more at risk of colliding with wind turbines. As mentioned previously, the Top of Iowa project provides supporting evidence that waterfowl are at low risk of colliding with wind turbines. Despite extremely high waterfowl use of that project area and the surrounding vicinity, including direct observations of nearly 500 flocks of Canada geese feeding in fields with wind turbines, no waterfowl mortality has been observed at that project. The Howard Wind Power Project includes turbines that will be located in fields that will likely be used by flocks of migrating Canada geese, and there may be flyovers of other species of waterfowl such as mallard and wood duck, as well as water birds such as great blue heron or green heron. Based on the available information from other facilities, however, the risk of fatalities to waterfowl and water birds to collide with the proposed wind turbines is very low.

According to the Risk Assessment (Appendix I) researchers currently have limited understanding of the specific factors influencing rates of bat collision mortality. However, evidence from the timing of fatalities documented at existing wind facilities and other structures suggests that migrating bats along some Appalachian ridgelines are at the highest risk (Johnson and Strickland 2004, Johnson *et al*. 2003, Whitaker and Hamilton 1998). A number of plausible hypotheses explaining the high rates of bat mortality have been presented by bat researchers, but none of these have been adequately tested. The most likely explanations center on the possibility that ridges act as corridors for migrating or feeding bats, that bats are unable to detect turbines visually or by echolocation, or that bats may be attracted to wind turbines due to artificially high insect concentrations, light attraction, or acoustic attraction. Other researchers believe that during migration bats turn off their echolocation to conserve energy (Arnett *et al.* 2005).

Results of the relatively few studies that have documented bat fatalities at existing wind facilities indicate that the risk of bats colliding with wind turbines can be higher than that for birds. Findings from the Mountaineer Wind Facility in West Virginia and the Meyersdale Wind Facility in Pennsylvania have heightened concerns regarding collision risk to migratory bat populations. While few studies have been conducted to document bat mortality at operating wind power sites, Johnson and Strickland (2004) documented bat mortality rates of 46.2 fatalities per turbine per year at wind projects sited along forested ridgelines in the Appalachians. This differs from the much lower rates (ranging from 0.07 to 2.32 fatalities per turbine per year) documented at more open midwest and western sites (Erickson *et al.* 2002).

Estimates of the number of bats that may collide with wind turbines at the Howard Wind Power Project can be derived by multiplying reported mortality rates by the number of proposed turbines. This results in estimates of two to 58 bat fatalities per year if fatality rates similar to western and mid-western projects occur and 1,155 bat fatalities per year if fatality rates are similar to rates found at facilities along forested ridgelines of the central Appalachians.

This range appropriately estimates the potential high and low ends of the range of potential bat mortality that may arise from operation of the Project. However, as stated in the Risk Assessment, the site characteristics of the Howard Wind Power Project are not identical to the site characteristics of either the low mortality mid-western and western sites, or the higher mortality Appalachian ridge sites. The Project will be located in an agricultural landscape, with the turbines placed in fields on rolling hills. These characteristics are similar to those of western and mid-western facilities. However, the Project Site is located atop a plateau that is separated from other plateaus by steep-sided, narrow valleys. It is also located in the eastern United States where bat populations in general may be higher than western and mid-western areas due to the prevalence of forested habitat. These characteristics are similar to those of the eastern facilities that have been investigated.

Given that the characteristics of the Howard site lie in between the characteristics of the sites of the other projects that have been investigated for bat collision mortality, it is likely that the bat collision mortality for the proposed Project will lie within the range bracketed by the observed mortality at those other projects (Woodlot, 2006).

3.3.2.2.3 Threatened and Endangered Species

As previously mentioned, no threatened or endangered plant species (or unique natural communities) have been identified within the Project Site. Therefore, operational impacts to rare plant species or communities are not expected.

NYSDEC correspondence reported the potential occurrence of longtail salamander, timber rattlesnake and small-footed bat. Operational impacts to longtail salamander and timber rattlesnake are not anticipated, as habitat for these species (if they occur in the area) will not be disturbed as a result of Project operations and maintenance. The only possible impact would be very limited incidental mortality from maintenance and repair vehicle utilizing Project access roads. Because such vehicular activity will be very limited and conducted at low speed, significant road-kill is not anticipated. In regard to small-footed bat, disturbance to hibernacula and roost sites should not occur as a result of Project operation. The potential for collision impacts is as described above, for bats in general.

Operational impacts to listed grassland bird species, such as northern harrier, horned-lark and grasshopper sparrow, could include occasional collision mortality and disturbance/displacement of nesting individuals. Of the listed grassland species documented within the Project area, only horned lark is considered susceptible to significant collision risk. This is due to the aerial courtship displays performed by males of this species. Regularly flying in circles at 100-200 feet (30-60 m) above the ground would put these species at risk of colliding with turbine rotors (Kerlinger, pers. comm.).

Because grassland birds have evolved in a habitat that lacks large overhead structures (i.e., trees), it is possible that the presence of wind turbines in open fields could have a disturbance/displacement effect on listed grassland species. However, the siting of wind turbines at field edges and outside of the open meadow/pastureland habitat typically utilized by these species will result in very limited disturbance/displacement impacts on grassland birds.

Operational impacts to listed woodland raptors, such as sharp-shined hawk, Cooper's hawk, and red-shouldered hawk are not anticipated. As mentioned in the Risk Assessment, rates of raptor mortality from turbine collision are very low. The listed raptor species likely to be found at the Howard site have rarely been documented in mortality surveys at other wind power sites, and appear capable of avoiding the operating turbines under most circumstances.

As mentioned previously, the NYSDEC and the USFWS have expressed concerns regarding potential impacts to Indiana bats as a result of wind power projects in New York State. This concern has resulted primarily from sizeable bat kills that have occurred at wind power projects in recent years at the Mountaineer site in West Virginia and the Meyersdale site in Pennsylvania (although no Indiana bats are known to have been killed at these sites). Specific to this Project, correspondence received from the NYSDEC did not indicate any concern over the Project's potential to impact Indiana bat. Regardless, an analysis of potential impact to Indiana bat is provided below.

The nearest wintering cave (hibernaculum) used by Indiana bats is located approximately 80 miles northeast of the Project Site, in Onondaga County. While the proposed Project Site is within the dispersal distance of Indiana bats, Project-related impacts on this species are not considered likely for a variety of reasons, including:

1. The Project Site is not in an area designated by regulatory agencies as critical habitat for Indiana bats.

2. Bats utilizing the Onondaga County hibernaculum are likely to be widely dispersed once they leave the cave. NYSDEC telemetry studies also indicate that most Indiana bats in New York breed within 30-40 miles of their hibernacula (A. Hicks, Pers. Comm.). Thus, relatively few individuals are likely to occur in the vicinity of the proposed Project.

3. There are no physiographic landscape features (e.g., abrupt ridge lines or water courses) that might direct or concentrate bats migrating to and from the Onondaga County hibernaculum toward the Project Site.

4. High winds and low temperatures make the Project Site less likely to receive use by Indiana bats, when compared to warmer, less exposed valley and lake plain areas located closer to the hibernaculum. Based on the results of previous NYSDEC studies of Indiana bats elsewhere in the state, it is reasonable to expect that Indiana bats (especially reproductive females) will remain within suitable habitat at lower elevation (e.g., large valley and lake plain areas west of the hibernaculum on the Lake Ontario plain). Results of a 2005 telemetry study conducted by the NYSDEC and the USFWS at the Glen Park Indiana bat hibernaculum revealed that none of the bats traveled further than 17 miles from the cave.

5. The majority of documented turbine-related bat mortality has involved three species of migratory tree bat (hoary bat, red bat, and silver-haired bat). An Indiana bat fatality has never been documented at any wind power project site in the United States, even those in proximity to Indiana bat hibernacula and summer maternity roosts, and where sizable numbers of other bat species have been killed.

Based on all of the information presented above, the Project is not expected to result in any impacts to the Indiana bat.

3.3.3 Proposed Mitigation

The development of wind power projects can legitimately be considered a form of mitigation, in that power generated from the wind can satisfy increasing demand that would otherwise require expansion of conventional electricity generating capacity. All electric generating facilities impact ecological resources (fish, wildlife, natural communities). However, as indicated in Table 11 below, environmental impacts that result from more traditional power generating facilities (fossil fuel, hydroelectric, nuclear) are much more significant than the impacts caused by wind power projects.

Table 11. Environmental Impacts of Electricity Sources.

	Wind	Hydro	Nuclear	Coal	Natural Gas
Global Warming Pollution	None	None	None	Yes	Yes
Air Pollution	None	None	None	Yes	Limited
Mercury	None	None	None	Yes	None
Mining/Extraction	None	None	Yes	Yes	Yes
Waste	None	None	Yes	Yes	None
Habitat Impacts	Limited	Yes	Limited	Yes	Yes

Source: AWEA Factsheet. (www.awea.org/pubs/factsheets.html)

The addition of wind energy capacity provides the flexibility to phase out existing high-impact electricity sources in the future. These impacts include a larger project footprint, which results in direct habitat loss; the use of surface waters for generation and/or thermal regulation, which results in thermal discharge, fish entrainment, and impingement; the extraction and transportation of raw materials, which results in habitat disturbance and air pollution; waste disposal, which increases the effective footprint of a project and presents pollution/contamination concerns; air pollution, which results in acid precipitation and the subsequent affects on ecological resources; and/or continued contribution to global warming, which is perhaps the greatest potential impact to ecological (and human/cultural) resources worldwide.

3.3.3.1 Vegetation

Mitigation of impacts to vegetation will be accomplished primarily through careful site planning. Large areas of forest and wetland areas are being avoided to the extent practicable. Therefore, the most ecologically significant communities within the Project Site will be largely protected from disturbance. Project access roads will be sited on existing farm lanes wherever possible, and areas of disturbance will be confined to the smallest area possible. In addition, a comprehensive sediment and erosion control plan will be developed and implemented to protect adjacent undisturbed vegetation and other ecological resources.

Mitigation measures to avoid or minimize impacts to vegetation will also include delineating sensitive areas (such as wetlands) where no disturbance or vehicular activities are allowed, educating the construction workforce on respecting and adhering to the physical boundaries of off-limit areas, complying with guidance provided by environmental monitors, employing best management practices during construction, and maintaining a clean work area within the designated construction sites. Following construction activities, temporarily disturbed areas will be seeded (and stabilized with mulch and/or straw if necessary) to reestablish vegetative cover in these areas. Other than in active agricultural fields, native species will be allowed to revegetate these areas.

3.3.3.2 Fish and Wildlife

As previously discussed, construction-related impacts to fish and wildlife should be limited to incidental injury and mortality due to construction activity and vehicular movement, construction-related silt and sedimentation impacts on aquatic organisms, habitat disturbance/loss associated with clearing and earth moving activities, and displacement due to increased noise and human activities. Mitigation of impacts related to construction activity will be accomplished through careful site design (e.g., utilizing existing roads, avoiding sensitive habitat, and minimizing disturbance to the extent practicable), adherence to designated construction limits, and avoidance of off-limit sensitive areas.

To avoid and minimize impacts to aquatic resources resulting from construction-related siltation and sedimentation, an approved sediment and erosion control plan and Storm Water Pollution Prevention Plan (SWPPP) will be implemented. The sediment and erosion control plan and SWPP were previously described in Section 3.2 (Water Resources). Proper implementation of these plans will assure compliance with NYSDEC State Pollutant Discharge Elimination System (SPDES) regulations and New York State Water Quality Standards. In addition, a Spill Prevention, Containment and Counter Measures (SPCC) Plan will be developed and implemented to minimize the potential for unintended releases of petroleum and other hazardous chemicals during Project construction and operation.

Mitigation for impacts related to permanent habitat loss and forest fragmentation will be accomplished through careful site design (i.e., minimizing the permanent footprint of Project components to the extent practicable) and restoration of all temporarily disturbed areas. In addition, cleared forest land along Project access roads and at the periphery of turbine sites will be allowed to grow back and reestablish forest habitat in these areas.

The Project has been designed to minimize bird and bat collision mortality. The turbines will be placed much further apart than in older wind farms where avian mortality has been documented, such as those in northern California. They will also be mounted on tubular towers (rather than lattice), which prevent perching by birds. In an effort to reduce avian and bat impacts, all electrical lines between the turbines will be buried and any the above-ground lines will follow Avian Power Line Interaction Committee (APLIC) guidelines for insulation and spacing. Lighting of the turbines (and other infrastructure) will be minimized to the extent allowed by the FAA and follow specific design guidelines to reduce collision risk (e.g., using flashing strobes with the longest permissible off cycle, rather than pulsed or steady-burning lights).

Despite the fact that significant impacts to birds and bats are not anticipated, a post-construction avian and bat fatality monitoring program will be implemented. Although this study will not directly mitigate Project-specific impacts, it will help to advance understanding of avian and bat collision impacts. Experts have indicated that, although the impact of wind power projects on wildlife has been studied more intensively than comparable infrastructure, such as communication towers, important research gaps remain (GAO, 2005). These gaps result primarily from the limited number of post-construction monitoring studies that have been conducted and made publicly available.

The purpose of the on-site, post-construction monitoring program will be to determine if avian and/or bat collision fatalities are occurring as a result of Project operation, and if so, the rate of mortality. This data can then be correlated with pre-construction data, and ultimately this information can help to develop models that will more precisely predict the impact of future wind power projects. The protocols and study design will follow established/accepted procedures for monitoring collision mortality at wind power facilities and other tall structures. These methods include searches under turbines, coupled with analysis of carcass removal rates (scavenging) and searcher efficiency rates. Specific study methodology and duration will be determined in consultation with the NYSDEC and USFWS. The results of these studies, and subsequent consultation with (and analysis by) the NYSDEC and the USFWS, will determine the need for an “adaptive management component:” of post-construction monitoring. If necessary, this will include a process for addressing environmental impacts (such as impacts on birds and bats) that become apparent during Project operation.

In addition, in an attempt to provide general mitigation/off-sets to anticipated impacts to ecological resources, Howard Wind will investigate the feasibility of the creation of environmental enhancements through cooperative partnerships. These partnerships may arise with local landowners, governments, educational, and/or conservation organizations.

3.3.3.3 Threatened and Endangered Species

Because the closest known timber rattlesnake sighting is approximately 2.5 miles southeast of the Project Site, and because the project is not proposed to impact the preferred habitat of this species, impacts to the timber rattlesnake are not anticipated. Correspondence with NYSDEC personnel indicated that mitigation for impacts to this species is not required, provided that Project components are not sited within preferred habitat (A. Kirsch, pers. comm.).

To avoid impacting listed threatened and endangered bird species, a pre-construction breeding bird survey will be undertaken if the Project construction schedule coincides with the breeding season. This survey will focus on the identification and survey of habitat suitable for use by listed threatened or endangered species. If such species are nesting within or adjacent to proposed areas of disturbance, these areas will be avoided until after the nesting season, to the extent practicable. If the pre-construction breeding bird survey indicates the presence of listed grassland bird species, the Project developer will also undertake a post-construction habitat displacement study to ascertain whether, and to what extent, the operating turbines are disturbing/displacing nesting grassland birds. Although this study will not directly mitigate Project-specific impacts, it will serve to provide post-construction data that can be correlated with pre-construction data, and ultimately used to develop predictive models for use in the siting of future wind power projects.

3.4 CLIMATE AND AIR QUALITY

3.4.1 Existing Conditions

3.4.1.1 Climatic Conditions

The Natural Resources Conservation Service (NRCS) maintains and monitors National Water and Climate Centers (NWCC) in numerous locations throughout the United States, including Bath, New York, approximately 8 miles east of the Project Site. This NWCC substation has collected temperature and precipitation data from 1971 through 2000. Based upon the compiled 30-year averages, the average daily maximum temperature in Bath is 57.0 degrees Fahrenheit (°F), and the average daily minimum is 34.2°F. Historically, January is the coldest month with an average daily temperature of 22.7°F, and July is the warmest with an average daily temperature of 67.9°F. Temperature extremes range from a high of 94°F to a low of -15°F.

The 30-year annual average precipitation recorded in Bath is 31.9 inches. June, with an average monthly precipitation of 3.92 inches, is historically the wettest month of the year, and February, with an average monthly precipitation of 1.61 inches, is the driest. The 30-year average annual snowfall recorded in Bath is 46.0 inches. January and February are historically the snowiest months of the year with monthly averages of 11.3 inches and 10.2 inches, respectively (NRCS, not dated).

3.4.1.2 Air Quality

Air quality data for New York State are published annually by the NYSDEC Division of Air Resources. The most recent summary of air quality data available for the state is the *2005 New York State Air Quality Report: Data Tables* (NYSDEC, 2005). Included in this report are the most recent ambient air quality data, as well as long-term air quality trends derived from data that have been collected and compiled from numerous state and private (e.g., industrial, utility) monitoring stations across the state. These trends are assessed by the appropriate NYSDEC region, and the Project Site is located in NYSDEC Region 8. Most of the air quality sampling points for Region 8 occur in the metropolitan Rochester area, where sources of pollution and air quality concerns are most significant. The other Region 8 sampling points are located in Elmira, Pinnacle, and Williamson. During 2005, all of the Region 8 sampling points were within the acceptable levels established by the National Ambient Air Quality Standards (NAAQS) for all tested parameters, which include sulfur dioxide, inhalable particulates, carbon monoxide, and ozone.

One of the largest sources of air emissions in the vicinity of the proposed Project is the AES Greenidge coal and biomass co-fired power plant in Dresden (Yates County) approximately 40 miles northeast of the Project Site. This power plant is ranked among the top ten facilities in New York State for total on-site releases (all chemicals) by the Environmental Protection Agency (EPA, 2003). Additionally, the NYSDEC listed this plant in the top ten facilities releasing mercury in New York in 2000 (NYSDEC, not dated). However, no local air monitoring data is available to further characterize air quality in the vicinity of the proposed Project.

3.4.2 Potential Impacts

3.4.2.1 Construction

During the site preparation and construction phases of the Project, minor, temporary adverse impacts to air quality could result from the operation of construction equipment and vehicles. Such impacts could occur as a result of emissions from engine exhaust and from the generation of fugitive dust during earth moving activities and travel on unpaved roads. The increased dust and emissions will not be of a magnitude or duration that would significantly impact local air quality. However, dust in particular could cause annoyance and property damage at certain yards and residences that are adjacent to unpaved town roads or Project access roads. These impacts are anticipated to be short-term and localized and will be avoided or corrected quickly, as discussed below.

3.4.2.2 Operation

The operation of this Project is anticipated to have a positive impact on air quality by annually producing 164,250 Megawatt hours (MWh) (assuming 25-2.5 MW turbines operating at 30% annually) of electricity with zero emissions. Power delivered to the grid from this Project will directly off-set the generation of energy at existing conventional power plants. Based on emissions rates for the average U.S. average fuel mix (AWEA, not dated), this 157,000 MWh wind farm is estimated to annually displace:

- 804,825 pounds of NO_x
- 1,314,000 pounds of SO_2
- 249,660,000 pounds of CO_2

The operation of this Project is not anticipated to have any measurable effect on climate. Some recent studies have suggested that there may be minor impacts to microclimates within 0.5 mile of wind turbines. Modeling conducted by Roy, *et al*. (2004) suggests that large scale wind turbine installations (10,000 turbines) may have a warming effect on the local climate. During the environmental review process for a wind farm in Chautauqua, NY a study group analyzed the impacts of wind turbines on vineyard microclimates (DeGaetano, *et al*., 2004). This study group determined that a wind turbine could influence the ground level air temperature by no more than one degree Celsius (ºC) and concluded that there were unlikely to be significant positive or negative impacts to area vineyards as a result of this potential change in microclimate. However, by generating 60 MW of electricity without the production of “green house” gasses, the Project represents a legitimate effort to mitigate the well-established causes of global climate change.

3.4.3 Proposed Mitigation

Except for minor, short-term impacts from construction vehicles, the Project will have no adverse impacts on air quality. A dust control plan will be developed and implemented to minimize the amount of dust generated by construction activities. In accordance with this plan, the extent of exposed/disturbed areas on the site at any one time will be minimized and restored/stabilized as soon as possible. The environmental monitor will identify dust problems and report them to the construction manager and the contractor. Water will be used to wet down dusty roads (public roads as well as Project access roads) as needed throughout the duration of construction activities. In more severe cases, temporary paving (e.g. oil and stone) could be used to stabilize dusty road surfaces in certain locations. In addition, Howard Wind LLC will implement a Complaint Resolution

Procedure to establish an efficient process by which to report and resolve any construction (or operational) related impacts.

Project operation has the potential to reduce current emissions from existing power plants. The United States generates approximately 85 percent of its energy from fossil fuels, with the biggest contribution coming from coal, the fossil fuel with the highest carbon dioxide content per unit of electricity produced (AWEA, 1998). A detailed analysis by the Department of Energy's Pacific Northwest Laboratory in 1991 estimated the energy potential of the United States wind resource at 10.8 trillion kilowatt-hours (kWh) annually, or more than three times total U.S. electricity consumption in 1996 (Elliot *et. al*., 1991; USDOE, 1997). Every 10,000 MW of wind installed can reduce carbon dioxide emissions by approximately 33 million metric tons (MMT) annually if it replaces coal-fired generating capacity, or 21 MMT if it replaces generation from the United States average fuel mix (San Martin, 1989). The American Wind Energy Association (AWEA) estimates that wind energy has the potential to reach 30,000 MW of installed generating capacity in the United States by 2010. If this target is achieved, wind would reduce national carbon dioxide emissions by 100 MMT annually (based on displacement of coal-fired generation) (AWEA, 1998). The PSC has estimated that achievement of the State's RPS goal will reduce New York State emissions of NOx by approximately 4,000 tons per year, emissions of SO2 by approximately 10,000 tons per year, and emissions of CO2 by approximately 4,129,000 tons per year.

Thus, by contributing to this effort, the Project will have an incremental and long-term beneficial impact on climate and air quality. This benefit should be viewed as mitigation for other environmental impacts associated with the Project.

3.5 AESTHETIC/VISUAL RESOURCES

3.5.1 Existing Conditions

Existing visual and aesthetic resources within the visual study area were identified as part of a Visual Impact Assessment (VIA) conducted by EDR (Appendix J). Based on established visual assessment methodology (NYSDEC, not dated) the visual study area for the Project was defined as the area within a 5-mile radius of each of the proposed turbines. This area includes 146 square miles in Steuben County. However, to address agency concerns regarding visibility beyond 5 miles, sensitive site mapping and viewshed analysis were extended to a 10-mile radius (see Figure 4 in Appendix J). The VIA included a review of existing data and field reconnaissance to identify landscape similarity zones, viewer groups, and sensitive visual resources within the study area. These existing visual/aesthetic components of the area are described below.

3.5.1.1 Landscape Similarity Zones

Land use within the 5 mile-radius visual study area is dominated by active agricultural land, but also includes rural residential development, forest land, the City of Hornell and several small villages and hamlets. Within this area, four distinct landscape similarity zones were defined. The general landscape character of these zones is described below.

Zone 1: Upland Agricultural Zone

This landscape similarity zone occurs on hilltops and elevated ridges within the visual study area, and is characterized by open agricultural land with widely dispersed farms and rural residences along a network of county, and local roads. Some small areas of more concentrated settlement, such as the hamlets of Howard and Towlesville, along with the majority of Route 17/86, also occur within this zone. Active agricultural fields and woodlots dominate the landscape. Topography ranges from steeply dissected plateaus in the southern portion of the study area (along the Canisteo River Valley), to more gently rolling terrain in the central and northern portions. Views in the upland agricultural zone are generally open, at times expansive. These views typically include open fields in the foreground, often backed or bordered by hedgerows and woodlots. Views across valleys to other hilltops are available from many locations. These views include widely scattered homes, barns, silos, and farm equipment.

Zone 2: Valley Agricultural Zone

This zone includes the Canisteo River Valley in the southern and southwestern portions of the study area, as well as the Bennett Creek and Colonel Hills Creek Valleys, that extend south from here. It is characterized by level crop fields, along with farms, residences, and rural businesses located within a well-defined river valley. This zone includes a few areas of more concentrated human settlement, such as the hamlets of Adrian and Browns Corners, along with significant portions of State Routes 36 and 248 and County Route 119. These roads generally parallel the orientation of the major valleys and offer open views of the valley floor and surrounding slopes. The Canisteo River runs through the majority of this area and is characterized by a meandering channel and banks lined with mature trees and understory brush in most places. Consequently, views to and from the river are generally limited to locations where roads run adjacent to or cross the channel. The dominant activity in this area is farming and travel along local highways. Although abundant farmland provides for open views in many areas, the narrowness of the valleys and the steep, wooded slopes that enclose them, block views to more distant background features.

Zone 3. City/Village Zone

This landscape similarity zone includes the City of Hornell and the Villages of North Hornell and Canisteo. It is characterized by moderate to high-density residential and commercial development. Vegetation and landform may contribute to visual character in this zone, but buildings (most 1-3 stories tall, but some in Hornell over 4 stories) and other man-made features dominate the landscape. These features can be highly variable in their size and architectural style. However, they are typically arranged along an organized street pattern that tends to screen outward views and focus views along the main streets and crossroads. In many areas, street and yard trees also help to enclose and screen views within this zone. Long distance views are generally not available from this zone due to its location within the relatively narrow Canisteo River Valley.

Zone 4. Forestland Zone

This zone is characterized by the dominance of forest vegetation (native deciduous/mixed forest and mature conifer plantations) and generally steep/hilly topography. The forestland zone occurs throughout the visual study area, but is concentrated in valleys and ravines, and along the steep slopes that line the Canesteo River Valley in the southern portion of the study area. Also included in this zone are some areas of State Forest that occur in the central portion of the Project area, as well as to the southeast, southwest and west. Views within this zone are generally restricted to areas where small clearings and road cuts provide breaks in the tree canopy. Where long distance views are occasionally available, they are typically of short duration, limited distance, and/or tightly framed by trees and adjacent slopes. Land use in this zone includes, low-density residential and recreational use (hunting, fishing, etc.).

These landscape units are illustrated in Figure 5 in Appendix J.

3.5.1.2 Viewer/User Groups

Three categories of viewer/user groups were identified within the visual study area. These include the following:

Local Residents

Local residents include those who live and work within the visual study area. They generally view the landscape from their yards, homes, local roads and places of employment. Except when involved in local travel, residents are likely to be stationary, and have frequent or prolonged views of the landscape. Local residents may view the landscape from ground level or elevated viewpoints (typically upper floors/stories of homes). Residents' sensitivity to visual quality is variable, however, it is assumed that residents may be very sensitive to changes in particular views that are important to them.

Through Travelers/Commuters

Commuters and travelers passing through the area view the landscape from motor vehicles on their way to work or other destinations. Commuters and through travelers are typically moving, have a relatively narrow field of view, and are destination oriented. Drivers on major roads in the area (e.g., Route 17/86 and Route 36) will generally be focused on the road and traffic conditions, but do have the opportunity to observe roadside scenery. Passengers in moving vehicles will have greater opportunities for prolonged off-road views than will drivers, and accordingly, may have greater perception of changes in the visual environment.

Tourists/Recreational Users

Tourists and vacationers come to the area for the purpose of experiencing its scenic or recreational resources. These viewers include sightseers and weekend home/camp owners. They may view the landscape on their way to a destination or from the destination itself. Some, such as weekend and seasonal home owners, may spend extended time in the area. Tourists' and vacationers' sensitivity to visual quality and landscape character will be variable (depending on their reason for visiting the area), although this group is generally considered to have relatively high sensitivity to aesthetic quality and landscape character. Recreational users include local and seasonal residents involved in outdoor recreational activities at parks and recreational facilities, and in undeveloped natural settings such as forests, fields and water bodies. This group includes campers, snowmobilers, bicyclists, recreational boaters, hunters, fishermen, and those involved in more passive recreational activities (e.g., picnicking or walking). Recreational users will often have continuous views of landscape features over relatively long periods of time, and most will only view the surrounding landscape from ground-level or water-level vantage points. Although tourists and recreational users will be concentrated outside the 5 mile-radius visual study area (i.e., in and around the Finger Lakes to the north), these viewers may traverse the study area while traveling the major roads.

3.5.1.3 Visually Sensitive Resources

The 5-mile radius visual study area includes only a few sites that the New York State Department of Environmental Conservation (NYSDEC) Visual Policy (DEP-00-2) considers scenic resources of statewide significance. These include eight sites/districts listed on the National Register of Historic Places (seven in Hornell and one in Canesteo) and a section of the Finger Lakes Trail that occurs in the central portion of the study area. Within the study area, there are no State Parks, Urban Cultural Parks, State Forest Preserve lands, State Wildlife Management Areas, National Wildlife Refuges, National Natural Landmarks, National Park Service lands, designated scenic overlooks, designated Scenic Byways, designated Wild, Scenic or Recreational Rivers, or designated Scenic Areas of Statewide Significance (NYSOPRHP Web Site; NYSDOT, not dated; ECL Article 15 Title 27; NYSDOS, 1993). Review of existing data also failed to reveal the presence of any State Nature or Historic Preserve Areas or Bond Act Properties purchased under the Exceptional Scenic Beauty or Open Space category. However, the 5 mile-radius study area also includes areas that are regionally or locally significant/sensitive, due to the type or intensity of land use they receive. These include the City of Hornell, the Villages of North Hornell and Canisteo, Route 17/86, Burt Hill State Forest, and various publicly-accessible waterbodies.

The area between 5 and 10 miles from the Project Site includes an additional 16 scenic resources of statewide significance. These include an additional 15 historic structures/districts listed on the National Register (all in the Village of Bath), and the West Cameron Wildlife Management Area located in the Town of Cameron.

These resources, along with scenic resources of regional or local significance and areas of intensive land use within 10 miles of the proposed Project, are listed in Table 1, in Appendix J. The locations of visually sensitive resources within the 10 mile-radius visual study area are illustrated in Figure 9.

3.5.2 Potential Impacts

3.5.2.1 Construction

Visual impacts during construction will include the addition of construction material and working construction vehicles and equipment to the local roads and landscape. Construction activity will also result in visible site disturbance, such as tree clearing, earth moving, soil stockpiling and road building, all of which will alter the character of the landscape, at least on a temporary basis. Dust generated by the movement of construction vehicles and sediment-laden storm water run-off could also potentially have an adverse impact on aesthetic resources. However, all of these activities will be relatively short term (i.e., generally restricted to the construction season), can be minimized/mitigated, and at any one site, will generally occur on only a few days during the course of Project construction. Once construction activity ceases and site restoration activities are complete, construction-related visual impacts will no longer occur.

3.5.2.2 Operation

Impacts to visual resources resulting from Project operation were evaluated primarily through the VIA prepared by EDR (see Appendix J).

The VIA procedures used on this Project were based on visual impact assessment methodologies developed and/or accepted by various state and federal agencies. Potential Project visibility was evaluated using viewshed mapping, line-of-sight cross section analysis, and field verification (ballooning). Visual impact was evaluated by preparing computer-assisted visual simulations of the Project from representative/sensitive viewpoints from throughout the 5-mile radius study area. The Project's visual impact on the landscape was evaluated by a panel of registered landscape architects with experience in visual impact assessment. VIA methodology and results are summarized below. Additional detail is available in Appendix J.

3.5.2.2.1 Viewshed Analysis

Topographic viewshed maps for the Project were prepared using USGS digital elevation model (DEM) data (7.5-minute series), the location and height of all proposed turbines, and ESRI ArcView® software with the Spatial Analyst extension. Two 10-mile radius topographic viewsheds were mapped, one to illustrate “worst case” daytime visibility (based on a maximum blade tip height of 425 feet above existing grade) and the other to illustrate potential visibility of turbine lights (based on a nacelle height of 262 feet above existing grade).

The resulting topographic viewshed maps define the maximum area from which any turbine (or turbine light) within the completed Project could potentially be seen within the study area during both daytime and nighttime hours. Because the screening provided by vegetation and structures is not considered in this analysis, the topographic viewsheds represent a "worst case" assessment of potential Project visibility.

A turbine count analysis was performed to better identify how many wind turbines are potentially visible from any given point within the viewshed study area, and a vegetation viewshed analysis was also prepared to better illustrate the potential screening effect of forest vegetation. To address concerns regarding the potential cumulative visual impact of multiple wind power projects, cumulative viewshed analyses were prepared for the Howard Project and three other projects proposed within 15 miles. The results of this analysis are presented in the VIA (Appendix J) and the Cumulative Impacts section of the DEIS (Section 8.0).

Potential turbine visibility, as indicated by the viewshed analyses, is illustrated in Figure 7 and summarized in Table 3 in Appendix J. The topographic blade tip analysis, revealed that the proposed Project could potentially be visible in approximately 62% of the 5-mile study area and 45% of the 10-mile study area. Potentially visible areas are concentrated in the ridge top terrain in the central portion of the study area, but also include slopes and valleys oriented toward the Project throughout the study area. Outside the central portion of the study area, concentrated areas of potential visibility are indicated along the southern and western walls of the Canisteo River Valley, the northeastern wall of the Cohocton River Valley, and along significant portions of the Purdy Creek and Campbell Creek valleys. Most of the visually sensitive sites in the study area fall outside the topographic viewshed, including the City of Hornell, the Villages of North Hornell, Bath, Avoca, and Almond, and most of the Register-listed historic sites and heavily-traveled state highways. However, portions of the Finger Lakes Trail, Route 17/86, the Villages of Arkport and Canisteo, and all of the State Forests are indicated as having potential blade tip visibility (based on topography alone).

As indicated by the turbine count analysis, in most areas where potential visibility is indicated by the topographic viewshed analysis, views to multiple turbines could be available. The largest number of turbines will be visible from hilltops and elevated slopes, while the smallest number will be visible from valley areas. These valley areas include the majority of visually sensitive sites, suggesting that most views from such sites, if available, will include relatively few turbines.

Areas of potential nighttime visibility cover approximately 56% of the 5-mile radius study area and 40% of the 10-mile radius study area, and are indicated in roughly the same locations indicated by the blade tip analysis. However, factoring vegetation into the analysis decreases potential Project visibility to 17% of the 5-mile radius study area, and 10% of the 10-mile radius study area. These areas are largely restricted to open agricultural fields on hilltops and valley floors.

Areas of actual visibility are anticipated to be even more limited than indicated by the viewshed analysis, due to the slender profile of the turbines (especially the blade, which make up the top 150 feet of the turbine), the effects of distance, and screening from hedgerows, street trees and structures, which are not considered in the viewshed analysis.

3.5.2.2.2 Cross Section Analysis

To further illustrate the screening effect of vegetation and structures within the study area, three representative line-of-sight cross sections (ranging from 12 to 17 miles long) were cut through the study area. Cross section locations were chosen so as to include visually sensitive areas (e.g., villages, historic sites, and major roads) and cover the various landscape similarity zones occurring within the visual study area. The cross sections are based on forest vegetation and topography as mapped on the 7.5-minute USGS quadrangle maps and digital aerial photographs. For the purposes of this analysis, a uniform 40-foot tree height was assumed. A 10 fold vertical exaggeration was used to increase the accuracy of the analysis and facilitate reader interpretation.

Cross section analysis revealed that the Project will be visible from between 14% and 30% of the area along the selected lines of sight. The analysis confirms that most visually sensitive sites within the study area are unlikely to have views of the Project. The cross sections suggest that views of the turbines will not be available from sites in the City of Hornell and the Villages of Canisteo and Avoca, or from various sites along major highways in the area. Forested hillsides, the Canisteo and Cohocton Rivers, various creeks in valleys and ravines, and roads that parallel these streams are also indicated as being screened. The results of the cross section analysis are summarized in Table 4 in Appendix J.

3.5.2.2.3 Field Verification

Actual visibility of the proposed Project was evaluated in the field on April 19, 2006. Four 15-foot by 6-foot helium-filled balloons were tethered at the approximate location of proposed Turbines 2, 8, 13, and 23 and raised to a height of approximately 490 feet above the existing grade, thus somewhat exceeding the maximum finished elevation of the turbine blade tip when oriented straight up (i.e., at the 12 o'clock position). The purpose of this exercise was to provide a locational and scale reference to verify visibility of the Howard Wind Power Project turbines and to obtain photographs for subsequent use in the development of visual simulations.

While the balloons were in the sky, field crews drove public roads and visited public vantage points within the 5 mile-radius study area to document points from which the balloons could or could not be seen. Photos were taken from 208 representative viewpoints within the study area. Viewpoint locations were determined using hand-held global positioning system (GPS) units and high resolution aerial photographs (digital ortho quarter quadrangles). The time and location of each photo were documented on all electronic equipment (cameras, GPS units, etc.) and noted on field maps and data sheets. Viewpoints generally represented the most open, unobstructed available views of the balloons, and because the field work was conducted prior to “leaf-out” conditions, the photos documented worst case visibility.

Field review confirmed that actual Project visibility, (as indicated by visibility of the helium-filled balloons raised at four proposed turbine sites) is likely to be more limited than suggested by viewshed mapping. This is due to the fact that screening provided by buildings and trees within the study area is more extensive and effective than assumed in these analyses (e.g., vegetation is more extensive than indicated on the USGS maps, and often taller than 40 feet in height). The result is that certain sites/areas where "potential" visibility was indicated by viewshed mapping were actually well screened from views of the proposed Project. Field review confirmed a lack of visibility from areas that were heavily forested, and areas in low valleys. The balloons could not be seen from the City of Hornell or the Village of Canisteo, where ground-level views were typically blocked by buildings and street/yard trees, as well as by the surrounding walls of the Canisteo River Valley. However, the balloons could be seen from outskirts of the hamlet of Howard as well as from certain locations along Route 17/86 and the Finger Lakes Trail. In the rural/agricultural portions of the study area, hedgerows and trees not indicated on the USGS maps blocked/interrupted views of the balloons in many areas.

A summary of potential Project visibility from sensitive sites is presented in Table 5 in Appendix J.

3.5.2.2.4 Visual Simulations

Fifteen viewpoints were selected to show representative open views of the Project from various sensitive sites and landscape similarity zones within the visual study area. The selected viewpoints also include each of the identified viewer/user groups, cover various distances and directions, and show various numbers of turbine and different lighting conditions. Together, the selected viewpoints show the full range of visual change that will occur with the Project in place. The 15 selected viewpoints are summarized in Table 12 below.

Table 12. Viewpoints Selected for Simulations and Evaluation

Viewpoint Number	LSZ Represented	View from Sensitive Receptor?	Scale Elements in Foreground?	Distance from Nearest Turbine in View
2	Forestland	Finger Lakes Trail	N	6.1 miles
17	Upland Agricultural	N	Y	1.5 miles
82	Forestland	Lake Demons	Y	1.9 miles
97	Forestland	N	N	1.0 mile
128	Upland Agricultural	Interstate 17/86	N	3.7 miles

Viewpoint Number	LSZ Represented	View from Sensitive Receptor?	Scale Elements in Foreground?	Distance from Nearest Turbine in View
131	Upland Agricultural	Interstate 17/86	Y	2.1 miles
148	Upland Agricultural	N	N	3.5 miles
151	Upland Agricultural	N	Y	1.4 miles
162	Upland Agricultural	N	N	4.7 miles
173	Valley Agricultural	County Route 69	Y	1.4 miles
177	Upland Agricultural	N	N	0.4 mile
178	Upland Agricultural	County Route 69	Y	1.9 miles
184	Upland Agricultural	N	Y	0.3 mile
189	Upland Agricultural	N	Y	1.4 miles
189A	Upland Agricultural	N	N	0.3 miles

To show anticipated visual changes associated with the proposed Project, high-resolution computer-enhanced image processing was used to create realistic photographic simulations of the completed Project from each of the 15 selected viewpoints. The photographic simulations were developed by constructing a three-dimensional computer model in 3D StudioMax®, based on turbine specifications and survey coordinates of the proposed facilities. To illustrate the motion of the turning rotor, animation was added to the Viewpoint 189A simulation (see digital images in Appendix J). For the purposes of this analysis, it was assumed that all new turbines would be Clipper C99 machines.

Simulations indicate that the Project will result in a significant change to the existing visual setting/landscape (see Figures 10-24 in Appendix J). However, the visibility and visual impact of the wind turbines will be highly variable based on distance, number of turbines visible, weather conditions, sun angle, the extent of visual screening, viewer sensitivity, and/or existing land use characteristics. The greatest impact occurs when the turbines are close to the viewer (i.e., less than 1.5 miles), which heightens the Project's contrast with the landscape in color, line, texture, form, and especially scale. In such views, the turbines become focal points, and begin to alter the perceived land use in the view. More distant views, and those that include significant screening and/or the presence of other man-made features in the view, generally have more limited visual impact. These factors tend to decrease turbine visibility and/or contrast with the landscape.

3.5.2.2.5 Panel Evaluation

A panel of three landscape architects (one in-house and two independent) was asked to rate the proposed Project in terms of its contrast with existing components of the landscape. The methodology utilized in this evaluation is a simplified version of the U.S. Army Corps of Engineers Visual Resources Assessment Procedure (VRAP) (Smardon, et al., 1988) developed by EDR in

1999 for use on wind power projects. It involves using a rating panel, a short evaluation form, and a simple numerical rating process. The rating form quantifies the Project's contrast with existing vegetation, landform, land use, water resources, and user activity on a scale of 1 (completely compatible) to 5 (strong contrast). For each viewpoint, these scores were added and averaged to provide an overall contrast rating.

This evaluation revealed that individual contrast ratings ranged from 1.0 (completely compatible) 4.25 (strong contrast). Composite scores (i.e., the average of individual rating panel members) ranged from 1.42 to 3.92. Scores in this range indicate a moderate level of visual contrast. The lowest contrast ratings (2.0 and under) were received by viewpoints that were characterized by more distant views (over 3.5 miles), limited turbine visibility due to screening, or an abundance of man-made elements in the view. All of these conditions tend to decrease turbine visibility and/or contrast with the existing landscape.

The highest individual and composite contrast ratings were received by viewpoints where the turbines were in proximity to the viewer (under 1.5 miles), which heightens line, form, and scale contrast with the landscape. These views also tended to be unobstructed by vegetation or topography. However, in most cases the panel felt the Project was compatible with the working agricultural landscape that makes up the majority of the visual study area. Based on experience with currently operating wind power projects elsewhere, public reaction to the Project is likely to be generally positive. the results of a recent study of public perception of wind power in Scotland and Ireland (Warren, et. al., 2005). The conclusion of this study states the following:

> *"A remarkably consistent picture is emerging from surveys of public attitudes to wind power, and the case studies provide further evidence that this picture is a representative one. Large majorities of people are strongly in favour of their local windfarm, their personal experience having engendered positive attitudes. Moreover, although some of those living near proposed windfarm sites are less convinced of their merits, large majorities nevertheless favour their construction. This stands in marked contrast with the impression conveyed in much media coverage, which typically portrays massive grassroots opposition to windfarms."*

However, individual reaction to the Project is likely to be highly variable based on proximity to the turbines, the affected landscape, and personal attitude of the viewer regarding wind power.

Based upon review of nighttime photos/observations of existing wind power projects, the panel felt that the red flashing lights on the turbines could result in a nighttime visual impact on certain viewers. The actual significance of this impact from a given viewpoint will depend on how many turbines are visible, what other sources of lighting are present in the view, the extent of screening provided by structures and trees, and nighttime viewer activity/sensitivity. However, it was felt that night lighting could be somewhat distracting and have an adverse effect on rural residents that currently experience dark nighttime skies. It should be noted that nighttime visibility/visual impact will be reduced on this Project due to 1) the FAA lighting determination, which requires aviation warning lights on only 10 of the 25 turbines, 2) the steep slopes of the Canisteo River Valley and other hills and ridges that largely screen portions of the Project from most valley locations, and 3) the concentration of residences in villages, hamlets, and along highways where existing lights already compromise dark skies and compete for the viewer's attention.

3.5.2.2.6 Assessment of Shadow Flicker

In addition to the VIA prepared by EDR, a separate assessment of the phenomenon known as "shadow flicker" was conducted by Wind Engineers, Inc. (WEI) (see Appendix K). Shadow flicker is the alternating change in light intensity or shadows created by the moving turbine blades when back-lit by the sun. These flickering shadows can cause an annoyance when cast on nearby residences. The spatial relationship between a wind turbine and a receptor (residential home), as well as wind direction are key factors related to shadow-flicker impacts. At distances beyond 1000 feet, shadow flicker impacts only occur at sunrise or sunset, when long shadows are cast. Although setback distances for turbines (1,000 feet from non-participating residences) will significantly reduce shadow flicker impacts to potential receptors, some limited impact may occur.

Additionally, there is some public concern that flickering light can have negative health effects such as triggering seizures in people with epilepsy. According to the British Epilepsy Foundation (2006), approximately five percent of individuals with epilepsy have sensitivity to light. Most people with photosensitive epilepsy are sensitive to flickering around 16-25Hz (Hertz or Hz = 1 flash per second), although some people may be sensitive to rates as low as 3Hz and as high as 60Hz. A maximum wind turbine rotor speed of 15.5 RPM translates to a blade pass frequency of 0.8 Hz (less than one alternation per second). Therefore health effects to individuals with photosensitive epilepsy are not anticipated.

WEI used the following data to evaluate potential hours of shadow flicker impact:

- Turbine locations (coordinates)
- Shadow flicker receptor (residence) locations (coordinates)

- USGA 1:24,000 topographic and USGS DEM (height contours)
- Turbine rotor diameter
- Turbine hub height
- Joint wind speed and direction frequency distribution
- Sunshine hours (long term monthly reference data)

The model calculated shadow-flicker time at each assessed receptor location and the amount of shadow-flicker time (hours/year) everywhere surrounding the Project (on an iso-line plot).

WEI's modeling indicated that of 76 potential receptors, 45 (59%) will experience no shadow flicker, and 62 (82%) will receive 10 or fewer hours of shadow flicker annually. Only three receptors could experience over 25 hours of shadow flicker throughout a year (typically around sunrise or sunset). The receptor that could experience the highest level of shadow flicker impact (65:03 hours annually) is a participant in the Project. The other two receptors expected to receive over 25 hours of shadow flicker annually (27:09 and 25:55) are non-participants. However, as indicated in the WEI study, obstacles between the turbines and receptors (such as terrain, trees, or buildings) may significantly reduce or eliminate shadow-flicker.

WEI indicates that the shadow flicker impacts reported for the Howard Project are common and comparable to other New York State and U.S. wind projects. Further WEI notes that assumptions applied to the analysis of the Project are very conservative, and as such, the analysis is expected to over-predict impacts. As previously indicated, these model results do not reflect many of the local conditions at the receptor site that could further reduce shadow flicker, such as trees and neighboring structures. This model also assumes that the turbine rotor is always turning, the receptor always has a window facing the direction of the sun, and that the receptor dwelling is occupied at all hours when shadow flicker may occur (i.e., at sunrise and sunset). Site-specific factors such as terrain, trees, buildings, and window location would further reduce impacts from shadow flicker.

3.5.3 Mitigation

Construction-related visual impacts have been/will be avoided, minimized, and mitigated through 1) careful site planning/Project layout, 2) development and implementation of various construction plans, and 3) a comprehensive site restoration process following completion of construction.

The proposed Project layout was developed so as to minimize the need for tree clearing and new road construction. The majority of the proposed turbines and other Project components have been sited in open fields (agricultural and successional). Mature forest and wetland communities have been avoided to the extent practicable, thus minimizing the need to clear existing vegetation. Existing farm lanes will be upgraded for use as turbine access roads wherever possible, while buried interconnect lines will follow access roads and field edges to minimize required clearing. Where clearing of undisturbed forest is unavoidable, such sites are typically well removed from adjacent roads and residences and therefore will not result in a significant adverse visual impact.

During construction visual impacts associated with working construction equipment will be minimized through adherence to a construction routing and sequencing plan that minimizes impacts on local roads and residences. A dust control plan and a SWPPP will be developed and implemented to minimize off-site visual impacts associated with dust generation and stormwater runoff during construction.

As described in the impacts discussion, any unavoidable construction-related visual impacts will be short term.

Following completion of construction, site restoration activities will occur. These will include removal of access road material from most Project access roads (i.e., going from 30+ feet to 16 feet in width), restoration of agricultural fields (including soil decompaction, rock removal, and topsoil spreading), and stabilizing/revegetating all disturbed sites through seeding and mulching. These actions will assure that, as much as possible, the site is returned to its preconstruction condition.

Mitigation options for the operating Project are limited, given the nature of the Project and its siting criteria (tall structures on high elevation sites). However, in accordance with NYSDEC Program Policy (NYSDEC, 2000), various mitigation measures were considered. These included the following:

A. Screening. Due do the height of individual turbines and the geographic extent of the proposed Project, screening with earthen berms, fences, or planted vegetation will generally not be effective in reducing Project visibility or visual impact. However, if necessary, a visual mitigation planting fund may be established to screen views of the Project from Register-eligible historic sites within the study area. In addition, if adequate natural screening of the proposed substation site is not present, a planting plan will be developed and implemented to minimize visibility and visual impact associated with this component of the Project.

B. Relocation. Again, because of the extent of the Project, the number of individual turbines, and the variety of viewpoints from which the Project can be seen, turbine relocation will generally not significantly alter the visual impact of a wind power project. The Howard Project is completely screened from almost all of the aesthetic resources of statewide significance within the visual study area. Views that are available from sensitive sites, such as Route 17/86 and the Finger Lakes trail, will be highly variable and include different turbines at different vantage points. Therefore, turbine relocation would generally not be effective in mitigating visual impacts from these receptors.

C. Camouflage. The white color of wind turbines generally minimizes contrast with the sky under most conditions and precludes the need for daytime aviation warning lights. Consequently it is recommended that this color be utilized on the Howard Project. The size and movement of the turbines prevents more extensive camouflage from being a viable mitigation alternative (i.e., they cannot be made to look like anything else). Neilson (1996) notes that efforts to camouflage or hide wind farms generally fail, while Stanton (1996) feels that such efforts are inappropriate. She believes that wind turbine siting "is about honestly portraying a form in direct relation to its function and our culture; by compromising this relationship, a negative image of attempted camouflage can occur."

D. Low Profile. A significant reduction in turbine height is not possible without significantly decreasing power generation. To off-set this decrease, additional turbines would be necessary. There is not adequate land under lease to accommodate a significant number of additional turbines, and a higher number of shorter turbines would not necessarily decrease Project visual impact. In fact, several studies have concluded that people tend to prefer fewer larger turbines to a greater number of smaller ones (Thayer and Freeman, 1987; van de Wardt and Staats, 1988). The visual impact of the electrical collection system is being minimized by placing the majority of the collection system underground rather than on overhead poles. Where overhead poles are being proposed, they will be replacing existing 40-foot poles with approximately 50-foot poles, and will likely not exceed the height of adjacent trees.

E. Downsizing. With 25 turbines, the Howard Wind Power Project is already a relatively small commercial wind farm. In addition, because the Project is generally well screened from aesthetic resources of statewide significance within the visual study area, downsizing would not appear to be warranted. Reducing the number of turbines could reduce visual impact from certain viewpoints, but from most locations within the study area where numerous turbines are visible, unless this reduction were drastic, the visual impact of the Project would change only marginally. A significant reduction in turbine number would reduce the Project's socioeconomic benefits to the area, and could make the Project economically unviable.

F. Alternate Technologies. Alternate technologies for power generation would have different, and perhaps more significant, visual impacts than wind power. Alternative utility-scale wind power technologies, that would significantly reduce visual impacts, do not currently exist.

G. Nonspecular Materials. Non-reflective paints and finishes will be used on the wind turbines to minimize reflected glare. Nonspecular conductor will be used on the above-ground sections of the electrical collection system.

H. Lighting. Turbine lighting will be kept to the minimum allowed by the FAA. New FAA guidelines (FAA, 2005) do not require daytime lighting, and allow nighttime lighting of perimeter turbines only, at a maximum spacing of 0.5 mile. Medium or low intensity flashing red lights will be used at night, rather than white strobes or steady burning red lights. The feasibility of upwardly-directed lighting fixtures, or light shields, should be explored to minimize nighttime visual impacts on nearby residents (see information on shields in Appendix J).

I. Maintenance. The turbines and turbine sites will be maintained to ensure that they are clean, attractive, and operating efficiently. Research and anecdotal reports indicate that viewers find wind turbines more appealing when the rotors are turning (Stanton 1996). In addition, the Project developer will establish a decommissioning fund to ensure that if the Project goes out of service and is not repowered/redeveloped, all visible above-ground components will be removed.

J. Offsets. Correction of an existing aesthetic problem within the viewshed is a viable mitigation strategy for wind power projects that result in significant adverse visual impact. Although, results of this VIA do not suggest that such mitigation measures are warranted for the Howard Wind Power Project, various historic restoration/maintenance activities will be considered to mitigate potential impacts on cultural resources, and a dilapidated structure in the area may be restored and utilized as a Project visitor center.

In addition to the mitigation measures described above, other measures that will reduce or mitigate visual impact have been incorporated into the Project design. These include the following:

- Compliance with all required set-backs from roads and residences.
- All turbines will have uniform design, speed, color, height and rotor diameter.
- Towers will include no exterior ladders or catwalks.
- The Project operations and maintenance building (although not yet designed) will reflect the vernacular architecture of the area (i.e., resemble an agricultural structure).
- New road construction will be minimized by utilizing existing farm lanes whenever possible.
- The placement of any advertising devices on the turbines will be prohibited.
- Additional investigation of the two non-participating receptors that could receive more than 25 hours of shadow flicker annually will be undertaken. This investigation will determine if site-specific conditions (building/window orientation, tree screening, etc.) will prevent or minimize the predicted impact. In instances where such mitigating factors are not present, mitigation for potential shadow flicker impacts will be provided by the Project developer through the purchase of landscape screening (trees, shrubs). In addition, any problems that may arise due to shadow flicker will be resolved through consultation with representatives from the Town of Howard and SCIDA, and through implementation of a complaint resolution procedure.

3.6 HISTORIC, CULTURAL, AND ARCHEOLOGICAL RESOURCES

John Milner Associates, Inc. (JMA) conducted a Phase IA Cultural Resources Survey of the Project area. The purpose of this investigation was to identify previously recorded cultural resources (i.e., archaeological or historic sites) and to evaluate the potential for previously unrecorded cultural resources to occur within the Project area. This report was conducted in May 2006 and is included in Appendix L.

In accordance with the recommendations of the Phase IA Cultural Resources Survey, EverPower Renewables contracted JMA to prepare a Historic Architectural Resources Survey and a Phase IB

Archeological Survey to determine the location and extent of potential cultural resources within the study area, and to assess whether the proposed Project would have an effect on cultural resources (Appendix L). For the Historic Architectural Resources Survey, JMA's efforts consisted of defining the area of potential effect (APE); conducting a review of previously recorded data; performing two phases of in-field architectural surveys and inventories of relevant structures and properties; and participating in a meeting with New York State Office of Parks, Recreation and Historic Preservation (OPRHP) staff on September 11, 2006 to review the results of the survey. For the Phase IB Archeological Sensitivity Assessment, JMA's efforts consisted of a pedestrian survey of 19.2 acres and the excavation of 880 shovel pits. Survey areas included a sample of proposed wind turbine locations, access roads, electrical interconnect routes, the proposed substation location, and the proposed transmission line route.

All research and report preparation were conducted in accordance with the New York Archaeological Councils Standards for *Cultural Resources Investigations and the Curation of Archaeological Collections* (NYAC 1994) and the New York State Historic Preservation Office *Guidelines for Wind Farm Development Cultural Resources Survey Work* issued in January 2006.

3.6.1 Existing Conditions

3.6.1.1 History of the Project Area

JMA reviewed various documentation (both cartographic and written) relating to historical settlement of the region. The region that includes present-day Steuben County was formerly the territory of the Seneca tribe of the Iroquois Confederacy. A fortified village along the banks of the Canisteo River near the Village of Canisteo was reported to have been under the control of the Iroquois (Clatyon 1879; McMaster 1853; Roberts 1891). The Cohocton River valley is reported to have been a favored hunting ground for the Seneca (McMaster 1853). In the late 17th and early 18th centuries, the French explored the Steuben County area, but the first settlers arrived from Pennsylvania post-Revolutionary War. The first recorded settler to what is now the Town of Howard was in 1806 and shortly thereafter there was a road running from Lake Erie to Bath (Turnpike Road) (Roberts 1891).

Although lumbering and manufacture of potash drove the economy in the early-nineteenth century, this eventually gave way to agricultural activity, which continues to this day to be the dominant economic activity in the area. Settlement in the area was spurred by the transportation corridors offered by the Canisteo and Cohocton Rivers. However, unlike the effect they had on many area communities, the Erie Canal, area railroad lines, advent of the automobile, and road improvements did little to promote growth in the area and it remains to this day sparsely populated, with dairy agriculture as the primary local economic industry.

3.6.1.2 Previously Recorded Archeological Sites

Background research indicates that substantial Native American settlements were present with the river and stream valleys such as the Canisteo, Colonel Bliss and Bennett Creeks. During the Phase 1A Cultural Resources Survey, JMA identified a total of 15 previously recorded Native American archeological sites within five miles of the Project Area. A complete listing of these resources is provided in Table 2 of the Phase 1A report in Appendix L. All of these sites are located along the Canisteo River or one of its major tributaries and are beyond 2.3 miles from the Project Site. According to JMA, due to the upland setting of the Project, is unlikely that deposits from significant Native American villages are present in the Project Area.

Potential nineteenths century archeological resources located in the Project Area include domestic, agricultural, cemetery, and rural industrial sites. Historic maps and atlases depict former locations of farmsteads and mills. Structural remains, features, and or artifact deposits associated with these sites may also be located in the Project Area.

3.6.1.3 Previously Recorded Architectural Resources

During the Phase 1A Cultural Resources Survey, JMA identified one historic district and 12 individual structures located within five miles of the Project Area that are listed on, or have been determined eligible for listing on the State/National Register of Historic Places (S/NRHP). The closest of these listed properties is 3.3 miles from the Project Area. However, there are numerous unrecorded structures within the Project viewshed and therefore JMA undertook a comprehensive historic architectural survey for structures within five miles of the Project Area (See Appendix L).

3.6.1.4 Archeological Field Survey

In consultation with the OPRHP, JMA developed a Phase 1B Archeological Survey Work Plan which included a combination of pedestrian surface survey in cultivated areas and the excavation of shovel test pits in wooded or idle areas (meadows, pastures, hayfields) (See Appendix L). JMA selected areas for intensive survey within the Project area based upon the distribution of the archeological APE within the various environmental zones within the Project Area determined by the research design; and judgmental field evaluations of archeological sensitivity made by a Principal or Project Archeologist in the field.

JMA conducted a landscape classification analysis for the Project area to determine the locations, limits, and distribution of local habitat zones. JMA's analysis is based upon a geographic information system (GIS) model dividing the landscape into three zones; valley floor, valley walls, and interfluves (uplands). The result of the landscape classification analysis is presented in Table 2 of the Archeological Survey Work plan in Appendix L. This analysis formed the basis for the survey level of effort by landscape zones, while the principal archeologist determined the locations of survey.

In total, the Phase 1B survey field work included the excavation of 880 shovel tests and pedestrian surface survey of approximately 19 acres. The total surveyed area was approximately 74 acres. JMA identified seven (7) historic-archeological sites that are located within the Project Area. All of these sites are the locations of structures depicted on nineteenth-century maps.

1. *The Cole/Freelove Historic Site (OPRHP Sites A10118.000010)*. Site includes two extant and well maintained barns, outhouse, farmstead landscape and filled house foundation. Site identified as the "A.M. Cole" residence on the 1857 map and the "H. Freelove" residence on the 1873 Beers atlas. Located on the east side of South Woods Road approximately 2060 feet south of Burt Hill Road. No proposed Project components are located in the vicinity of the site.
2. *The Peck Historic Site (OPRHP Site 10118.0000008).* Located on the east side of South Woods Road south of the Cole/Freelove Historic Site. Residence is depicted on the 1857 Levy map and the 1873 Beers atlas. No traces of foundation or cellar hole are apparent. No artifacts or architectural materials were recovered from shovel tests in this area.
3. *The Coots Historic Site (OPRHP Site A10118.000007).* Located east of east side of South Woods Road, south of the Peck Historic Site. No clearly defined foundation or cellar hole is apparent. A total of 23 artifacts were recovered from this site. All of the materials appear to date to the nineteenth century. No intact structural remains or archeological features were identified at the site.
4. *The Dyer/Coots Historic Site (OPRHP Site A10118.000009).* Located on the northeast side of the intersection of South Woods Road and Coots Road. The structure is identified as "T.Coots" on the 1873 Beers Atlas, but is not present in subsequent maps. No house structural remains were found. No artifacts were uncovered from the site.
5. *The Burt Historic Site (OPRHP Site A10118.000011).* Located on south side of Turnpike Road, west of the intersection with Misick Road. The structure is identified as "Mrs. Burt" on the 1857 Levy map, but is not present in subsequent maps. Three artifacts were recovered from the site from the plowzone stratum within an adjacent hayfield. No potential significant deposits were identified.

6. *The Misick School Site (OPRHP Site A10118.000012).* Located on the south side of Turpike Road, just east of the intersection with Misick Road. The structure is identified as “J. Sabin” on the 1857 Levy map and as “Mrs. McGonegal” on the 1873 Beers atlas. The 1918 USGS survey identifies the “Misick School” at the same location. The former location of the structure is a slight rectangular depression defined by disarticulated fieldstone. JMA personnel observed a few scattered artifacts on the ground surface. No features or potentially significant deposits were identified in the area where Project facilities are proposed.
7. *The Hamilton Historic Site (OPRHP Site A10118.0000013).* Located on the north side of Buena vista Road opposite Magill Road. The structure is identified as “L. Hamilton” on the 1857 Levy map and 1873 Beers Atlas. Some structural remains were found. A few artifacts were recovered from the plowzone horizon in this area. No features or potential significant artifact deposits were identified in the vicinity where Project facilities are proposed.

3.6.1.5 Architectural Field Survey

In accordance with the *Guidelines for Wind Farm Development Cultural Resources Survey Work* (2005), JMA established a five-mile APE for the Project, based upon several viewshed analyses performed by EDR (see Section 3.5, and the Visual Impact Assessment in Appendix J). This area includes the parts of the Towns of Avoca, Bath, Cameron, Canisteo, Fremont, Hartsville, Howard, and Hornellsville, the Village of Canisteo, and the city of Hornell, all in Steuben County.

In-field architectural surveys were undertaken in two phases by JMA during the summer of 2006. The first phase of survey was limited to properties determined to be over fifty years of age located in the area within one mile of any Project facilities. Each of these properties were inventoried and digital photographs of the property exteriors were taken. Additional residential, commercial, agricultural, and religious properties were included in the survey. After consulting with the OPRHP staff on September 11, 2006, JMA conducted a second phase of survey consisting of an inventory of properties within the five-mile study area that are also within the Project’s topographic viewshed and also satisfied National Register or State Register of Historic Places (NRHP/SRHP) eligibility criteria.

JMA identified 54 previously recorded historic properties within the study area that satisfy N/SRHP. All but one is located in the City of Hornell. During the in-field surveys undertaken by JMA during the summer of 2006, 123 properties were surveyed within the one-mile study area and an additional 153cproperties were surveyed in the remainder of the five-mile viewshed. JMA evaluated the surveyed properties to determine if they satisfy NRHP/SRHP eligibility criteria. A consolidated list of properties within the Project's five-mile topographic viewshed and that are listed on the N/SRHP, eligible for listing, or inventoried but unevaluated for eligibility is provided in Appendix L. These include a total of 37 properties, and in JMA's opinion, 11 of the properties are part of concentrations that are potential historic districts. These concentrations are in the hamlets of Howard, and along the Canisteo River Road. Additionally, JMA identified a third potential historic district in the Village of Canisteo that is partially within the Project viewshed.

3.6.2 Potential Impacts

3.6.2.1 Impacts to Historic Archeological Resources

JMA identified seven (7) archeological sites within APE for specific Project components. These sites are all foundation remains of nineteenth-century farms/houses that are depicted on historic mapping of the area. The Project will not result in impacts to significant archeological features or deposits at any of these sites.

3.6.2.2 Impacts to Historic Architectural Resources

No structures will be demolished or physically altered in connection with construction of the Project. However, the viewshed maps prepared as part of the Project VIA clearly indicate that the Project may be visible from throughout a large portion of the study area (see Appendix J). JMA provides an analysis of visual impact to historic properties by determining affected properties within two miles of a proposed turbine location; between two and 3.7 miles from Project facilities; and those beyond 3.7 miles. These distances are derived from at least two reports issued by the European Commission that suggests the five mile limit placed on analysis by OPRHP may result in a conservative analysis of visual impacts (Berry et al. 1998: 163, Eyre 1995). JMA notes a distinction between visual impact and visual detection as being important. It is also important to note that a property was considered to have a view of the turbine no matter how much of the turbine is visible (only the tip of a blade as it rotates or views of entire structures), or whether it may only have views of a turbine or turbines during a defoliated season (leaf-off conditions).

JMA offers the following summaries regarding potential impacts to historic structures:

Properties within Two Miles of a Proposed Turbine:

- Of the 37 properties considered, nine are located less than two miles from a Project facility. Views of and/or from all of these are likely to include one or more turbines. Views of/and or from seven of the nine properties will be eliminated or exist only during the defoliate seasons.

- Two of the nine properties are located in relation to the adjacent public right of way in such a manner that places the Project behind individuals who are observing the property from the street and therefore no change in the properties visual setting will be apparent.
- It is possible that two properties will incur significant adverse visual impacts as both properties are less than two miles from a proposed turbine, will likely have year round views of the facility and are situated in a way that views may include one or more turbines. These structures are identified by JMA as H4, and H34 (see Appendix L).

Properties between 2.0 and 3.7 Miles from a Project Turbine

- Of the 37 properties considered, 23 are located between 2.0 and 3.7 miles from a Project facility. Views of and/or from all of these are likely to include one or more turbine. Views of/and or from ten of the 23 properties will be eliminated, or exist only during the defoliate seasons.
- A total of ten of the 23 properties are located in the hamlet of Howard. Six of these, in the opinion of JMA, may collectively meet the criteria for designation as a historic district. Of the ten properties in Howard, seven are located on the north or northwest side of the public right-of-way, which means the Project will be located behind individuals who view these properties.

Properties more than 3.7 Miles from a Project Turbine

- Of the 37 properties considered, five are located more than 3.7 miles from any Project facility. All but one is situated in relation to the adjacent public right-of-way in a manner that places the Project behind individuals who are observing the property. For this reason no change in these properties' visual setting will be apparent. In the opinion of JMA, the Project will have no adverse effect on these properties.
- One of the properties is the Canisteo Living Sign, the only NRHP-listed property in the Project's topographic viewshed. The Project is located near the southwest periphery of the study area and is situated so that observers will generally have their backs towards the Project. In the opinion of JMA, the Canisteo Living Sign will not be adversely affected by the Project.

In addition to potential visual impacts to historic structures, JMA notes that noise related impacts can diminish the integrity of a historic property's significance and result in an adverse effect to the property. Based upon a review of the Noise Assessment conducted by Hessler Associates (and described in detail in Section 3.7 and Appendix M), JMA noted that none of the historic properties evaluated fall within areas where the Project sound levels are expected to exceed 50 dBA.

3.6.3 Mitigation

The Project's effects on historic properties will be a change in the visual setting associated with each affected property. A number of measures can be taken to offset or compensate for impacts that cannot be eliminated. JMA has identified these measures as follows:

- Identify an existing historic building within the area that does not presently meet NRHP/SRHP eligibility criteria and restore it for use as a Project office or visitor's center.
- Directly undertake or provide financial support for the restoration/maintenance of local historic cemetery(s).
- Undertake a comprehensive historic property inventory for the Town of Howard.
- Prepare Cultural Resources Management Plans for the Town of Howard.
- Prepare local history/archeology curriculum modules for use by local school districts.
- Prepare local history exhibits for display in libraries or other public buildings.
- Fund development, preparation, publication, and distribution of a local history tour guide.
- Establish a visual mitigation planting fund to subsidize owners of affected properties.

As recommended by JMA, the Project Sponsor will develop a plan to mitigate for unavoidable impacts to historic structures inventoried within the Project area incorporating components of the above outlined measures. This plan will be developed in consultation with NYSOPRHP staff and will be designed meet the needs of the local communities and focuses mitigation efforts on those resources, communities, and individuals that may be impacted by the Project. It is anticipated that a Memorandum of Agreement (MOA) will be developed between the OPRHP and EverPower to outline the requirements of the mitigation plan.

3.7 SOUND

To obtain background sound levels and evaluate potential sound impacts from the Project, a Noise Impact Assessment was prepared (Appendix M). The two primary phases of the study included a background sound level survey and a computer modeling analysis of future turbine sound levels. The study was performed by Hessler Associates, Inc. (Hessler), a member of the National Council of Acoustical Consultants with over 30 years of experience evaluating industrial, commercial, and residential noise issues.

The primary basis for evaluating potential Project sound issues is the NYSDEC Program Policy *Assessing and Mitigating Noise Impacts* (NYSDEC, 2001). Following this assessment procedure, a simplified "first level sound impact evaluation" is initially carried out to determine if any residential receptors may experience a noticeable increase in sound level. This is followed by a more in depth "second level sound impact evaluation" if any sensitive receptors are identified as being possibly affected. The procedure essentially defines a cumulative increase in overall sound level of 6 dBA as the threshold between no significant impact and a potentially adverse impact.

3.7.1 Existing Conditions

For most wind power projects, the sound produced during construction and operation is a concern to local residents. Certain activities inherently produce sound levels or sound characteristics that have the potential to create noise (i.e., unwanted sound). Some properties of sound which can be measured include:

1. Frequency: Frequency is the rate at which the source produces sound waves, (i.e. complete cycles of high and low pressure regions). In other words, frequency is the number of times per second that a vibrating body completes one cycle of motion. The unit for frequency is the hertz (Hz = 1 cycle per second). Low pitched or bass sounds have low frequencies. High-pitched or treble sounds have high frequencies. The sensitivity of the human ear to sound depends on the frequency or pitch of the sound. The human ear, in general, and different individuals, in particular, hear some frequencies better than others.

2. Sound Pressure: Sound pressure level (SPL) is the amount of air pressure fluctuation that a sound source creates. We "hear" or perceive sound pressure as loudness. Sound pressure is usually expressed in units called pascals (Pa). The common sounds we hear have sound pressure over a very wide range (0.00002 Pa - 20 Pa). It is difficult to work with such a broad range of sound pressures. To overcome this difficulty a unit of decibel (dB) is used which compresses the scale of numbers into a manageable range. SPL can be statistically summarized as the residual, or L90, sound level. The L90 is the sound level exceeded during 90% of a measurement interval. It excludes sporadic, short-duration sound events, thereby characterizing the more quiet lulls between such events. It is this consistently present "background" level that forms a conservative basis for evaluating the audibility of a new sound source.

3. Sound Power: The sound power is the sound energy transferred per second from the sound source to the air. A sound source has a given, constant sound power that does not change if the source is placed in a different environment. Sound power is expressed in units called watts (W). An average whisper generates a sound power of 0.0000001 watts, a truck horn 0.1 W, and a turbo jet engine 100,000 W. Like sound pressure, sound power (in W) is usually expressed as sound power levels in dB. Sound measurement readings can be adjusted to correspond to human hearing with an "A-weighting filter" which de-emphasizes low frequencies or pitches that are outside the normal range of human hearing. Decibels measured using this filter are A-weighted and are called dB(A).

4. Time Distribution: Sound can be continuous, variable, intermittent or impulsive depending on how it changes over time. Continuous sound remains constant and stable over a given time period.

The Project Site is rural and sparsely populated. Most of the homes and farms are widely scattered and divided by open fields, hills and/or wooded areas. A number of residences, particularly those located in the southern portion of the Project Site, are seasonal. To evaluate background sound levels, Hessler selected four measurement positions (northeast, northwest, southeast, and southwest portions of the Project Site). The four monitoring locations selected for the survey were carefully chosen at points representative of the nearest houses to proposed turbine locations and, in most cases, houses that are downwind (east) of turbines. In addition, the locations were chosen so that they were distributed over the site area in a reasonably uniform manner, leaving no significant part of the project area unrepresented. Essentially all of the homes that might possibly be impacted from project noise are situated in fairly high and exposed areas near where the turbines are planned (the turbines are all located on or near the summits of broad ridges). According to Hessler, the residences in relatively sheltered valleys between the ridges are sufficiently far from any turbines that they are clearly beyond the area where any adverse impact might occur (as illustrated in the sound contour maps provided in Appendix M). In short, the measurement locations were chosen to fit the circumstances of the site and represent the particular type of geographic setting typical of the nearest homes to the project. The location of the measurement positions is described in Table 13.

Table 13. Background Survey Measurement Positions

Position	Description of Location
Northeast	Adjacent to a residence on Hughes Road.
Southeast	At a seasonal cabin off of Buena Vista Road on an exposed hilltop.
Southwest	In the rear of a farmhouse on Coots Hill Road.
Northwest	Adjacent to a new home near the intersection of S. Wood and Burt Hill Roads

Hessler recorded the residual L90 sound levels using Rion Model NL-21, NL-06 and NL-31, ANSI Type 2, integrating sound level meters were used for the survey. Each of these instruments is designed for service as a long-term environmental sound level data logger measuring A-weighted sound level. The survey period begin at noon on April 27, 2006 and all instruments recorded continuously 24 hours per day until May 15, 2006 (18 days). The trees were essentially still bare during the survey so the measurements are representative of “leaf-off” conditions. When the leaves are off the trees, ambient sound level is generally lower during windy conditions. Measurements taken during leaf-off conditions are conservative as the lowest level of natural masking noise (leaf rustle) hiding or obscuring potential noise from wind turbines is present.

According to Hessler, measurements of the frequency spectrum were consciously not made for a variety of reasons, but primarily because the spectral content of the background sound level has been found in a number of previous site surveys (where it was measured) to be of little or no real value/significance.

The ultimate objective of all ambient sound level surveys for wind turbine projects is to identify the minimum background sound level that is likely to exist on a consistent basis when the turbines are operating at their maximum noise point. The L90 sound level conservatively represents the amount of natural masking noise that is likely to be present to obscure the perception of turbine noise.

According to Hessler, when conducting a background survey and acoustical design assessment for a conventional power station the background level of principal concern is the lowest sound level that is consistently present and available to hide or mask noise from the project. This level almost always occurs at night, particularly under calm and still conditions. Therefore, day-night variance is a key concern in the assessment because noise from the plant will continue around the clock irrespective of wind or weather conditions. However, this is not the case with wind power projects. In the dead of the night when the winds are calm and background levels are minimum a wind power project is completely idle and makes no noise at all. It is only the background sound level that exists under relatively windy conditions that is relevant.

During the two week background sound level survey conducted by Hessler for the Howard Project, a day-night variance in sound levels was unusually evident (at most wind project sites it is not clearly present) because the winds during the survey were generally very light (i.e., below the cut-in wind speed of the turbines). The dips in nighttime sound level seen in the survey data stem from the fact that most nights were calm and quiet, which equates to an idle project. These quiet nighttime levels are, in effect, of no relevance to future wind turbine sound levels. The regression analysis of background sound level vs. wind speed considers all the data collected in the survey both during the night and during the day since the objective is to find the representative sound level that is likely to exist when the turbines are generating the most noise (in a wind of around 8 to 10 m/s at 10 m).

Because the turbine model for planned the Project was not selected at the time the noise survey was conducted, Hessler modeled sound power levels for six wind turbines under consideration, ranging in size from 1.5 MW to 2.75 MW. For the analysis purposes, the turbine models were grouped into categories (minimum, intermediate and maximum), as indicated in Table 14.

Table 14. Turbine Model Noise Categories, Representative Sound Power Levels and Design Background Levels

Make and Model	Group	Representative Max. Sound Power Level, dBA	Wind Speed at 10m Associated with Max. Sound Level, m/s	Background Sound Level at Peak Noise Wind Speed, dBA
GE 1.5 sle	Minimum	104.0	9.5	50
Gamesa G87/G90	Intermediate	106.4	8	46
Suzlon 588				
Siemens SWT 2.3-93				
Clipper C96				
Vestas V100	Maximum	109.9	10	50
Vestas V82/1650				

Noise measurements indicated that the existing background, or ambient, noise levels rise and fall with increasing and decreasing wind speeds, respectively. The turbine models planned for this Project produce a range of noise level at a wind speed between 8 to 10 m/s (measured at 10m). At the typical turbine cut in wind speed of about 3.5 m/s the background sound level is likely to be in the range of 30 dBA. When the turbines are operating at their maximum speed in an 8 to 10 m/s the background sound level is likely to range between 46 to 50 dBA. It is important to note that the Hessler survey was conducted during the spring when the trees were bare and no appreciable insect or bird sounds were present. In the summertime, when outdoor activities are more common and windows might be open, higher background levels due to leaf rustle and insects can be expected to significantly increase the amount of background sound level masking. In addition, wind speeds in New York State are generally lower in the summer, meaning that the turbines will operate less frequently and at generally lower, quieter rotor speeds.

3.7.2 Potential Impacts

Virtually everything that has moving parts will make some sound, including wind turbines. Table 15 lists examples of common sound levels using typical dB(A) levels.

Table 15. Common Sources of Sound and Associated Typical Sound Levels (dBA)

Source/Activity	Indicative sound level (dBA)
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Wind farm at 350m	35-45
Car at 40mph at 100m	55
Busy general office	60
Truck at 30mph at 100m	65
Pneumatic drill at 7m	95
Jet aircraft at 250m	105
Threshold of pain	140

Source: The Scottish Office, Environment Department, Planning Advice Note, PAN 45, Annex A: Wind Power, A.27. Renewable Energy Technologies, August 1994. Cited in "Noise from Wind Turbines," British Wind Energy Association, http://www.britishwindenergy.co.uk/ref/noise.html .

The distinction between sound and noise are subjective, as well as what constitutes 'noisy'. The Town of Howard Local Law No. 1 (2006) limits noise from any wind turbine to a maximum of 50 dBA at any dwelling.

Low frequency noise is best quantified in terms of 'C-weighted' sound levels (dBC), the measurement of sound pressure level, which is designed to be more responsive to low-frequency noise. C-weighting is intended to represent how the ear perceives sound at high decibel levels and is also used for evaluating impact or impulse noise such as demolition or mining blasting, artillery firing and bomb explosions using conventional explosives of less than approximately one ton. Low frequency noise can produce vibrations in frame structures or rattle windows if the magnitude is high enough. The minimum level of low frequency noise that might lead to perceptible vibrations is 70 dBC. According to Hessler, the maximum C-weighted sound level at any receptor is well below the threshold of any perceptible vibrations. Therefore low frequency noise impacts are not anticipated.

The potential sound-related impacts resulting from the construction and operation of wind turbines are described below.

3.7.2.1 Construction

Construction of wind power projects requires the operation of heavy equipment and construction vehicles for various activities including construction of access roads, excavation and pouring of foundations, the installation of buried electrical interconnects, and the erection of turbine components. Assessing and quantifying construction-related impacts is difficult because construction activities will be constantly moving from place to place around the site, leading to highly variable impacts at any given receptor location. In general, the maximum potential impact at any single residence might be analogous to a few days to a week of repair or repaving work occurring on a nearby public road. More commonly, the sounds from Project construction are likely to be faintly perceived as the far off sound of diesel-powered earthmoving equipment characterized by such things as irregular engine revolutions, back up alarms, gravel dumping and the clanking of metal tracks.

The types of equipment likely to used on the Project and their typical sound levels are presented in Table 16. Also shown are the maximum total sound levels that might temporarily occur at the closest residences (roughly 1,200 feet away) and the distance from a specific construction site at which its sound would drop to 44 dBA (the nominal threshold for disturbance).

Table 16. Construction Equipment Sound Levels

Equipment Description	Typ. Sound Level at 50 ft., dBA	Est. Maximum Total Level at 50 ft. per Phase, dBA*	Max. Sound Level at a Distance of 1,000 ft., dBA	Distance Until Sound Level Decreases to 40 dBA, ft.
Road Construction and Electrical Line Trenching				
Dozer, 250-700 hp	88	92	62	4,200
Front End Loader, 300-750 hp	88			
Grader, 13-16 ft. blade	85			
Excavator	86			
Foundation Work, Concrete Pouring				
Piling Auger	88	88	58	4,200
Concrete Pump, 150 cu yd/hr	84			
Material and Subassembly Delivery				
Off Hwy Hauler, 115 ton	90	90	60	4,800
Flatbed Truck	87			
Erection				
Mobile Crane, 75 ton	85	85	55	3.400

*Not all vehicles are likely to be in simultaneous operation. Maximum level represents the highest level realistically possible at any given time. (Source: Hessler Associates)

What the values in this table indicate is that, depending on the particular activity, sounds from construction equipment are likely to be significant at distances of less than 3.400 to 5,500 feet. During construction in any one location, many houses will be further than 5,500 feet, and therefore should be largely or completely unaffected by construction sound. However, in some places these activities will occur relatively close to existing residences and, at distance of 1,200 feet, a total sound level ranging from 55 to 62 dBA might occur over several working days. Such levels would generally be unacceptable if they were occurring on a permanent basis or outside of normal daytime working hours. However, as a temporary, daytime occurrence, construction sound of this magnitude may well go unnoticed by many in the Project area. This fact is especially true in agricultural areas like Howard where the sounds of tractors, trucks, and other agricultural machinery is commonplace.

Sound from the very small amount of daily vehicular traffic to and from the construction site should be negligible in magnitude relative to normal traffic levels, and temporary in duration at any given location.

3.7.2.2 Operation

Operating wind turbines most commonly produce some broadband sound (a “swishing” or “whooshing” sound) as a result of revolving rotor blades encountering turbulence in the air. Although less common with newer turbine designs, turbines can also produce tonal sounds (a “hum” or “whine”), caused by mechanical components (AWEA 2005).

Hessler's assessment modeled predicted operational sound from the built Project to evaluate potential impacts on adjacent residential receptors. The study’s methodology followed guidelines included in the NYSDEC program policy (NYSDEC, 2001). Using a regression analysis of residual (L90) sound levels vs. wind speed, Hessler’s model shows that the background sound level likely to exist when the wind turbines are generating maximum noise ranges from 46 to 50 dBA. Following the NYSDEC guidance, a cumulative increase in total sound level up to 6 dBA is characterized as having a potential for adverse noise impact near sensitive receptors. For this site a 6 dBA cumulative increase is associated with Project-only sound levels ranging from 51 to 55 dBA. All of the values used in the analysis were derived from measurements taken downwind of the turbine (lower sound levels typically exist in other directions).

Using the sound power level spectrum, a worst-case, maximum sound level contour plot for the site was calculated using the "Cadna/A", ver. 3.5 sound modeling program developed by DataKustik, GmbH (Munich). This software enables the Project and its surroundings, including terrain features, to be realistically modeled in three-dimensions. The somewhat complex hill and valley topography of this site was digitized into the sound model from USGS topographic mapping. Each turbine is represented as a point sound source at a height of 80 m above the local ground surface (design hub height). The model uses conservative assumptions regarding ground absorption of sound and wind speed, and predicts downwind sound levels from all directions simultaneously, to evaluate the "worst case" sound scenario.

It is worth noting the field research carried out by G.P. van den Berg (*The Sounds of High Winds: The effect of atmospheric stability on wind turbine sound and microphone noise*, May 2006), which studies the variation in sound propagation from wind power projects under different atmospheric conditions. The van den Berg study found that the perceptibility of turbine noise at a given far field location increases and decreases with changes in atmospheric temperature gradients relative to the “standard” or “mean” atmosphere assumed when calculating sound propagation using ISO 9613-2 *Acoustics – Attenuation of Sound during Propagation Outdoors*, the reference used to perform the modeling for the Howard Project. More specifically, van den Berg reports that sound levels can noticeably increase in a stable atmosphere when the air is relatively warm above the surface and relatively cool near the surface due to radiative cooling. Under such conditions the wind speed gradient as a function of elevation may or may not follow the logarithmic formulation given in IEC 61400-11 *Wind Turbine Generator Systems – Acoustic Measurement Techniques* and used as a basis for normalizing 35 meter meteorological tower anemometer data to the standard 10 meter elevation that is the basis for all wind turbine sound level testing.

The Hessler analysis conducted for the Howard Project was carried out with a full awareness of van den Berg's work. The fact that turbine sound levels may occasionally increase with certain atmospheric conditions is taken into account by including a number of conservative assumptions in the modeling so that the predicted levels are significantly higher than are likely to occur under most normal circumstances. There are no analytical algorithms that allow in any practical way for the sound propagation from wind turbines to be modeled/calculated under the stable conditions observed by van den Berg. Instead conservative allowances are made in the model to reasonably cover such conditions, which are largely confined to certain clear summer evenings and are not a constant or everyday occurrence. For example, the maximum downwind noise level from each turbine is assumed in the model to occur in every direction simultaneously, ignoring what the field measurements indicate are significantly lower upwind and lateral sound levels. This omni-directional wind assumption means that an observer between two turbines, for instance, would be modeled as hearing the loudest downwind level from both units at the same time, which is a physical impossibility. In addition, a very low ground absorption coefficient of only 0.5 was used in the model. However, the farm fields and wooded areas that characterize the site would normally be assigned a much higher value such as 0.8 or 0.9. The lower the absorption coefficient the higher the sound level from a given source will be at any given point. With regard to conservatism it should also be pointed out that the background survey was done when the leaves were off the trees, conservatively representing the quietest time of year (leaf rustle noise in windy conditions is substantially higher in the summertime).

The results of the assessment performed by Hessler are summarized as follows:

- Preliminary sound modeling indicated that the potential for community sound impacts exists with this Project. This modeling work essentially performed the function of the First Level Noise Impact Assessment described in the NYSDEC policy and demonstrated that a Second Level assessment was appropriate.

- According to the NYSDEC Noise Policy, a cumulative increase in total sound level up to 6 dBA is characterized as having "potential for adverse sound impact only in cases where the most sensitive of receptors are present", and is suggested as a threshold for determining what areas might be adversely impacted by a new sound source and what areas should see "no appreciable effect". For this site a 6 dBA cumulative increase is associated with a Project-only sound level ranging from 51 to 55 dBA, depending upon the class of wind turbine modeled.

- A "Second Level" modeling study of the intermediate and maximum noise cases carried out per the NYSDEC guideline showed that all residences were beyond the 51 to 55 dBA contour, and therefore the NYSDEC anticipated human reaction would be "unnoticeable". Several key working assumptions in the modeling and assessment are highly conservative including:

    - The background design sound levels of 50, 46, and 50 dBA for each of the three cases is the residual, L90 level, which represents the quietest lulls between wind gusts, cars passing by, dogs barking, etc. As such, this level quantifies a very low value for masking environmental sound. Most of the time (90% of the time) a somewhat higher background sound level will exist during peak wind condition associated with each turbine class.

    - The sound model assumes that wind is blowing simultaneously from all directions and that the turbine sound level experienced at any given point is the sound level that would occur downwind from all nearby turbines. Such a sound level is a physical impossibility in many situations. For example, a receptor between two turbines cannot possibly be downwind from both units at the same time.

    - Any attenuation from wooded areas has been completely neglected in all models.

- Special model plots were made for each case showing the 50 dBA sound level contour so that compliance with the Town of Howard noise ordinance could be evaluated. These plots indicate that all residences in the Project area (except one participant residence) should see a Project-only sound level substantially lower than 50 dBA. The one potentially affected house is only predicted to possibly experience a sound level of approximately 52 dBA for the maximum noise turbine case. In the maximum class case (Vestas models), natural background noise essentially obscures all Project noise less than 55 dBA, so a level of 52 dBA would be largely or totally inaudible.

- Although concerns are sometimes raised with respect to low frequency sound emissions from wind turbines, no adverse impact related to low frequency sound is expected from this Project. The maximum C-weighted sound level at any receptor is at least 8 dBC below the threshold of any perceptible vibrations.

3.7.3 Proposed Mitigation

The Project layout addressed in this DEIS has already been revised to avoid or reduce sound impacts to adjacent and nearby receptors. Although residential sound impacts that remain are anticipated to be minor, additional mitigation measures will include the following:

- Limit the cutting/clearing of vegetation surrounding the proposed substation.
- Implementing best management practices for sound abatement during construction, including use of appropriate mufflers and limiting hours of construction.
- Notifying landowners of certain construction sound impacts in advance (e.g., if blasting becomes necessary).
- Implementing a complaint resolution procedure to assure that any complaints regarding construction or operational sound are adequately investigated and resolved.

3.8 TRANSPORTATION

The Project area is served by a network of state, county, and local roadways. Roads range from two-lane highways with paved shoulders to seasonally maintained, dirt/gravel roads. Wind power generating projects have the potential to create transportation impacts as a result of short-term construction activities (temporary impacts) and as a result of long-term operation and maintenance of the Project (permanent impacts). To evaluate the potential temporary and permanent impacts resulting from the proposed Project, Creighton Manning Engineers (CME) conducted a Transportation Evaluation. The purpose of this evaluation is to document the existing transportation conditions and identify probably travel routes, constraints, and proposed improvements. The Transportation Evaluation report is included as Appendix N.

3.8.1 Existing Conditions

CME conducted a field inventory and visual assessment and prepared a photo log of potential Project transportation routes within the study area. Included in this inventory is documentation of roadway characteristics and conditions. Table 17 provides a summary of the existing road conditions in the study area in terms of width, surface and posted traveling speed.

Table 17. Existing Road Characteristics

Road	From	To	Lane Width	Pavement Condition	Surface Type	Speed Limit
County Roads						
Route 70A	Russell Rd.	Wheeler Rd.	22'	Good	Asphalt	40-mph
Route 70	Saxton Rd.	Route 70A	20' to 22'	Good	Asphalt	55-mph
Route 27	Route 70A	Buena Vista Rd.	22'	Good	Asphalt	Not Posted
Route 109	Smith Rd.	Route 27	20' to 21'	Good	Asphalt	Not Posted
Route 69	Hughes Rd.	Turnpike Rd.	17' to 20'	Poor	Asphalt	Not Posted
Route 55	Skelly Parker	Route 70A	20'	Fair to Poor	Asphalt	Not Posted
Route 54	Rose Rd.	Jobs Cr Avery	26'	Poor	Native Gravel	Not Posted
Local Roads						
Jobs Corners-Avery	Route 55	Route 70	18'	Poor	Dirt/Stone	Not Posted
Palmer Rd.	Graves Hill Rd.	Route 109	24'	Very Poor	Dirt	Not Posted
Hopkins Rd.	Route 27	Route 70A	18'	Poor	Dirt	Not Posted
Craig Rd.	Hopkins Rd.	Rice Rd.	19' to 20'	Fair to Good	Asphalt	Not Posted
Hughes Rd.	Buena Vista Rd.	Craig Rd.	18' to 27'	Fair to Poor	Gravel Crusher Run	Not Posted
Mill Rd.	Craig Rd.	Route 70A	20'	Fair	Asphalt	Not Posted
Turnpike Rd.	Route 27	Walker Rd.	19' to 20	Fair to Good	Asphalt	Not Posted
McBeth Rd.	Turnpike Rd.	Buena Vista Rd.	21' to 24'	Poor	Native Gravel	Not Posted
Buena Vista Rd.	Route 27	Hughes Rd.	18'	Poor	Asphalt	Not Posted
Burleson Rd.	Buena Vista Rd.	Turnpike Rd.	18'	Very Poor	Dirt	Not Posted
Coots Rd.	South Woods Rd.	Route 27	16' to 18'	Poor	Dirt	Not Posted
South Woods Rd.	Route 109	Route 27	15' to 22'	Fair to Poor	Native Gravel	Not Posted
Smith Rd.	Route 56	Route 109	20'	Fair	Asphalt	Not Posted
Russell Rd.	Route 70A	Route 56	20'	Fair to Poor	Dirt/Asphalt	Not Posted
Rose Rd.	Route 54	Route 70A	26'	Poor	Dirt	Not Posted
Walker Rd.	Turnpike Rd.	Route 69	26'	Poor	Native Gravel	Not Posted
Willis Rd.	Route 70A	Route 27	17'	Good	Asphalt	Not Posted

3.8.2 Potential Impacts

3.8.2.1 <u>Construction</u>

Some temporary impacts to transportation in-route (mobilizing to the Project Site), as well as in and around the Project Site will result from the movement of vehicles involved in Project construction. These vehicles and their role in the Project are described below. The exact construction vehicles have not yet been determined, however, it is known that transportation of turbine components and associated construction material involves numerous conventional and specialized transportation vehicles, including:

- Gravel trucks for access road construction.
- Concrete trucks for construction of turbine foundations and transformer pads.
- Specialized flatbed trucks (with articulating rear axles to allow maneuverability) for transporting turbine and primary substation components (tower sections, blades, nacelles, and hubs).
- Cranes for assembly of the wind towers. Cranes are transported in sections over numerous trips to the site.
- Variety of conventional semi-trailers for delivery of reinforcing steel and small substation components and interconnection facility material.
- Pickup trucks for employees, equipment and tools.
- Oversize equipment escort vehicles.

Based upon an assessment of the existing conditions, CME developed probable construction travel routes as well as potential alternate routes for each site. CME identified route options to access the general Project Site as well as options to access each turbine site. Figure 8 illustrates the preferred travel routes.

To access the general Project area, CME identified 5 potential routes using access from NY Route 17 to County Road 109/Turnpike Road. The preferred route involves traveling south on County Road 70 to the Howard Town Center/County Road 70A, then County Road 27 until it intersects with County Road 109/Turnpike Road.

Once on-site, construction and delivery vehicles are anticipated to concentrate operations on select public roadways, as well as new, private access roadways specifically constructed to access turbine locations and to carry construction and delivery related traffic. The preferred routes identified by CME are presented in Table 18.

Table 18. Preferred Access from County Road 109/Turnpike to Wind Turbines

Wind Turbine Sites	Travel Route Description
1-2	County Road 109/Turnpike Road west past County Road 109/South Woods Road intersection into site.
3-7	County Road 109/Turnpike Road west to County Road 109/South Woods Road, south on South Woods Road into site.

Wind Turbine Sites	Travel Route Description
8-10	County Road 109/Turnpike Road west to County Road 109/County Road 27, south on County Road 27 to Coots Road, south on Coots Road into site.
11-12	County Road 109/Turnpike Road and travel east to into site.
13	County Road 109/Turnpike Road and travel east to the Turnpike Road/Hughes Road intersection, turn left into site.
14-16	County Road 109/Turnpike Road and travel east to the Turnpike Road/Hughes Road intersection, travel south on Hughes Road into site.
17-22	County Road 109/Turnpike Road and travel east to the Turnpike Road/Hughes Road intersection, travel south on Hughes Road to the Hughes Road/Buena Vista Road intersection, travel west on Buena Vista Road to site.
23-25	County Road 109/Turnpike Road and travel east to the Turnpike Road/Hughes Road intersection, travel south on Hughes Road to the Hughes Road/Buena Vista Road intersection, travel west on Buena Vista Road to Magill Road and into site.

Table 19 represents an estimate of the total number of loaded truck trips entering the site during the construction of the turbines. The estimates do not account for trips associated with the construction of Project access roads.

Table 19. Preliminary Trip Generation Estimate (loaded trucks entering)

Component/Truck Type	Assumption	Trips
Blades	One blade per truck	75
Towers	4 tower sections per tower	100
Nacelle and Hub	7 truck trips per tower (3 oversized trucks and 4 standard trucks)	175
Road Construction	Gravel trucks 10 cubic yards per truck, plus other construction equipment.	2200
Crane	Several trips per access point depending on the degree of disassembly.	50
Concrete	250 to 450 cubic yards per foundation, 8 cubic yards per truck. Assume 50 trips per tower.	1250
Total Heavy Vehicle Trips		3850

Note: trips should be doubled to account for exiting.

Oversize construction vehicles could cause minor delays on Project area roadways, but these are unlikely to be significant given the relatively low traffic volume through the area. Each of the routes identified in Table 18 have a number of constraining features including turning radii. Improvement options for turning radii constraints include widening on the inside or the outside of the curve. The delivery and construction of the turbines may also require general roadway widening. It is assumed that a minimum 16-foot roadway and shoulder width will be necessary to accommodate construction of the Project.

Although the source of local construction materials has not been confirmed, possible local suppliers include AL Blades and Sons located in the Town of Avoca, and on Mill Road in the Town of Howard, or Knight Settlement Sand and Gravel located in Bath, among others. Sources for gravel and concrete could be located in easterly, southerly, or westerly directions from the Project site and could arrive to the Project site using routes other than the construction routes identified in Appendix N. The primary purpose of the route evaluation study presented in Appendix N is to identify constraints and possible improvements for the oversized delivery vehicles, where necessary widening and physical improvements should be investigated. According to CME, typical sized gravel and concrete construction vehicles can travel on alternate routes without improvement.

The following construction activities will likely be required at the locations of road width and turning radii improvements:

- Clearing and grubbing of existing vegetation
- Grading of the terrain to accommodate the improvement
- Extension of existing drainage pipes and/or culverts
- Re-establishment of ditch line (if necessary)
- Construction of a suitable roadway surface to carry the construction traffic (based on the existing geotechnical conditions)

Improvements to public roads will be included among the initial stages of Project construction, and are anticipated to start in the spring of 2007. The required improvements that will ultimately be necessary cannot be finalized until landowner negotiations are complete, and input from the turbine manufacturer and/or the contractor is provided. However, the information provided in the DEIS (and Appendix N) is based upon an analysis conducted by a qualified transportation consultant/expert, and this information represents conceptually identified worst-case scenarios. It should be noted that landowner negotiations are currently underway, as Howard Wind initiated this process upon receipt of the transportation assessment conducted by CME. It should also be noted that the graphics provided in the CME report depict the anticipated area of disturbance at the identified road improvement locations along with parcel lines. This information graphically illustrates areas of potential impacts to private land due to road improvement activities. The impacts will likely include soil disturbance and vegetative clearing in the identified locations. In addition, some wetland impacts are possible as a result of these activities (see Section 3.2.2 of the DEIS for additional detail). During the negotiation process, all landowners are made aware of the potential impacts to their land, and ultimately all participating landowners will understand (and agree) to these impacts.

The required improvements will be coordinated with state, county, and local highway departments (at no expense to these departments) prior to the arrival of oversize/overweight vehicles on-site. In addition, these improvements may create additional Project related impacts (i.e. wetlands, drainage, grading, etc.) that will be addressed in detail during the final Project design, and reviewed/approved during all Project permitting subsequent to this DEIS (i.e., SPDES General Permit, USACOE/NYSDEC wetland permits, highway work permits).

3.8.2.2 Operation

Once the Project is commissioned and construction activities are officially concluded, permanent impacts will likely be concentrated around the O&M building. The Project will employ up to approximately ten individuals, all of whom may drive separately to the O&M building. Some of these personnel will need to visit each turbine location and return to the O&M building. Each turbine typically requires routine maintenance visits once every 3 months, but certain turbines or other Project improvements may require periods of more frequent service visits should a problem arise. Such service visits typically involve 1 to 2 pick-up trucks.

Project personnel (or NYSEG personnel) may also need to service the Project substation. Routine servicing would likely be carried out on a similar quarterly basis (unless a non-routine maintenance matter occurs) and would involve a similar number of maintenance vehicles. In addition to maintenance activity, the operation of a wind power project typically increases tourist traffic, which can negatively impact certain roadways within the Project Site.

The Project owner is responsible for the maintenance of all private access roads leading to the turbine sites, and does not anticipate plowing access roads during winter months. Therefore, it may become necessary for personnel to service turbines with snowmobiles or some other small track driven vehicles.

3.8.3 Proposed Mitigation

Special hauling permits are required when loads exceed legal dimensions or weights. Thus transport of the blades, nacelles, tower sections and crane will require a variety of special hauling permits. The types of permits depend on the characteristics of the vehicle and its cargo, number of trips, distance traveled and duration. The following list summarizes the driveway permits and special hauling permits that may be required:

Roadway Improvement/Driveway Permits

- NYSDOT – A Highway Work Permit (PERM 33) for any physical improvement within the NYSDOT right-of-way.
- Steuben County – A county representative from the Department of Public Works will require a field visit to each of the proposed site access driveway locations on county roads.
- Town of Howard – Driveway permit.

Overload Permits

- NYSDOT – NYSDOT will require several Type 1 permits for individual convoys including special hauling, route approval, trailer attachment, vehicle configuration, and cranes (PERM 85, PERM 12, PERM 80, PERM 39-1, PERM 39-2k, PERM 39-3g, PERM 99, AND PERM 39-4).
- Steuben County – The county will validate the NYSDOT overload permits after the specific routes used by trucks are identified.
- Town of Howard – The Town is currently developing an overload permit.

Prior to construction, the applicant and/or contractor will obtain all necessary permits described above.

Final transportation routing will be designed to avoid/minimize safety issues associated with the use of the approved haul routes, which will confine the heavy truck travel to a few select roads. The Applicant will repair damage done to roads affected by construction within the approved haul route, at no expense to the towns, county, or state.

Delivery/haul routes may change during the design and construction preparation process; however, the municipalities will be notified of the changes throughout the continued development of the Project. Additionally, design plans will be completed for all public road improvements, and will be made available for the affected local towns (and to the owner/operator of the respective road) to review prior to construction activities.

Prior to construction, the Applicant will video-document the existing roadways to verify the pre-construction roadway conditions. Upon completion of the construction activities, the Applicant will, at a minimum, return all roadways to their pre-construction conditions (and video-document).

The following outlines the proposed protocol for responding to traffic/transportation issues that arise during Project construction:

- Prior to construction EPR will identify one or more construction managers as the primary traffic contact(s) for traffic/transportation concerns that may arise during the construction of the Project.
- The town, county, and state highway departments will be notified of the primary traffic contact(s).
- EPR will consult with all town, county, and state highway departments prior to construction to identify potential traffic congestion areas and to develop potential detours.
- If construction-related congestion occurs, the primary traffic contact will call the appropriate town, county, or state highway department immediately and discuss the implementation of pre-determined detour routes.
- All construction personnel will be instructed to watch for traffic/transportation concerns and to contact the primary traffic contact immediately following identification of a traffic/transportation issue.
- The primary traffic contact will call the appropriate town, county, or state highway department immediately following identification of a congestion problem.

To minimize potential delays (and safety risks) to school children (including children at school bus stops on local roads), prior to initiating construction activities, the Applicant or contractor shall coordinate with appropriate school district personnel (i.e., director of transportation) to determine if the proposed delivery or construction routes pose any safety risks. If necessary, mitigation measures will be determined through consultation with school district personnel, and will address school bus and construction activity schedules, appropriate safety measures such as regularly scheduled communication between the Applicant or contractor and school district personnel, avoidance scheduling, and alerts.

3.9 SOCIOECONOMICS

To understand the effects this Project will have on socioeconomic conditions within the Town of Howard, it is important to first understand the current state of the local economy. Thus, this section presents specific information regarding the labor force, including population and housing; the economy, in particular employment rates and opportunities; and municipal budgets and taxes, including the local school budgets and taxes. The potential impacts of the Project on these existing socioeconomic conditions, during both construction and operation, are then evaluated.

A socioeconomic report was prepared by Saratoga Associates (Appendix O). This report presents specific information regarding population, economy and employment, housing characteristics, existing tax base and tax revenues, community facilities and services (see Section 3.11), and municipal budgets and taxes.

3.9.1 Existing Conditions

Existing population and housing, employment and income, and municipal budgets and taxes in the Town of Howard are described below.

3.9.1.1 Population and Housing Characteristics

According to U.S. Census Bureau data (1990 to 2006), the Town of Howard experienced considerable growth of approximately 14.5% over the last 16 years. Population growth projections for 2000 to 2011 indicate a continued growth trend. However, the Town still remains relatively rural in nature, with a population estimated at 1,524 persons and a population density of 26.4 persons per square mile. The majority of these residents are working adults (ages 25 to 54 years) in addition to a substantial preschool and school age populations (ages 0 to 17 years).

Consistent with observed population increases, the number of households increased by approximately 13.4% in the Town of Howard from 1990 to 2000. This increase has continued into 2006, and is projected to remain steady through 2011. The majority of the households in the Town are families.

3.9.1.2 Income and Employment

According to the Saratoga Associates report, the per capita income for the Town of Howard is estimated at $17,613. Just under half of the Town's households have incomes below the median house hold income of $43,061. Approximately 21.3% of all households in the Town have incomes ranging from $50,000 to $74,999, and there are no households with incomes in excess of $200,000.

High technology manufacturing and healthcare are important industries for Steuben County. The county is home to several large companies and hospitals such as Corning Incorporated, St. James Mercy Hospital, Dresser-Rand Company, Alstom, and Corning Hospital. While none of the top ten employers are located within the Town of Howard, they employ residence throughout the region, having a positive economic impact on the region as a whole.

While Steuben County exceeds the regional average, with 21.72% of all workers employed in manufacturing, health care/social assistance and retail also provide a substantial number of jobs. Nearly 20% of Steuben County workers are employed in health care and social assistance, while the retail industry provides over 16.13% of all jobs. However, according to U.S. Census Bureau 2004 data, while manufacturing produced an average salary of $43,130, retail yielded an average salary of only $17,534.

With respect to the agricultural industry, in 2003 there were a total of 1,490 farms (totaling 372,800 acres), which represents a 45% decrease in number of farms since 1959, when the county had over 2,700 working farms. Unfortunately, the decline in number of farms continues. In 2004 there were 1,450 farms in the Steuben County, representing a decline of 40 farms in one year (NASS website; Office of Real Property Services).

3.9.1.3 Municipal Budgets and Taxes

Municipalities (towns, villages, and counties) and school districts are responsible for providing specific services and facilities to those who live and work within their boundaries. Municipalities and school districts incur costs when providing these facilities and services and collect revenues to offset these costs by levying taxes. Tax revenues in the Project area accrue from both sales taxes and real property taxes. The taxing jurisdictions in the Project area include Steuben County, the Town of Howard, and four central school districts; Bath, Hornell City, Canisteo-Greenwood, and Avoca Central School Districts. Table 20 summarizes the total 2003 property tax levy, or money raised, for these taxing jurisdictions.

Table 20. 2003 Real Property Tax Levy Per Taxing Jurisdiction.

Taxing Jurisdiction	2005 Real Property Tax Levy
Town of Howard	$1,083,455
Steuben County	$41,656,954
All School Districts	$954,364

(Source: NYS Office of Real Property Services)

A comparison of the tax base composition by land use category for the Town of Howard is presented by Saratoga Associates. Table 21 below shows the parcel count by broad land use category according to the New York State Office of Real Property Services (NYSORPS) 2004 annual assessment rolls. As illustrated below, the majority of the assessed parcels in both communities are residential properties (nearly 50%). However, the Town of Howard also has a substantial percentage of agricultural land at nearly 28%.

Table 21. Assessed Value of Property by Land Use Classification (2004)

Type of Land Use	Town of Howard	
	Assessed Value	Percent of Total Parcels
Residential	$20,974,101	49.96%
Commercial	$262,400	0.62%
Industrial	$122,015	0.29%
Agricultural	$11,693,995	27.85%
Amusement	$113,000	0.27%
Public Serve Properties	$8,901,912	236%
Community Service	$138,134	0.33%
Vacant Land	$2,440,590	5.81%
Public Service	$6,241,585	14.87%
Public Parks, Wild, Forested and Conservation Properties	$0	0.00%

(Source: 2004 NYS Office of Real Property Services)

Table 22 provides information regarding budgets at the town and county levels. In 2004, the total expenditures for the Town of Howard were $1,015,406, including $53,680 in debt service. According to Saratoga Associates, transportation and general government comprise the two largest categories of the budget.

Table 22. Municipal and County Budgets (2004).

Area	Revenue (total)	Expenditure (total)	Indebtedness
Town of Howard	$973,544	$1,015,406	$172,841
Steuben County	$139,592,269	$147,646,220	$5,896,798

(Source: NYS Office of the State Comptroller)

The town, county, and school districts face the yearly challenge of meeting their service obligations (or expenditures) through the collection of sales and/or real property taxes. As with most taxing jurisdictions in upstate New York, loss of, or lack of, commercial and industrial tax base, in combination with rising labor and material costs, make it increasingly difficult to meet their budgets without significantly raising taxes.

3.9.2 Potential Impacts

The Project will have both direct and indirect positive economic effects on the towns, counties, and school districts, as well as on the individual landowners participating in the Project. These effects will commence during construction and continue throughout the operating life of the Project. In the short term, benefits will include additional employment and expenditures associated with construction of the Project. In the long term, the operating Project will generate significant additional revenue through a PILOT agreement, purchases of goods and services, and lease payments to participating landowners. The Project will also provide full-time employment for a limited number of individuals, and will likely result in some increased visitation to the Project area by tourists interested in wind power. All of these results could have a beneficial effect on local businesses. The overall socioeconomic impacts of Project construction and operation are discussed in detail below.

3.9.2.1 Construction

3.9.2.1.1 Population and Housing

The population trends previously discussed will likely continue regardless of whether the proposed Project is built. The Project will not generate construction employment at a level that would significantly increase population in either the town or county. Even though employment during the construction period will be significant (see Section 3.9.2.1.2), this employment is relatively short term, and is not expected to result in workers permanently relocating to the area. For the duration of construction (approximately nine months) there could be a temporary increase in local population and demand for temporary housing by out-of-town workers. However, this demand will be relatively modest, and should easily be accommodated by the available housing in the towns and surrounding communities (see Appendix O). Beyond this relatively minor (and positive) short-term impact, Project construction will have no significant impact on population and housing.

3.9.2.1.2 Economy and Employment

To quantify the local economic impacts of constructing the Project, Saratoga Associates studied the economic impacts for a facility with a Project size of 60 MW and 80 MW (i.e., to evaluate both the low and high ranges of potential Project size). The Regional Input-Output Modeling System (RIMS II) developed by the Bureau of Economic Analysis was used to determine economic impacts during the construction phase and the operations phase of the Project. Construction creates a one-time surge in economic activity, while operation and maintenance makes an on-going economic contribution by creating long-term jobs and ongoing income streams.

The construction phase of a Project in the range of 60 to 80 MW will generate approximately 50 to 60 full-time *direct* jobs over a 6 to 9 month period, representing between $90 and $120 million in investment. It is anticipated that up to two-thirds of employment will be drawn from the Southern Tier and Finger Lakes labor markets. Local construction employment will consist primarily of equipment operators, truck drivers, laborers and electricians. The balance of construction employment will include workers with special skills imported from outside the area for the duration of construction.

The construction phase will have an *indirect* and *induced* impact of approximately 439 to 526 jobs, bringing the total economic impact of construction to approximately 489 to 586 jobs. The construction investment will generate an indirect and induced output of $126.77 - $169.02 million, bringing the total impact on output to between $216.77 and $289.02 million. Household earnings generated by the 50 to 60 construction jobs will have a spin-off of approximately $0.626 million to $0.752 million in earnings, bringing the total impact of the construction to $2.351 million to $2.822 million in earnings (see Appendix O for additional detail).

3.9.2.1.3 Municipal Budgets and Taxes

During construction, the Project will not impact municipal budgets and taxes. Temporary construction workers will not create significant demand for municipal or school district services or facilities. These workers will also not generate significant revenue through payment of property taxes. The Project will result in impacts to the local road system (see discussion of transportation impacts in Section 3.8.2) but these impacts will not affect local highway department expenditures/budgets because, as discussed in the mitigation section, the cost of any construction related road repairs/improvements would be borne by the Project developer.

3.9.2.2 <u>Operation</u>

3.9.2.2.1 Population and Housing

It is anticipated that approximately six full-time jobs will be created once the Project is fully operational. These jobs will include an Operations Manager, a Quality Control Engineer, a Bookkeeper/Secretary, and three wind technicians. These employees are expected to reside locally, which could translate into purchase of a few homes and the addition of a few families to the towns and surrounding communities. Although this represents a positive economic impact, long-term employment associated with the Project is not large enough to have a significant impact on local population or housing characteristics.

Local residents often express concern over the potential for property values to depreciate as a result of a proposed wind power project. This issue has come up during the siting and review of other wind power projects in New York and throughout the United States. In order to address this concern, a quantitative study was conducted by the Renewable Energy Policy Project (REPP) in 2003, titled *Effect of Wind Development on Local Property Values*. REPP assembled a database of real estate transactions adjacent to every wind power project in the United States (10 MW or greater) that became operational between 1998 and 2001 (a total of 10 projects, including the Madison and Fenner projects in Madison County, New York). For this study, data was gathered within 5 miles of the wind projects, as this was determined to be the potential area of visual impact (viewshed). For each of the 10 projects, similar data was also gathered for a comparable community that was located outside of the project viewshed (comparable communities were based on interviews with local assessors as well as analysis of U.S. Census Bureau demographic data). The goal of the data collection was to obtain real estate transaction records for a time period covering roughly six years (three years pre-construction and three years post-construction), and for data based on actual sales values, and not necessarily assessed values. The data was then analyzed in three different ways: Case 1 examined the price changes in the viewshed and the comparable community for the entire period of the study; Case 2 examined how property values changed in the viewshed before and after the project became operational; and Case 3 examined how property values changed in the viewshed and the comparable community after the project became operational.

The results of these analyses showed no negative affect on property value from existing wind farms. Of the 10 projects examined in the Case 1 analysis, property value actually increased faster within the wind power project viewshed in eight of the 10 projects. The Case 2 analysis revealed that the property values also increased faster after the wind farms became operational in nine of the 10 projects examined. In the Case 3 analysis, property values increased faster in the wind power project viewshed than in the comparable community in nine of the 10 projects. More specifically (and perhaps most relevant to the proposed Howard Wind Power Project) is the fact that these positive results apply to the Madison Wind Power Project and the Fenner Wind Power Project in New York State. The results from the Madison and Fenner analyses revealed a generally positive affect on area property values. In five of the six case studies (Case 1, 2, and 3 analyses for both projects), the monthly average sales price grew faster or declined slower in the viewshed communities than in comparable communities outside the project viewshed. The REPP study therefore concluded that there is no evidence that the presence of the Madison and Fenner wind farms had a significant negative effect on residential property values in Madison County, New York (Sterzinger, et. al., 2003).

It should be noted that the REPP study has been criticized because it assumes that all properties within the study area have a view of the respective wind farm, does not account for property distance to the wind farm, uses a questionable statistical analysis, and includes inappropriate transactions (e.g., estate sales, sales between family members, sales due to divorce, etc.). In addition, at least one property value study (Haughton et. al., 2004) has predicted a negative effect from the proposed development of a wind power project. To present a clearer understanding of the actual effects of existing wind farms on property values, a Master of Science thesis was prepared by Ben Hoen (2006). The purpose of this study was to analyze whether the transaction value of homes within 5 miles of the existing Fenner Wind Farm was significantly affected by views of the wind farm. "View" is defined using a continuous variable from 0 (no view) to 60 (a full view of all 20 turbines). The study additionally investigates how effects may vary with distance (spatially), time (temporally), and house value. Lastly, the effect and degree of the PILOT payment to Fenner Township is investigated. The study utilized the hedonic pricing model, which, given enough data, is sensitive enough to allow sales to be grouped temporally (e.g., by year), spatially (e.g., by distance), and economically (by the value of the home).

The data concerning transaction values and assessor information was collected from the Madison County Real Property Tax Office. From January 1, 1996 through June 1, 2005, 452 sales took place that were coded "arms-length" transactions by county assessors, and were within 5 miles of Fenner Wind Farm. Of these, 167 were removed as land-only sales (i.e., sale of parcel that did not contain a house), and five were removed as non arms-length sales, resulting in a total of 280 sales. Of these, 140 occurred after construction of the Fenner Wind Farm began (2001). A field analysis was conducted on October 30 and 31, 2005 to ensure complete accuracy of the "view" variables used in the model. Visits were made to those homes sold after January 1, 2001 (138 homes visited) to assess the degree to which the home has a view of the wind farm. By standing at or near the house a rating of 1 to 60 was established for each home. This rating was based on the degree to which viewers could see each of the 20 windmills in the Fenner Wind Farm. A total of 3 points per turbine were possible (one point if only the blade above the nacelle was visible, two points if the nacelle was also visible, and three points if the tower below the rotor swept area was also visible), for a cumulative maximum of 60 points.

Computer modeling analysis of the 280 home sales within 5 miles of the Fenner Wind Farm did not reveal a statistically significant relationship between the sale price of homes and either proximity to, or visibility of, the wind farm. Additionally, the analysis did not demonstrate a relationship even when concentrating on homes within one mile of the wind farm that sold immediately following the announcement and construction of the Project. This study therefore concluded that in Fenner, a view of the wind farm does not produce either a universal or localized effect, adverse or otherwise. To the degree that other communities resemble the Fenner rural farming community, similar conclusions are anticipated (Hoen, 2006).

Specific to Steuben County, Cushman & Wakefield conducted an analysis to address local concerns regarding the potential for property values in Cohocton to depreciate as a result of a proposed project in that township. Cushman & Wakefield to prepared an assessment of potential impacts on local property values, and undertook a variety of data collection tasks to assess the potential affect of the Cohocton Project on local property values including:

- Interview with the Town of Cohocton Assessor.
- Review of the Town of Cohocton Zoning Ordinance
- Review of topographical overlays and viewshed analysis of the project area.
- Field inspections of similarly affected rural areas in neighboring Wyoming County.
- Site visits to the Fenner (1999, Madison County, NY), Maple Ridge (2005, Lewis County, NY), Wethersfield (2000, Wyoming County, NY), and Searsburg (1997, Bennington County, VT) Wind Power Projects.
- Direct experience from wind projects in Kittias County, Washington.
- Review of demographic profiles and housing sales data for each of the above-referenced study areas.
- Current literature review of relevant published information.

As a result of the above mentioned site visits and data collection, the following general findings were reported by Cushman & Wakefield:

- The patterns of settlement in the area are considered sparse, with little growth for over 30 years.
- Median values for owner-occupied homes near Cohocton are lower than the median within Steuben County, and considerably lower than the statewide median value.
- Since 2000, actual sales data showed that homes in the Cohocton area sold for well below the median values.
- Similar to owner-occupied homes, agricultural/rural land sold for well below average values.

- The most sensitive properties in the project area are rural homesites.
- The Cohocton Wind Power Project may yield net economic benefits, which could in turn spur demand for housing and increase local property values over time.
- Dairy farms and vacant agricultural land are unlikely to be affected since the value of such property lies in the relative productivity of the soil and the age and functional utility of farm and dairy related structures.

Cushman & Wakefield concluded that the Cohocton Project should have negligible impact on property values for undeveloped properties or existing farms. They found that local property values will be much more susceptible to the local economy than to changes in the viewshed created by this project. They concluded that the Cohocton Project should have no impact upon future sales or values of developed properties given the prevailing conditions (DeLacy, 2006).

The results of Sterzinger (2003), Hoen (2006), and DeLacy (2006) provide no evidence to suggest that the proposed Howard Wind Power Project will have an adverse impact on local property values.

Also worth noting is a June 28, 2005 press release from the Madison County Public Information and Services Department. This press release discussed a recent study published in *Progressive Farmer* (a national publication), which ranked Madison County as the fourth best place to live in the northeast in their list of Best Places to Live in Rural America. The rankings for each county were based upon healthcare, education, climate, pollution, crime, and tax burden (Madison County, 2005). In addition, a May 27, 2006 article in The Post Standard discussed the positive effects of the Fenner Wind Farm. According to this article, the tentative tax rolls released in May 2006 indicate that the overall assessed value of the Town of Fenner has increased 45 % (from $79.2 million to $114.8 million). The Madison County Real Property Director was quoted as saying “Fenner’s booming…the amount of new construction and people building and buying is tremendous” (Potrikus, 2006).

3.9.2.2.2 Economy and Employment

During operation, the Project is projected to generate approximately six full-time jobs. Total direct earnings, comprised of direct wages and leases paid to landlords, are estimated at $0.638 million to $0.810 million. Wages are estimated to range from $122,000 per year for the wind technicians.

The six full-time jobs generated by the Project operation will have a spin-off of approximately 19 jobs, bringing the total impact of operations to 25 jobs. These full-time jobs will create additional jobs in other sectors of the economy through expenditures derived from household wages. Earnings are projected to have an indirect and induced impact of approximately $0.084 million to $0.161 million, bringing the total economic impact on earnings at approximately $0.509 million to $0.975 million per year.

Additionally, expected lease payments of approximately $516,000-$688,000 per year will be provided to local landowners participating in the Project. These lease payments are a direct financial benefit to all participating landowners, and will enhance the ability of those in the agricultural industry to continue farming. Russell Cary, Supervisor of the Town of Fenner (New York), believes that lease payments from the wind power project in his town are preserving a rural life style and protecting family farms from being taken over by large-scale commercial farming operations (Cary, Pers. Comm.). Local lease payments will also enhance the ability of participating landowners to purchase additional goods and services. To the extent that these purchases are made locally, they will have a broader positive effect on the local economy.

With respect to tourism in the region, it is worth noting that other wind power projects in New York State have resulted in a significant increase in visitation from tourists interested in the projects. Both the Fenner and Madison Wind Power Project's, for example, are listed as attractions on the Madison County Tourism website (www.madisontourism.com). In addition, a June 28, 2005 press release issued by Madison County discussed it's high ranking (fourth in the northeast) on a list of the Best Places to Live in Rural America (published by *Progressive Farmer* Magazine). This press release also discussed the wind power projects as tourist attractions. Rocco J. DiVeronica, Chairman of the Madison County Board of Supervisors, was quoted as saying "Madison County has much to offer…we have a number of tourist attractions. The Boxing Hall of Fame located in Canastota and the windmill farms in Fenner and Madison to mention a few" (Madison County, 2005). This tourism has certainly resulted in increased local expenditures for goods and services, but these have not been quantified, and are probably fairly modest. It should also be acknowledged that this effect is likely to diminish as wind power projects become more common in the state and their novelty decreases. Despite concerns expressed by some area residents, there is no evidence to indicate that the presence of wind turbines will have a negative impact on tourism. A 2002 study conducted in the Argyll Region of Scotland, involving interviews with over 300 tourists, found that 91% said the presence of wind farms in the area would not influence their decision to return to the area (MORI Scotland, 2002). Almost half (48%) of the tourists interviewed were visiting the area because of the 'beautiful scenery and views'. Of those who had actually seen wind farms, 55% indicated that their effect was "generally or completely positive", 32% were ambivalent, and 8% felt that the wind farms had a negative effect. Similar positive effects have been reported from various wind farm locations in Australia. According to the Australian Wind Energy Association (AusWEA), initial concerns that wind turbines would negatively impact tourism in that country, have proven unfounded (AusWEA, 2003). Similarly, a recent survey of visitors, to Vermont's Northeast Kingdom found that 95% would not be deterred from further visits by the existence of a proposed wind farm (Institute for Integrated Rural Tourism, 2003). This is also evident in the resort community of Palm Springs, California, where there are over 3,500 wind turbines. Tours of this wind farm regularly draw 10,000 to 12,000 curious tourists every year (Clean Power Now website).

3.9.2.2.3 Municipal Budgets and Taxes

Wind energy systems have enjoyed tax-exempt status in New York State. According to New York State Real Property Tax Law, Article 4, Section 487, real property, which includes a wind energy system, shall be exempt from taxation. However, local municipalities and school districts have the option to disallow this tax-exempt status for properties that lie within their jurisdiction (NYSORPS, 2004). A PILOT can also be administered by the Steuben County Industrial Development Agency.

Although the presence of the turbines will increase the value of the properties on which they are located, due to the tax exemption and/or a PILOT agreement, the landowners of these properties will not be assessed a higher value to reflect these improvements. In addition, studies of wind power impacts on property values have indicated that these projects do not have an adverse effect on assessed property value (Sterzinger, et. al., 2003, Hoen, 2006). Therefore, the Project should not negatively affect the total amount of real property taxes levied by the local taxing jurisdictions or the budgets of these jurisdictions. According to Town of Fenner Supervisor Russell Cary, the wind farm in his town has required the town to purchase additional road maintenance equipment to service roads that have been improved or are more heavily traveled as a result of the project (Cary, pers. comm.). However, the improved roads are a benefit to the community, and represent the only significant municipal service required by the project. The Project will place similar, limited demand on municipal (and school district) services. The Project will more than off-set any impact on municipal budgets and taxes through additional revenue provided in the form of a PILOT agreement. The details of the PILOT agreement are described in Section 3.9.3.2.3 below.

3.9.2.2.4 Environmental Justice

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (EPA website). It is sometimes suggested that Environmental Justice is neglected/ignored when large infrastructure projects are directed towards areas populated predominantly by those in lower socioeconomic classes. However, Environmental Justice is not an issue with respect to wind power projects.

The siting of wind power projects is driven by three primary factors: 1) an adequate wind resource; 2) willing landowners; and 3) proximity to existing transmission infrastructure. In New York State, the combination of these factors typically results in wind power projects that are located on relatively high-elevation sites that are sparsely populated and generally dominated by agricultural land uses. Such areas are populated by farmers and rural residents, many of whom are in the middle to lower economic strata. However in many areas these residents include large landowners and farmers that are quite prosperous, along with seasonal/weekend homeowners who have acquired land in the area for use as vacation home sites due to the available scenic views and abundant open space. As a result, a mix of socioeconomic classes are typically found in proximity to wind power projects. Therefore, due to 1) siting requirements that are essential and totally independent of socioeconomic class and 2) the mixed socioeconomic classes generally found within (and adjacent to) project sites, Environmental Justice is generally not an issue on wind power projects.

3.9.3 Mitigation

3.9.3.1 Construction

As described in the impacts discussion, construction of the proposed Project will not have a significant impact on local population and housing, and will have a short-term beneficial impact on the local economy and employment. Consequently, no mitigation is necessary to address these impacts. The only potential adverse impact to municipal budgets and taxes is the impact of Project construction on local roads, and the need to repair or upgrade these roads to accommodate construction vehicles/activity. To mitigate this impact, any construction-related damage or improvements to state, county, or town roads will be the responsibility of the Project developer, and will be undertaken at no expense to the town or county (see Section 3.8.3 for more detail on road mitigation).

3.9.3.2 Operation

3.9.3.2.1 Population and Housing

As previously discussed, the operating Project is not anticipated to adversely affect population or housing availability in the local towns or surrounding area. Nor is it expected to have a depressing effect on local property values. Consequently, mitigation measures to address population and housing impacts are not necessary.

Property owners within the viewshed of proposed wind power projects are often concerned about the possibility that these projects could at some point be abandoned, and that the derelict facilities will have a depressing effect on local property values. To address this concern, the Project developer will establish a decommissioning fund. This fund will assure that the proposed wind power facility will be dismantled and removed in the event that it reaches the end of its operational life span. Prior to the start of construction the Project developer will submit evidence of the financial mechanisms that are in place to ensure the removal of each wind turbine in the event it is not in active service for one year or more. A Project Decommissioning Plan will be prepared, and will include a financial structure for funding the cost of removal (see Section 2.7 for more detail).

3.9.3.2.2 Economy and Employment

As described previously, the operating Project's potential impact on the local economy and employment will be positive, in that additional jobs will be created and additional local expenditures made (lease payments to participating landowners, as well as local purchase of goods and services). However, the number of permanent jobs created is not large enough to create a financial burden on the town, county or school districts by requiring the provision of additional services and/or facilities. Thus, mitigation measures to address either loss of jobs or increased demand for municipal services are not necessary.

3.9.3.2.3 Municipal Budgets and Taxes

Because operation of the proposed Project will not create a significant demand for municipal or school district services and facilities, it will have no adverse impact on municipal or school budgets. Howard Wind plans to enter into a PILOT agreement with all of the affected taxing jurisdictions, and proposes that the PILOT agreement will have a term of 20 years. Although the specific terms of the PILOT agreement have not been negotiated, Howard Wind anticipates, based upon annual PILOT payments for other wind energy projects in New York, that the annual PILOT payment will be a minimum of $5000 per installed megawatt per year (for an annual total of $300,000 - $400,000). Further, over an assumed 20-year duration of the PILOT agreement, the local jurisdictions would receive total payments of approximately $6-8 million. Howard Wind anticipates that the annual PILOT payments would be distributed between the Town of Howard, Steuben, the Bath, Hornell City, Canisteo-Greenwood, and Avoca Central School Districts Central School Districts. The percentage sharing of the payments has not yet, however, been negotiated. After the PILOT expires, the facility will be taxed at its assessed value.

The PILOT payments will increase the revenues of the local taxing jurisdictions, and will represent a significant portion of their total tax levy. Further, the PILOT payments will more than off-set any minor increases in community service costs that may be associated with long-term operation and maintenance of the Project (e.g., small number of additional school children, slightly increased road maintenance costs).

Because the wind power facility will generate a predictable source of additional revenue for all of the affected municipalities and school districts over the next 20-plus years, the Project will positively impact municipal and school district revenues. This will enhance the type and level of services these jurisdictions provide to local residents for the duration of the Project's operational life. It is also worth noting that based upon the lack of currently proposed (or approved) projects before the Town of Howard Planning Board, the Howard Wind Power Project is likely the only private source of additional revenue available to supplement municipal and school district budgets.

3.10 PUBLIC SAFETY

This section addresses the potential impacts of the Project on public safety. Background information on public health and safety issues associated with wind energy projects is presented first, followed by a discussion of potential impacts associated with the Project, and proposed mitigation measures.

3.10.1 Background Information

Public safety concerns associated with the construction of a wind power project are fairly standard construction-related concerns. These include the potential for injuries to workers and the general public from 1) the movement of construction vehicles, equipment and materials, 2) falling overhead objects, 3) falls into open excavations, and 4) electrocution. These types of incidents are well understood and with proper safety plans can be eliminated or at least minimized, and do not require extensive background information.

Public safety concerns associated with the operation of a wind power project are less well known to most people and are thus the focus of this section.

In many ways, wind energy facilities are safer than other forms of energy production since a combustible fuel source and fuel storage are not required. In addition, use and/or generation of toxic or hazardous materials are minor when compared to other types of generating facilities. However, wind turbines are generally more accessible to the public, and risks to public health and safety can be associated with these facilities. Examples of such safety concerns include ice shedding, tower collapse, blade throw, stray voltage, fire in the nacelle, lighting strikes, and electrocution.

Although concerns are sometimes raised with respect to low frequency sound emissions and vibrations from wind turbines, no adverse impact related to low frequency sound is expected from this Project. The maximum C-weighted sound level at any receptor is well below the threshold of any perceptible vibrations. For more information on noise impacts, see Section 3.7.

According to turbine manufacturers, turbine vibration is minimal and if it occurs, the SCADA system detects the abnormality and the turbine is shut down. Although no vibration related health effects have been previously documented at operating wind power facilities, no effects would be anticipated as a result of this automated detection and shut down process. Additionally, current Building Code of New York State (May 2005) provides the engineering design standards for all new structures, including wind turbines, in New York State. Specific processes and design provisions in the building code were developed for earthquake loads and seismic events. The design standards were developed in accordance with known existing fault lines, historic and probabilistic seismic activity, and the anticipated spectral response accelerations for individual site class soil categories. Therefore structural design will ensure that vibration caused by turbine mechanical problems would not result in turbine foundation failure.

Each of the safety concerns described above is discussed individually below.

3.10.1.1 Ice Shedding

Ice shedding and ice throw refer to the phenomena that can occur when ice accumulates on rotor blades and subsequently breaks free and falls to the ground. Although a potential safety concern, there has been no reported injury caused by ice being "thrown" from an operating wind turbine (NYSERDA Power Naturally NY Website). However, ice shedding does occur, and could represent a potential safety concern.

Icing in the Howard area would generally result from freezing rain events forming a “glaze” ice (as opposed to “rime” icing that occurs at high elevations). Under such conditions, either the anemometer on the top of the nacelle would freeze, which would in turn signal for the wind turbine to shut down, or the ice buildup would register as an imbalance in the weights of the blades and the turbine would shut down.

Field observations and studies of ice shedding indicate that most ice shedding occurs as air temperatures rise and the ice on the rotor blades begins to thaw. Therefore the tendency is for ice fragments to drop off the rotors and land near the base of the turbine (Morgan, 1998). Ice can potentially be "thrown" when ice begins to melt and stationary turbine blades begin to rotate again (although turbines do not usually restart until the ice has largely melted and fallen straight down near the base). Several observational studies and mathematical models examining this phenomenon have calculated how far ice can potentially be thrown from a moving rotor blade before hitting the ground (Morgan and Bossanyi, 1996). The distance traveled by a piece of ice depends on a number of factors, including the position of the blade when the ice breaks off, the location of the ice on the blade when it breaks off, the rotational speed of the blade, the shape of the ice that is shed (e.g., spherical, flat, smooth), and the prevailing wind speed. Data gathered at existing wind farms have documented ice fragments on the ground from 50 to 328 feet from the base of the tower (less than 33 to 197 feet blade diameter). These fragments were in the range of 0.2 to 2.2 pounds in mass (Morgan, 1998). The risk of ice landing at a specific location is found to drop dramatically as the distance from the turbine increases.

3.10.1.2 <u>Tower Collapse/Blade Throw</u>

Another potential public safety concern is the possibility of a wind turbine tower collapsing or a rotor blade dropping or being thrown from the nacelle. These are extremely rare occurrences, but such incidents do occur (a tower collapse at the Weatherford Wind Power Project in Oklahoma occurred in May, 2005), and are potentially dangerous for project personnel, as well as the general public. The reasons for a turbine collapse or blade throw vary depending on conditions and tower type. Past occurrences of these incidents have generally been the result of design defects during manufacturing, poor maintenance, wind gusts that exceed the maximum design load of the turbine structure, or lightning strikes (AWEA, 2006). Most instances of blade throw and turbine collapse were reported during the early years of the wind industry. Technological improvements and mandatory safety standards during turbine design, manufacturing and installation have largely eliminated such occurrences.

3.10.1.3 <u>Stray Voltage</u>

Stray voltage is a phenomenon that has been studied and debated since at least the 1960's. It is an effect that is primarily a concern of farmers whose livestock can receive electrical shocks. Stray voltage can be defined as a "low level of neutral-to-earth electrical current that occurs between two points on a grounded electrical system" (Wisconsin Rural Energy Management Council, 2000). The term stray voltage can be further defined as "continuous voltage sources of less than 10 volts between two objects that are likely to be contacted simultaneously by livestock". Most stray voltage problems have been traced to either National Electric Code wiring violations or poorly grounded electric services serving the farms in question (J. Barrett, pers. comm.).

The occurrence of stray voltage may result from a damaged or poorly connected wiring system, corrosion on either end of the wires, or weak/damaged insulation materials on the “hot” wire. Livestock may encounter stray voltage in their everyday activities when they contact two surfaces with voltage differences, resulting in a small electrical current flowing through the animal and creating a shock. In a barn, stray voltage may occur at watering systems, dairy stanchions, animal pens, or even the metal siding on the building. Dairy barns are particularly prone to the occurrences of stray voltage since they contain all the necessary components, including: concrete or dirt floors that are likely to be wet, metal confinement structures and water systems, metal rebar in the concrete floor, and metal walls with moisture condensed on the surfaces.

Wind power projects and other electrical facilities can only create stray voltage if they are not properly designed or during unusual circumstances. Stray voltage from overhead electric lines usually only occurs if poorly grounded metal objects (fences, underground pipelines, etc.) are in close proximity to the overhead line and run parallel to it for long distances (J. Barrett, pers. comm.).

3.10.1.4 Fire

Wind turbines, due to their height, physical dimensions, and complexity, have the potential to present response difficulties to local emergency service providers and fire departments. Although the 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 or a medical emergency within the tower or the nacelle. This, in combination with the elevated location of the nacelle and the enclosed space of the tower interior makes response to a fire or other emergency difficult, and beyond the capabilities of most local fire departments and emergency service providers.

Other Project components create the potential for a fire or medical emergency due to the storage and use of diesel fuels, lubricating oils and hydraulic fluids. Storage and use of these substances may occur at the substation, in electrical transmission structures, staging area(s), and the O&M building/facility. Due to the accessibility of these areas, response to an emergency should not pose difficulty to local fire and emergency personnel. However, the presence of potentially hazardous materials as well as high voltage electrical equipment at the substation could present potential safety risks to local responders (see Section 3.11 for detailed information regarding emergency response services).

3.10.1.5 Lightning Strikes

Due to their height and metal/carbon components, wind turbines are susceptible to lightning strikes. Statistics on lightning strikes to wind turbines are not readily available, but it is reported that lightning causes four to eight faults per 100 turbine-years in northern Europe, and up to 14 faults in southern Germany (Korsgaard and Mortensen, 2006). Most lightning strikes hit the rotor, and their effect is highly variable, ranging from minor surface damage to complete blade failure. All modern wind turbines include lightning protection systems which generally prevent catastrophic blade failure.

3.10.1.6 Electrocution

Due to the generation and transmission of electricity, a wind power project poses the risk of electrocution. Because power generation and transmission does not occur until after the wind project has been constructed, this concern is primarily associated with an operating wind power project. The electricity generated by each turbine will initially be transmitted through buried 34.5 kV electric lines, in some areas of the Project the buried lines will make a transition the above ground all of which will ultimately be delivered to the Project substation. The buried lines will be placed at least 3 feet below grade (4 feet in agricultural land). Therefore, any earthwork conducted at or below these depths (and in the immediate proximity of the buried lines) will introduce the risk of electrocution by accidental contact. Transmission lines that run above ground along existing transmission line rights of way will be constructed in accordance with all applicable industry codes and standards.

3.10.1.7 Eletro-magnetic Fields

Electric power transmission lines create electro-magnetic fields (EMF) because they carry electric currents at high voltages. EMF decrease in size as the distance form the source increases. For an electric transmission line, EMF levels are highest next to the transmission lines (typically near the center of the transmission line right-of-way) and decrease as the distance from the transmission corridor increases. Electric fields are attenuated by objects such as trees and walls of structures, and are completely shielded by materials such as metal and the earth. Thus, underground electric transmission lines do not produce electric fields at the ground surface.

Humans are exposed to a wide variety of natural and man-made EMF both in the outdoor environment and in homes, schools, and businesses. The EMF produced by electric transmission lines are well within the range of EMF exposures from such other sources. Numerous public health review groups, including the National Institute of Environmental Health Sciences, the National Institutes of Health, and the U.S. Department of Energy, have examined the public's exposure to EMFs produced by power lines. The consistent overall conclusion of these groups is that available data do not support a cause and effect relationship between exposure to environmental levels of EMF and elevated risk of disease.

3.10.2 Potential Impacts

3.10.2.1 <u>Construction</u>

As mentioned in the background information section, public safety concerns associated with Project construction include 1) the movement of large construction vehicles, equipment and materials, 2) falling overhead objects, 3) falls into open excavations, and 4) electrocution. These issues are most relevant to construction personnel who will be working in close proximity to construction equipment and materials, and will be exposed to construction related hazards on a daily basis. The risk of construction-related injury for such personnel will be minimized through regular safety training and use of appropriate safety equipment.

The general public could also be exposed to construction-related hazards due to the passage of large construction equipment on area roads and unauthorized access to the work site (on foot, by motor vehicle, ATV, or snowmobile). The latter could result in collision with stockpiled materials (soil, rebar, turbine/tower components), as well as falls into open excavations. Because construction activities will adhere to industry safety standards and occur primarily on private land, and be well removed from adjacent roads and residences, exposure of the general public to construction-related risks/hazard is expected to be very limited.

3.10.2.2 <u>Operation</u>

3.10.2.2.1 Ice Shedding

As stated previously, while turbine icing may occur at times, ice accumulation on the rotor blades will either cause an imbalance, or freeze-up of the control anemometer, both of which will result in turbine shut-down. As the ice begins to thaw, it will typically drop straight to the ground. Any ice that remains attached to the blades as they begin to rotate could be thrown some distance from the tower. However, such a throw will usually result in the ice breaking into small pieces, and falling within 300 feet of the tower base. The Project's minimum setback distance of 400 feet from roads and property lines, and 1,000 feet between the proposed turbines and adjacent residences, should adequately protect nearby residents and motorists from falling ice of any significant size. In addition, unauthorized public access to the site will be limited by posting signs to alert the public and maintenance workers of potential ice shedding risks. Since snowmobiling on private land is a popular activity in upstate New York and is likely enjoyed by large numbers of participants within the Project Site during winter months, EverPower Renewable will contact local landowners and snowmobile clubs, and inform them of the potential risks posed by falling ice in the vicinity of the wind turbines. Based upon the results of studies/field observations at other wind power projects, the Project's siting criteria, and the proposed control of public access to the turbine sites, it is not anticipated that the Project will result in any measurable risks to the health or safety of the general public due to ice shedding.

3.10.2.2.2 Tower Collapse/Blade Throw

Modern utility-scale turbines are certified according to international engineering standards. These include ratings for withstanding different levels of hurricane-strength winds and other criteria (AWEA, 2006). The engineering standards of the General Electric wind turbines proposed for this Project are of the highest level and meet all federal, state, and local codes. In the design phase, state and local laws require that licensed professional engineers review and approve the structural elements of the turbines. Design and construction of the Project will comply with construction standards established by various industry practice groups. State of the art braking systems, pitch controls, sensors, and speed controls on wind turbines have greatly reduced the risk of tower collapse and blade throw. As mentioned in Section 2.6, the wind turbines proposed for the Project will be equipped with two fully independent braking systems that allow the rotor to be brought to a halt under all foreseeable conditions. In addition, the turbines will automatically shut down at wind speeds over manufacturers threshold**.** They will also cease operation if significant vibrations or rotor blade stress is sensed by the turbines' blade monitoring systems. For all of these reasons, the risk of catastrophic tower collapse or blade failure is minimal.

3.10.2.2.3 Stray Voltage

While the concerns surrounding stray voltage are legitimate, it is important to note they are largely preventable with proper electrical installation and grounding practices. The Project’s power collection system will be properly grounded. It will be physically and electrically isolated from all of the buildings in and adjacent to the Project Site. Additionally, the bulk of the wind farm’s electrical collection lines will be located three to four feet below ground, and will use shielded cables with multiple ground points. The above ground lines will adhere to all applicable construction codes and standards. This design eliminates the potential for stray voltage (J. Barrett, pers. comm.).

3.10.2.2.4 Fire

All turbines and electrical equipment will be inspected by the utilities (for grid and system safety) prior to being brought on line. This, along with implementation of built-in safety systems, minimize the chance of fire occurring in the turbines or electrical stations. However, fire at these facilities could result from a lighting strike, short circuit or mechanical failure/malfunction. Any of these occurrences at a turbine would be sensed by the SCADA system and reported to the Project control center. Under these conditions, the turbines would automatically shut down and/or Project maintenance personnel would respond as appropriate.

In the event that a wind turbine catches fire, it is typically allowed to burn itself out while maintenance and fire personnel maintain a safety area around the turbine, and protect against the potential for spot ground fires that might start due to sparks or falling material. Power to the circuit of the Project with the turbine fire is also disconnected. An effective method for extinguishing a turbine fire from the ground does not exist, and the events generally do not last long enough to warrant attempts to extinguish the fire from the air (NYSERDA Power Naturally NY Website). However, since the public typically does not have access to the private land on which the turbines are located, risk to public safety during a fire event would be minimal.

In the unlikely event that a fire ignites in the substation, the circuit breakers would trip in the event of a transformer failure, thus isolating the substation from the transmission system, and allowing the local fire department to extinguish any fire.

Generally, any 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. Construction and maintenance personnel will be trained and will have the equipment to deal with emergency situations that may occur at a wind turbine site (e.g., tower rescue, confined spaces, high voltage, etc.). Consequently, such an incident would generally not expose local emergency service providers or the general public to any public health or safety risk.

3.10.2.2.5 Lightning Strikes

Lightning protection systems were first added to rotor blades in the mid 1990s, and are now a standard component of modern turbines (Korsgaard and Mortensen, 2006). These systems rely on lightning receptors and diverter strips in the blades that provide a path for the lightning strike to follow to the grounded tower. The turbine’s blade monitoring system provides documentation of all critical lightning events. If a problem is detected, the turbine will shut down automatically, or at a minimum, be inspected to assure that damage has not occurred.

3.10.2.2.6 Electrocution

As previously mentioned, the buried electric lines will be placed at least 4 feet deep in agricultural land. This depth, which conforms with NYSA&M guidelines, is below the plow depth of farm equipment. Therefore, agricultural activities are not anticipated to pose any risk of electrocution. Above ground electric lines will be installed complying to all codes and standards to minimize the potential risk.

3.10.2.2.7 Electro-magnetic Fields

EMFs will be generated by the operation of various Project components, including the turbine generator, electrical collection lines and transformers. However, the strength of EMF's produced by all of these components will not be significant at any receptor location. The height of the turbine generator (over 250 feet) above the ground; the location of electrical collection cables underground and primarily along established above ground routes; and the location of substation transformers and other electrical equipment inside a fenced yard, should adequately separate these components from any human receptors.

3.10.3 Proposed Mitigation

3.10.3.1 <u>Construction</u>

Contractors will comply with Occupational Safety and Health Administration (OSHA) regulations, in addition to state worker safety regulations, regarding electricity, structural climbing, and other hazards, during construction of the Project. To minimize safety risks to construction personnel, workers will be required to adhere to a safety compliance program protocol, which will be prepared by EverPower Renewable (or their representative) prior to construction. The safety compliance program will address appropriate health and safety related issues including:

- personal protective equipment such as hardhats, safety glasses, orange vest, and steel-toed boots)
- job safety meetings and attendance requirements
- fall prevention
- construction equipment operation
- maintenance and protection of traffic

- hand and power tool use
- open hole and excavation area safety
- parking
- general first aid
- petroleum and hazardous material storage, use, containment and spill prevention
- posting of health and safety requirements
- visitors to the job site
- local emergency resources and contact information
- incident reporting requirements

As mentioned in Section 3.8, a construction routing plan will be developed to assure that construction vehicles avoid areas where public safety could be a concern (schools, clusters of homes, etc.). To minimize safety risks to the general public, over-sized vehicles will be accompanied by an escort vehicle and/or flagman to assure safe passage of vehicles on public roads. Because construction activity will occur on private land, the general public should not be on the construction site. After hours, vehicular access to such sites may be blocked by parked equipment, and temporary construction fencing or other visible barriers will be placed around excavations that remain open during off hours. In addition, material safety data sheets (MSDS) for potentially hazardous construction materials will be provided to local fire and emergency service personnel. The contractor will also coordinate with these entities (including but not necessarily limited to local fire departments, ambulance squads, and county emergency management services office) to assure that they are aware of where various construction activities are occurring, and avoid potential conflicts between construction activity and the provision of emergency services (e.g., road blockages, etc.).

3.10.3.2 Operation

3.10.3.2.1 Ice Shedding

As stated previously, compliance with required set-backs and measures to control public access (gates, warning signs, etc.) should minimize any public safety risk associated with ice shedding. Howard Wind will also meet with local landowners and snowmobile clubs to explain the risks of ice shedding and proper safety precautions. Relocation of designated snowmobile trails that occur within 200 feet of a proposed turbine (if any) will be undertaken by the Owner in coordination with the local snowmobile clubs and affected landowners. Additionally, icing of the sensors on the wind turbines will result in automatic turbine shut-down.

3.10.3.2.2 Tower Collapse/Blade Throw

In regard to tower or blade failure, a fall zone set-back from roads and property lines equivalent to the maximum turbine height (i.e., base of tower to tip blade), plus a safety factor is generally considered adequate for public safety purposes. In those rare instances where towers or blades have failed, the failure typically results in components crumpling or falling straight down to the ground. It would be very unusual for the tower to break off at the base and fall over. However, the fall zone set-backs from roads, utility lines, and property lines allow for such an event. The minimum 400 foot setbacks adhered to by EverPower should assure that even a "worst case" tower failure would not endanger adjacent properties, roadways or utilities. Members of the public do not typically have access to the private lands on which the turbines are located, and as stated above, gates, signage, and public education/outreach efforts will be used to discourage unauthorized access. These actions should further reduce any risk due to a turbine collapse or blade throw.

3.10.3.2.3 Stray Voltage

Stray voltage will be prevented through proper design and grounding of the Project's electrical system. Any reported stray voltage problems will be addressed through the Project's Complaint Resolution Procedure.

3.10.3.2.4 Fire

An employee safety manual will be incorporated into the overall operating and maintenance policies and procedures for the Project. Included in that manual will be specific requirements for a fire prevention program. In addition, a Fire Protection and Emergency Response Plan will be developed in consultation with the fire department(s) that have jurisdiction over the proposed wind power Project Site. This plan will include the following components:

- Training of all operating personnel and procedures review in conjunction with local fire and safety officials.
- Regular inspection of transformer oil condition at each wind turbine step-up transformer.
- Regular inspection of all substation components.
- Regular inspection of fire extinguishers at all facility locations where they are installed.
- All Project vehicles will be equipped with fire fighting equipment (fire extinguishers and shovels) as well as communications equipment for contacting the appropriate emergency response teams.

- The MSDS for all hazardous materials on the Project site will be on file in the construction trailers (during construction) and the O&M building (during operation), and provided to local fire departments and emergency service providers.
- The facility Safety Coordinator shall notify the local fire department of any situation or incident where there is any question about fire safety, and will invite an officer of the fire department to visit the workplace and answer any questions to help implement a safe operating plan.

Development and implementation of this plan will assure that Project construction and operation will not have a significant adverse impact on public safety, or the personnel and equipment of local emergency service providers.

3.10.3.2.5 Lightning Strikes

Beyond the turbines' lightning protection system, and the fire/emergency response plan described previously, no additional measures to mitigate the effects of lightning strikes are proposed.

3.10.3.2.6 Electrocution

Howard Wind has committed to burying all electric lines a minimum of 3 feet (4 feet in agricultural lands). All above ground lines will be carried on existing NYSEG or Steuben Electric Cooperatives' poles, in strict accordance with all relevant regulations. Beyond these activities, no additional measures to mitigate the potential for electrocution are proposed.

3.10.3.2.7 Electro-magnetic Fields

Because no significant impacts from EMF are expected, no mitigation is required. However, to reduce the potential effects of EMF from the Project to the maximum extent practicable, EverPower will voluntarily adhere to the electric field strength interim standards established in the New York State PSC's Opinion No. 78-13, and the magnetic field strength interim standards established in the PSC's Interim Policy Statement on Magnetic Fields, issued September 11, 1990. Opinion No. 78-13 established an electric field strength interim standard of 1.6 kV/m for Article VII electric transmission lines, at the edge of the right-of-way, one meter above ground level, with the line at the rated voltage. The Interim Policy establishes a magnetic field strength interim standard of 200 mG, measured at one meter above grade, at the edge of the right-of-way, at the point of lowest conductor sag. The measurement is based on the expected circuit phase currents being equal to the winter-normal conductor rating.

3.11 COMMUNITY FACILITIES AND SERVICES

Community facilities for the Project Site include public utilities, police and fire protection services, emergency medical services (EMS), education facilities, and recreational facilities. The level of services provided to the Project Site was determined through telephone communications with state, county, town, and school district personnel, including the New York State Police Department, Steuben County Sheriff's Department, Steuben County Emergency Services Coordinator, local volunteer fire department, and administrative personnel at the Hornell City and Canisteo-Greenwood Central School Districts. In addition, as a component of their socioeconomic study, Saratoga Associates also evaluated community facilities and services (Appendix O).

3.11.1 Existing Conditions

Public Utilities and Infrastructure

Public utilities and infrastructure in the Project Site include various overhead and underground facilities. Aboveground components include electric distribution and telephone lines along most of the public roads within the Project Site. Cable television lines and communications towers also occur in and around the Project Site. Underground utilities include telephone and cable television lines, and natural gas transmission lines.

In addition, there are two known natural gas wells and associated buried natural gas distribution and transmission lines within the Project Site (mapped by the NYSDEC Division of Mineral, Oil Resources, and Gas) (Figure 10). It is assumed that these gas wells are located within easements on private land. According to the NYSDEC GIS attribute data, both wells are owned/operated by G.W. Gas & Oil.

Police Protection

The New York State Police and the Steuben County Sheriff's department have jurisdiction over the Project Site. Both departments provide 24-hour coverage seven days per week. Steuben County has a 911 emergency center that dispatches all police, emergency and fire calls. The Steuben County Sheriff's department primary station is located at 7007 Rumsey Street Extension in Bath, with approximately 19 Road Patrol Deputies. There are between two and seven patrol cars per shift, which varies per week, for the entire county (Tweddell, pers. comm.).

New York State Police (Trooper Division E) provides concurrent police service to the Project Site and operates out of the primary station located in Bath, as well as from their satellite station located in Canisteo. The Bath station has 18 troopers, five investigators, three sergeants, and a captain with approximately eight patrol cars. Emergency calls are dispatched by the Steuben County 911 center (Cleveland, pers. comm.).

Fire Protection and Emergency Response

The Howard Volunteer Fire Department provides fire protection services to the Project Site. The Avoca Ambulance Corps, Canisteo Ambulance Service, and Fremont Ambulance Corps. provide emergency ambulance services to the Project Site (Karr, pers. comm.). Fire and emergency response services are provided 24 hours per day, seven days per week, and the volunteers are dispatched through county 911 emergency centers. The Howard Volunteer Fire Department is located on County Route 70A in the Town of Howard. The department has approximately 20 active volunteer firefighters and responds to approximately 20 fire-related calls and approximately 100 emergency calls annually. The equipment at the station includes two pumper trucks with 1,000 gallon water tanks and a pumping capacity of 1,250 gpm and 1,000 gpm respectively, two tankers with pumping capacities of 2,300 gpm and 4,000 gpm, a small brush truck, and a squad truck with EMS supplies (Patrick, pers. comm.).

Avoca Ambulance Corps provides emergency ambulance service to approximately one-third of Howard in the eastern section of the town. This ambulance corp is located at the Avoca Hose Company No. 1 Firehouse on Chase Street in the Village of Avoca. There are 25 active volunteers, of which eight are emergency medical technicians (EMT's), eight are drivers, and nine are attendees. There are two ambulances equipped for basic life support services. The ambulance corp responds to approximately 12 emergency calls in the Town of Howard annually (Eaton, pers. comm.). The Fremont Ambulance Corps provides emergency ambulance service to approximately one-tenth of Howard in the western portion of the town. This ambulance corps is located on State Route 21 in the Town of Fremont. There are approximately three EMT's and eight drivers with one ambulance equipped for basic life support services. In addition, the Canisteo Ambulance Corps provides emergency ambulance service to the Town of Howard. However, the extent of this service, including town coverage and available personnel/equipment, provided by this ambulance corps is currently unknown at this time.

Health Care Facilities

There are three hospitals in Steuben County that provide health care services to the residents and visitors of the county. Guthrie Corning Hospital on Denison Parkway East in Corning is located approximately 25 miles from the Project Site. The hospital is an affiliate with the Guthrie Health Care System, which is a regional health care system of hospitals, nursing homes and home-care-service providers, serving the Southern Tier of New York and northern Pennsylvania. Guthrie

Corning provides primary care, general acute-care, and specialty services to residents of and visitors to Steuben County, primarily in the Corning-Elmira metropolitan area. There are approximately 123 physicians on staff who provide a full compliment of medical and surgical services such as surgery, ambulatory surgery, emergency medicine, family medicine, internal medicine, coronary care, obstetrics/gynecology, psychology, psychiatric medicine, and pediatric medicine. The hospital provides 99 beds for the following patient needs: intensive care (eight beds), maternity (eight beds), medical-surgical (78 beds), and pediatric (five beds) (www.hospitals.nyhealth.gov; www.corninghospital.com).

The Ira Davenport Memorial Hospital located on State Route 54 in Bath is approximately 11 miles from the Project Site. This is a 66-bed acute care hospital that provides a wide range of services to the community. There are approximately 70 physicians on staff who provide medical services including surgical care, cardiac rehabilitation, physical therapy, primary care, respiratory therapy, and pediatric care. The hospital is affiliated with the Fred & Harriett Taylor Health Center, which is a 120-bed skilled residential nursing facility. This center provides rehabilitation services, adult day health care, physical therapy, and hospice care (www.davenportandtaylor.org; www.hospitals.nyhealth.gov).

Saint James Mercy Hospital is located on Canisteo Street in Hornell and is approximately 4 miles from the Project Site. This hospital is an affiliate of the Catholic Health east health care system. St. James Mercy Hospital provides primary care, general acute-care, and specialty services primarily to residents and visitors of the northwestern portion of the county. There are approximately 48 physicians on staff who provide medical services such as psychiatric care, surgical care, cardiac rehabilitation, primary care, and obstetrics/gynecology. There are 157 beds for the following patient needs: coronary care (seven beds), intensive care (seven beds), maternity (ten beds), medical-surgical (85 beds), pediatric (ten beds), and psychiatric/mental (38 beds) (www.hospitals.nyhealth.gov; www.Stjamesmercy.org).

Educational Facilities

There are two public school districts that provide educational services to residents who live within and adjacent to the Project Site. However, none of the public schools are located within the Project Site. The Canisteo-Greenwood Central School District has three schools that provide education to a 1,050-student population. The Canisteo Elementary School is located at 120 Greenwood Street in the Village of Canisteo, Greenwood Elementary/Middle School is located on Main Street in the Town of Greenwood, and the Canisteo-Greenwood Junior/Senior High School is located at 84 Greenwood Street in the Village of Canisteo. The Hornell City School District has four schools. The Bryant

School (185, K-2 student population) is located at 173 Terry Street in the City of Hornell, North Hornell School (241, K-2 student population) located on Avondale Ave in the Village of North Hornell, Hornell Intermediate School (527, 3-6 student population) located at 71 Buffalo Street in the City of Hornell, and the Hornell Senior High School (933, 7-12 student population) located at 134 Seneca Street also in the City of Hornell.

Solid Waste Disposal

Steuben County has one municipal landfill and three transfer stations. The Bath Landfill is located on Turnpike Road and accepts residential, commercial, industrial, and construction and demolition waste. The transfer stations include the Erwin Transfer Station located south of Gang Mills on State Route 471; the Hornell Transfer Station located on County Route 64 off of State Route 21; and the Wayland Transfer Station located on Deiter Road off of State Route 63. According to Steve Orcutt (Assistant Commissioner of Solid Waste and Recycling), Steuben County has a county-wide solid waste management plan, which expires in 2010. The basic premise of this plan is to recycle as much as possible, and bring all remaining waste to one of the designated facilities. In the case of the Howard Project, waste will likely be transported directly to the Bath landfill (Orcutt, pers. comm.).

Parks and Recreation

Popular recreational activities within the vicinity of the Project Site likely include hunting, fishing, snowmobiling, bicycling and hiking. Portions of state designated recreational resources located within 10 miles of the Project Area include Burt Hill State Forest, Canacadea State Forest, Cameron State Forest, West Cameron Wildlife Management Area (WMA), Cameron Mills State Forest, Rock Creek State Forest, Turkey Ridge State Forest, and Bully Hill State Forest. Municipal parks and open space include the village square and Mossy Bank Park in Bath, and athletic fields and playgrounds associated with the Canisteo-Greenwood and Hornell City Central School Districts. Additionally, portions of snowmobile trails maintained by the Bath Snowflakes and the Allegany County Federation of Snowmobilers occur within the vicinity of the Project Site (approximately 3 miles from the nearest proposed turbine).

In addition, two recreational resources occur within the Project Site. The Site overlaps Burt Hill State Forest; however, no development is proposed within this state forest. Additionally, the Finger Lakes Trail passes through the Site, connecting the Village of Bath, Burt Hill State Forest, and Bully Hill State Forest (Figure 9). This portion of the Finger Lakes Trail, as well as many other sections in New York State, have been certified by the National Park Service as official components of the 4,600-mile North Country National Scenic Trail.

3.11.2 Potential Impacts

3.11.2.1 <u>Construction</u>

The Project will not result in significant increase in the demand for utilities such as telephone, natural gas, electric, water, sanitary sewer, etc. The Project will have a beneficial impact on utilities by generating between 60 and 80 MW of clean renewable energy that can be used by the people of Steuben County and New York State.

Short term and minor impacts to existing electric distribution facilities may occur during the construction phase of the Project. Steuben Rural Electric Cooperative, Inc. (SREC) manages the local overhead distribution poles and lines. Prior to the development of Project construction drawings, Howard Wind will review the Project layout with SREC representatives in order to determine potential areas of conflict between existing utility lines and construction activities. Howard Wind will then contract a detailed survey (pole locations, line height, etc.) of all lines identified to have potential conflict. If conflicts cannot be avoided through minor shifts in access road alignment or the delivery route, SREC will temporarily raise a line(s), drop a line(s), or relocate a line(s). None of these activities will require new utility easements/right of ways. Existing lines can often be temporarily lifted without service interruption. However, if disruption is necessary, construction will be planned so any service disruption to customers will be minimized, and any work that will require a service disruption will be conducted to avoid times of peak usage. Customers will be given adequate advance notice of the planned service disruption, including the expected time duration.

Linear Project components (i.e., access roads and buried electrical interconnect) have the potential to cross or run parallel to buried gas transmission lines that service the two gas wells in the Project Site. If operating in an inappropriate location, a shovel, backhoe or other heavy equipment has the potential to result in a pipeline rupture and gas leak, which presents an explosion and/or fire hazard. Even a gouge, scrape or minor dent in pipeline infrastructure, no matter how small, could eventually result in a rupture and leak. There is also a chance that a pipeline could be pulled apart at its fittings some distance from where a potential hit may have occurred. In addition, trucks and heavy equipment may damage buried pipelines. Howard Wind has initiated contact wit the owner/operator of buried gas infrastructure to try to determine their exact locations.

The police, fire, and emergency response departments have adequate personnel and equipment to respond to basic emergency needs during the construction and operation of the Project. However, during construction, some roadways may be temporarily blocked. In addition, damage may occur to the roadways anticipated to be used by oversized/heavy equipment, which has the potential to reduce the response time of emergency personnel. This is not anticipated to be a significant problem due to the small number of residents within the Project area, the general availability of alternate access routes, and correspondence and coordination that will occur between construction managers and local police departments. The construction site could also experience vandalism/trespass problems that would require involvement of local police. Based on experience with other wind power projects in New York, this is not anticipated to be a significant impact. To address any emergency access issues that may occur during construction, Howard Wind will work with the appropriate county, town, and/or local personnel to establish an emergency response plan, if necessary, during the construction phase.

Project construction will generate some solid waste, primarily plastic, wood, cardboard and metal packing/packaging materials, construction scrap, and general refuse. This material will be collected from turbine sites and other Project work areas, and disposed of in dumpsters located at the construction staging area(s). A private contractor will empty the dumpsters on an as-needed basis, and dispose of the refuse at a licensed solid waste disposal facility.

During construction, the Project will not adversely impact the local school districts, beyond the possible delay of school bus pick-ups and drop-offs at homes within the Project area due to temporary construction traffic/activity. Temporary construction workers will not create significant demand for school district services or facilities. These workers will also not generate a significant demand on local recreational facilities or other community services/facilities.

3.11.2.2 Operation

The Project will not result in any significant adverse long-term impacts to local utilities and energy resources. Long-term energy use will increase slightly as a result of facility maintenance. However, this impact will be minor because the amount of required electricity and fuel is small, and local fuel suppliers and utilities have sufficient capacity available to serve the Project's needs. As a result, no improvements to the existing energy supply system will be necessary. In addition, the Howard Wind Power Project will generate between 60 and 80 MW of electric power using a renewable resource (wind), and will advance the State's goal of having 25% of the state's power provided by renewable sources by 2013.

No significant public health or safety problems are anticipated to result from Project operation. The wind turbines are located at least 400 feet from property lines, 400 feet from the nearest public road, and 1,000 feet from any nonparticipating neighboring residences. This is well outside of any area that could be affected in the unlikely event of a tower fall or catastrophic blade failure (as discussed in Section 3.10).

Local fire departments do not have the specialized equipment necessary to respond to a fire should one occur in the nacelle of a Project turbine. Generally, any emergency/fire situations at a wind turbine site or substation will be the responsibility of the Project owner/operator and/or the substation owner/operator. Construction and maintenance personnel will be trained and will have the equipment to deal with emergency situations that may occur at the Project site (e.g., tower rescue, working in confined spaces, high voltage, etc.).

The Project is not anticipated to result in a significant increase in the demand on educational facilities. The operating Project is anticipated to require only six full-time employees and the existing educational facilities should have sufficient capacity to accommodate the addition of these families to the area.

3.11.3 Mitigation

The impacts to the local economy, population, and community services resulting from the proposed Project are not of the type or magnitude to require mitigation. In fact, development of the proposed Project will have minimal impact on population, and place little demand on community services, while at the same time providing significant income and tax revenue to the town, county, and school districts. The income anticipated from the proposed Project will more than offset any incurred costs, and will assist with the financing of community services that benefit all residents of the towns and county.

If it is determined that Project components will cross existing buried gas pipelines, Howard Wind and the owners/operators of gas infrastructure will enter into a crossing agreement and Howard Wind will provide proof of insurance. The crossing agreement will require that construction not disrupt the safe operation of the natural gas infrastructure, and will designate construction parameters to ensure safe construction in the vicinity of natural gas pipelines. In addition, certain US Department of Transportation Office of Pipeline Safety Best Practices and Federal and State occupational safety rules will influence engineering design and construction.

To mitigate any potential concerns regarding Project construction, Howard Wind will meet with the local emergency service personnel (fire, police, and EMS) to review and discuss the planned construction process. During this meeting, unique construction equipment, the overall construction process, and schedule/phasing will be addressed. In addition, any hazardous materials that may be present during construction and/or operation will be discussed. Prior to construction, Howard Wind will implement a coordinated emergency response plan, which will be developed through consultation with local emergency response personnel. The volunteer nature of some of the emergency response personnel, along with the distance and response time of some responders, will be taken into account when initially developing the coordinated emergency response plan, and the presence of emergency personnel on-site during construction will be considered.

Ongoing communication between town officials and police, fire, and emergency services officials will help assure adequate levels of protection potentially related to the Project. Howard Wind representatives will meet with fire and police and other emergency responders to develop plans to address potential public safety issues. The Fire Protection and Emergency Response Plan to be prepared for Howard Wind will include the following components:

- Initial and refresher training of all operating personnel (including procedures review) in conjunction with local fire and safety officials.
- Regular inspection of transformer oil condition at each step-up transformer installed at the main substation.
- Regular inspection of all substation components.
- Regular inspection of fire extinguishers at all facility locations where they are installed.
- All Project vehicles will be equipped with fire fighting equipment (fire extinguishers and shovels) as well as communications equipment for contacting the appropriate emergency response teams.
- The MSDS for all hazardous materials on the Project will be on file in the construction trailers (during construction) and the O&M building (during operation).
- The facility Safety Coordinator shall notify the local fire department of any situation or incident where there is any question about fire safety, and will invite an officer of the fire department to visit the workplace and answer any questions to help implement a safe operating plan.

Although not anticipated, to mitigate for potential impacts related to waste disposal (e.g., excessive waste), the Applicant or contractor will coordinate with the Steuben County Department of Public Works prior to Project construction. The type and quantify of waste anticipated as a result of Project construction will be discussed, and appropriate means of disposal agreed upon.

3.12 COMMUNICATION FACILITIES

To evaluate the potential for the Project to impact existing telecommunication signals, Comsearch was contracted to conduct a microwave path analysis, an off-air television reception analysis, a cellular/Personal Communication System (PCS) telephone analysis, and an analysis of AM and FM broadcast station operations, and to notify the National Telecommunications Information Administration (NTIA) (see reports in Appendix P).

3.12.1 Existing Conditions

3.12.1.1 Microwave Analysis

Microwave telecommunication systems are wireless point-to-point links that communicate between two sites (antennas) and require clear line-of-sight conditions between each antenna. Comsearch identified five microwave paths that intersect the Project Site (Figure 11).

3.12.1.2 Off-Air Television Analysis

The television reception analysis identified all off-air television stations within a 100-mile radius of the proposed Project (as measured from the approximate center of the Project Site). Off-air television stations transmit broadcast signals from terrestrially located facilities that can be received directly by a television receiver or house-mounted antenna. The results of the study indicate that there are 249 off-air television stations within 100 miles of the Project Site (see Appendix P). These stations are primarily located in the U.S., but four are located in Canada.

The most likely stations that will produce off air coverage to the Project Site are those within a distance of approximately 40 miles or less. Comsearch concludes that given the service and coverage of the stations identified, there are very few off-air television channels available to residents in the vicinity of the Project. As a result, most residents in the area likely view television programming through the use of cable or a satellite dish.

3.12.1.3 Cellular/PCS Telephone Analysis

The Comsearch analysis determined that there are two cellular telephone operators in Steuben County. Dobson Communications, which operates on Band A, and Verizon, which operates on Band B. In addition, there are six PCS telephone operators with a total of seven bands in the vicinity of the Project, which are listed below in Table 23.

Table 23. PCS Telephone Operators in the Steuben County, NY Area

Operator	Band of Operation
T-Mobile	A
Cingular	A, D, E
Dobson Communications	A
Sprint NEXTEL	B
None	C1
Verizon	C2
Buffalo-Lake Erie Wireless Systems Co.	F

3.12.1.4 AM and FM Broadcast Analysis

The Comsearch analysis determined that there are two AM stations and eight FM stations licensed within approximately 15 miles of the proposed Project. Of the two AM stations, one is of normal transit power and the other is a low power operation. The AM station antennas are located 5.8 and 7.1 miles away from the Project. Of the eight FM stations, one is full-power, two are medium power, three are low power, and two are very low power.

3.12.1.5 NTIA Notification

Comsearch sent a written notification of the proposed Project to the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce on August 22, 2006. Upon receipt of notification, the NTIA provides plans for the proposed Project to the federal agencies represented in the Interdependent Radio Advisory Committee (IRAC), which include the Department of Defense (DOD), Department of Education (DOE), Department of Justice (DOJ), and the Federal Aviation Administration (FAA). The NTIA then identifies any Project-related concerns during a 30-day review period.

3.12.2 Potential Impacts

3.12.2.1 Construction

Temporary communication interference as a result of Project construction may occur. Cranes used during construction activities (and the individual turbine components being raised by the cranes) can cause temporary obstruction of microwave links, as well as some degradation to television and radio signals (L. Polisky, pers. comm.). However, because individual turbines have been sited to avoid interference with microwave paths that cross the Project, the potential for microwave interference by equipment assembling and erecting these turbines is expected to be minimal. Any impact on television or radio reception caused by construction equipment would be temporary, as turbine assembly and erection at each turbine site is typically completed within 1 to 3 days.

3.12.2.2 Operation

3.12.2.2.1 Microwave Communication Systems

To assure an uninterrupted line of communications, a microwave link should be clear, not only along the axis between the center point of each antenna, but also within a mathematical distance around the center axis known as the Fresnel Zone. Comsearch calculated a Worse Case Freznel Zone (WCFZ) for each of the nine microwave paths identified within the Project Site. Digital files of each WCFZ were provided to EDR and analyzed for potential interference that may be caused by the proposed turbines. Based upon the calculated WCFZ and subsequent analysis, it was determined that the Project, as currently proposed, will not interfere with microwave communications (see Appendix P for a graphical depiction of the calculated WCFZ with respect to the proposed turbine locations).

3.12.2.2.2 Television Systems

Comsearch examined the coverage of the identified off-air television stations within a 100 mile radius of the Project Site and the potential for degraded television reception as a result of the Project. The Comsearch report indicated that off-air stations located within 40 miles of the Project Site are most likely to provide serviceable coverage for local residents. Of the 249 stations initially identified, 50 stations are located within the 40-mile range, and only 24 of the 50 stations were licensed and operational at the time of the Comsearch analysis (July 2006). Of the 24 licensed and operational stations, only three are full power and full service stations (Channel 18 [WETMTV] out of Elmira, Channel 36 [WENY-TV] out of Elmira, and Channel 48 [WYDC] out of Corning). The remaining 21 stations are Low-Power Licensed Translator TV stations providing limited coverage and service.

Because off-air coverage to this area includes just three full service stations and 21 low power, limited coverage translator stations, it appears that the off-air television stations are not the primary mode of delivering television service to the local communities. Given these existing conditions, the Project is not likely to result in significant impacts to television service in the area. However, because some level of off-air coverage is provided to the area, impacts to existing television reception for some residents as a result of the Project are possible. Specifically, the loss of one or more of these stations to residents who rely only on off-air reception for television programming would likely represent a significant impact. These impacts would most likely include noise generation at low VHF channels within 0.5 mile of turbines, reduced picture quality (ghosting, shimmering), and signal interruption (NWCC, 2005).

3.12.2.2.3 Cellular/PCS Systems

Telephone mobile communications in the cellular and PCS frequency bands will not be significantly affected by the presence of the wind turbines. This is because the blockage caused by wind turbines is not destructive to the propagation of signals in these frequency bands. In addition, these systems are designed so that if the signal from (or to) a mobile unit cannot reach one cell, it will be able to reach one or more other cells in the network. Therefore, local obstacles are not normally a problem for these systems, whether they are installed in urban areas near large structures and buildings, or in a rural area near a wind energy facility.

3.12.2.2.4 AM and FM Broadcast

Generally, the FM broadcast audio signal is not noticeably affected by wind turbines because the signal modulation is frequency modulated (FM) and the wind turbines have the affect of varying the amplitude of the signal, which will produce distortion to an amplitude modulated (AM) signal but not to a FM signal. Also, changes to audio coverage or distortion are not readily apparent to a listener when factored together with other causes of degradation such as being out of range of the station or signal fades. Since the FM Station antennas are located greater than 4.4 miles from the Project area, impacts to the coverage of these stations will be essentially non-existent. Additionally, AM Station antennas are at least 5.8 miles from the Project turbines, therefore no degradation of the AM broadcast coverage is anticipated to occur.

3.12.2.2.5 NTIA Notification

In a letter sent to Comsearch (dated September 23, 2006), the NTIA stated that they did not identify any concerns related to signal blockage following their 30-day review. Therefore, impacts to the IRAC radio frequency transmissions are not anticipated.

3.12.3 Proposed Mitigation

3.12.3.1 <u>Construction</u>

If disruptions to existing communication systems occur as a result of Project construction, they will be temporary, and will only occur during the erection of a limited number of turbines. Because turbine installation/crane activity will occur at different locations and at different times during the construction period, any degradation/disruption to existing communications will not represent a constant interference to a given television/radio reception area or microwave signal (L. Polisky, pers. comm.). In addition, turbine erection will be performed as efficiently as possible (under favorable conditions, one turbine can be erected in one day). Therefore, mitigation is not warranted.

3.12.3.2 <u>Operation</u>

3.12.3.2.1 Microwave Communication Systems

The Project, as currently proposed, will not impact existing microwave communications. If future turbine layout revisions are necessary, the new layout will be designed so as not to interfere with existing microwave paths. Beyond this, additional mitigation is not necessary and is therefore not proposed.

3.12.3.2.2 Television Systems

Although the Comsearch report indicates that impacts to existing off-air television coverage are possible, impacts/interference are not anticipated because very few television signals reach the area with enough strength to provide a clear picture with good audio. However, if Project operation results in any impacts to existing off-air television coverage, the developer/operator will address and resolve each individual problem as necessary. Mitigation actions could include adjusting existing receiving antennas, upgrading an antenna, or providing cable or satellite systems to the affected households. In addition, the FCC's mandate to transition all off-air television broadcasts from analog signals to digital signals by February 2009 will eliminate any turbine-related contrast variation (shimmering), thus reducing the potential for television signal interference from wind turbines (L. Polisky, pers. comm.).

3.12.3.2.3 Cellular/PCS Systems

If a cellular or PCS company were to claim that their coverage were compromised by the presence of the proposed Project, coverage could be restored by installing an additional cell or an additional sector antenna on an existing cell for the affected area. Utility, meteorology, and/or the turbine towers within the Project Site could serve as the structure platforms for the additional cellular or PCS base station or sector antennas.

3.12.3.2.4 AM and FM Broadcast

Due to its geographic location relative to existing AM and FM broadcast stations, the Project will not impact AM/FM coverage. Any future Project revisions (if any) would occur within or immediately adjacent to the current Project area. Therefore, mitigation is not warranted.

3.13 LAND USE AND ZONING

Land use and zoning in the Project Site was determined through review of local town codes, tax parcel maps, aerial photographs, and field review conducted during 2006. Land use and zoning are discussed in terms of regional land use patterns, on-site classifications, agricultural districts, and future land use.

3.13.1 Existing Conditions

3.13.1.1 Regional Land Use Patterns

The proposed wind farm is located in the Town of Howard, in central Steuben County. Steuben County is located in the Finger Lakes Region of western New York, and contains portions of Keuka Lake. Steuben County is bordered by Pennsylvania to the south, Allegany County to the west, Chemung and Schuyler Counties to the east, and Livingston, Ontario and Yates Counties to the north.

The region is characterized by dissected plateaus/ridges, with active and reverting agricultural land and small woodlots occurring on the ridge tops, and forestland on the ridge slopes and in the narrow valleys. Broad valleys are associated with the larger watersheds of the Cohocton, Canisteo, and Tioga Rivers. These valleys contain active agricultural land and wetlands, along with major transportation corridors and many of the larger villages and cities in the area.

The county is characterized by a large agricultural base that includes dairy farms, croplands, vineyards, commercial and farm wineries, and apple orchards. Residential land use is concentrated in and around cities, villages, and small hamlets, but occurs throughout the region along the network of state, county, and local roads. Pockets of commercial and industrial development are also scattered along the major transportation corridors. The majority of the population, as well as most commercial and industrial land uses, are located in and around the cities of Corning, Bath, and Hornell. Over the past few decades there has been a significant loss of farmland to new commercial and residential development. Most of this loss has occurred near larger villages and cities such as Corning and Hornell. The largest state recreational lands in the county are Erwin State Wildlife Management Area, Pinnacle State Park, and Stony Brook State Park.

Current land use patterns within the Town of Howard are similar to those of the larger region. The town is predominantly rural, with the majority of land being either active agricultural fields or undeveloped forestland. However, according to the New York State Office of Real Property

Services (NYSORPS), 47% of all parcels of land within the town are designated as residential properties (NYSORPS website). Residential development, consisting of individual single-family homes and farmhouses, is concentrated along state, county, and local highways within and adjacent to the Project Site. The higher-density residential and commercial land uses are primarily located in the Hamlet of Howard and along major roads such as Turnpike Road.

3.13.1.2 Project Site Land Use and Zoning

The Project Site has a rural and low-density character, with active farms, forestland, and single-family rural residences as the dominant land uses. The majority of the upland area consists of open crop fields (primarily hay, corn, potato and oats) and pastures, with forestland dominating the steep slopes that descend into adjacent valleys. The Project area also includes successional old field, hedgerow, successional shrubland, residential yards, farms, streams, and ponds. These land uses are consistent with the previously mentioned regional land use characteristics, and together define the community character within the majority of the Project Site. Existing built features within the Project Site include single-family homes, seasonal homes, communication towers, barns, silos, and other agricultural buildings.

According to the New York State Office of Real Property Services (NYSORPS), the Project Site consists of 4 distinct land use types (Figure 12). The majority of the Project Site (approximately 2115 acres [74%]) is categorized as agricultural, which is described by the NYSORPS as "property used for the production of crops or livestock". Approximately 237 acres (8%) of the Project Site is characterized as residential, which is described as "property used for human habitation." Vacant land, which constitutes approximately 308 acres (11%), is described as "property that is not in use, is in temporary use, or lacks permanent improvement". State Owned forestland, which constitutes approximately 190 acres (7%), is described as "reforested lands, preserves, and private hunting and fishing clubs". Although not located within the defined Project area, public roadways are immediately adjacent and are classified as community services, which are described as “property used to provide services to the general public” (NYSORPS, 2003).

The Town of Howard does not currently have zoning districts or zoning regulations in place (Karr, pers. comm.). However, the Town does have a local law governing Wind Energy Facilities (Local Law No. 1 of 2006). This local law provides the Town of Howard with the authority to approve, approve with conditions, or disapprove wind energy facility applications. A Wind Energy application, if approved, allows for the construction, maintenance, and operation of a Wind Energy Facility.

Table 24 summarizes the requirements and approvals necessary to permit a wind-powered electric generating facility in the Town of Howard.

Table 24. Wind Energy Facility Requirements and Approvals for the Town of Howard.

Requirements	Approvals
• Wind energy facilities are allowed, pursuant to the approval of a wind energy facility application by the Town Board. • Guidelines, regulations, and requirements for wind energy facilities include: - Setback from adjacent property lines and any pre-existing structures by a distance at least equal to its fall zone plus an additional 50% of said fall zone - Setback of 400 feet from adjacent road centerlines - Setback of 400 feet from front, side and rear lots, unless the Town Board waives requirement due to written consent from the adjacent property owner and a Board decision that the waiver is reasonable, safe and practicable - Setback of 1,000 feet from any residential structure, unless the Town Board waives requirement due to written consent from the adjacent property owner - Setback of 500 feet from any structure, unless the Town Board waives requirement due to written consent from the adjacent property owner - Screening of accessory structures from adjacent residences - Landscaping to keep site neat and orderly - Wind energy-deriving towers shall not be artificially lit except to assure human safety as required by the Federal Aviation Administration (FAA) - No wind energy facility shall be permitted if any wind turbine lacks an automatic breaking, governing, or feather system to prevent uncontrolled rotation, over speeding and excessive pressure on the tower structure, rotor blades, and turbine components. - No climbing device of any kind shall be attached to the wind turbine closer than fifteen feet from the ground - The minimum distance between the ground and any part of the rotor blade should be thirty feet	• Approval of an application for a Wind Energy Facility by the Town Board

3.13.1.3 Agricultural Land

The 2002 Census of Agriculture reported that 1,501 working farms occupied 373,294 acres in Steuben County, or 41.9% of the land in the county. Of that total, 177,644 acres were classified as harvested cropland and 63,388 acres as pastureland (USDA NASS website). According to the U.S. Census Bureau, in 2000, 1.4% of the Steuben County population (603 residents) listed farming, fishing or forestry as their occupation. In addition, 5.2% of residents within the Town of Howard (35 residents) indicated farming, fishing or forestry as their primary occupation (U.S. Census Bureau website). The Steuben County Agricultural Expansion and Development Plan states that there has been a significant decrease in the amount of farmland in the county, with an average decrease of 7.8 acres per day from 1992 to 1997 (SCAFPB, 2001). This plan stresses the importance of agriculture to the county economy, rural character, and environment and outlines goals and objectives for agricultural development and farmland protection.

Steuben County has a total of 23 designated agricultural districts. Portions of two districts, Districts 1 and 7, occur within the Project Site (Figure 13). Approximately 47% of the Project Site is located within these districts. Agricultural land use is a significant component of the Project Site with approximately 1,040 acres of the 2,850-acre area (36.5%) in row crops, field crops, or pastureland.

3.13.1.4 Future Land Use

Future land use patterns in Steuben County are anticipated to remain largely unchanged for the foreseeable future. Current land use patterns in the Town of Howard are also expected to remain largely unchanged, with an emphasis on agricultural, recreational, and forestry uses. However, if farms are sold and agricultural land continues to go out of production, land use within the Project Site is anticipated to undergo some degree of change. As indicated in Steuben County's Agricultural Expansion and Development Plan, farming helps to control urban/suburban sprawl by steering development towards hamlets and villages, and farms preserve the rural character and open space that are essential to the quality of life of permanent residents (SCAFPB, 2001).

With repsect to adjacent townships, according to the Steuben County Planning Department website, the Towns of Hornellsville, Fremont, Cohocton, Avoca, and Bath have a completed Comprehensive Plan (http://www.steubencony.org/planning/compplans.html). However, according to correspondence with town personnel, it was determined that the Town of Avoca and the Town of Fremont do not have Comprehensive Plans (Jackson, pers. corr.; Kilbury, pers. corr.). Personnel from the Town of Hornellsville were attempting to locate a copy of the Town's Comprehensive Plan.

However, as of the release of this DEIS, Howard Wind has not received a copy of this plan. In addition, the Comprehensive Plan for the Town of Bath was developed in 1967, and according to the Town Clerk, the town is currently working on updating their Comprehensive Plan (Burns, pers. comm.). Therefore, only information from the Town of Cohocton is presented.

The "Land Use Plan" section of the Cohocton Comprehensive Plan includes the following objectives:

- Maintain the Town's rural-agricultural character,
- Discourage unplanned roadside "strip" residential development,
- Encourage the retention of large areas of agriculture in their natural state as a legacy to future generations.

3.13.2 Potential Impacts

The Project will be compatible with the agricultural land use that dominates the Project Site. However, there will be temporary, construction-related impacts, as well as permanent impacts (operation related) to land uses within the Project Site and the larger community. Anticipated land use and zoning impacts are described below.

3.13.2.1 Construction

Construction-related disturbance to agricultural lands, as categorized by NYSORPS, will total approximately 150.5 acres. Along with this direct impact to agricultural land, movement of equipment and material could result in damage to growing crops, damage to fences and gates, damage to subsurface drainage systems (tile lines), and temporary blockage of farmers' access to agricultural fields. However, wind turbines and associated facilities have been located so as to minimize loss of active agricultural land and interference with agricultural operations, and construction activities will be in accordance with the NYSA&M agricultural protection guidelines included in Appendix E.

In addition, construction will result in the temporary disturbance of approximately six acres of land categorized as residential, and 11 acres of land categorized as vacant. Impacts to residential land are confined to the properties of participating landowners. No impacts to land categorized as state-owned forestland are anticipated. Additionally, buried electrical interconnects will be placed within local roads adjacent to the Project area, which will disturb approximately eight acres of lands classified as community services.

Construction activities could have a similar temporary impact on forest management/timber harvest activities. Movement of equipment and materials could temporarily block or damage forest access roads. Timber harvest activities may also need to be curtailed/rescheduled in certain areas to avoid interfering with Project construction. It is anticipated that any marketable timber that results from forest clearing activities will be salvaged and stockpiled for use/removal by the landowner. Construction impacts to forestland have also been minimized by siting turbines in previously disturbed areas and using the existing network of forest roads to accommodate proposed access road and interconnect routes to the extent practicable. Because Howard Wind has worked closely with landowners to design the Project footprint, improvements to existing roads to accommodate construction activity are expected to ultimately enhance access to these properties for future forest management activities.

3.13.2.2 Operation

The Project as proposed is consistent with the existing Wind Energy Facilities law and land use patterns within the Town of Howard. The Project will occur entirely on private land in areas dominated by active and reverting agricultural land and managed/disturbed forestland. Project components will be sited in accordance with local setback requirements and no public lands or recreational facilities will be impacted. Therefore, impacts to residential, commercial, and recreational land use will be minimized. Goals set forth by Steuben County's Agricultural Expansion and Development Plan strongly encourage the preservation of agricultural land use in the area. The operating Project will be largely compatible with agricultural land use, which is a significant component of the Project Site, and may serve to help keep land within agricultural use, thus furthering these goals. Russell Cary, Supervisor of the Town of Fenner, New York, believes that lease payments from the wind power project in his town are helping to preserve a rural lifestyle and protect family farms from being taken over by large-scale commercial farming operations (R. Cary, Pers. Comm.). In addition, a May 27, 2006 article in The Post Standard discussed the positive effects of the Fenner Wind Farm. In this article, Russ Cary stated "We look at them [the wind turbines] as an agricultural crop…you don't have to water them, you don't' have to feed them and whatever you harvest, you get a percentage" (The Post Standard, 2006).

Only very minor changes in land use within the Project Site are anticipated as a result of Project implementation. The 25 turbine locations, substation, O&M building, and other ancillary facilities represent the cumulative conversion of approximately 26.5 acres of land from its current use. Of these 26.5 acres, approximately 25 acres are categorized as agricultural by the NYSORPS, 0.50 acres are categorized as residential, and 1 acre is categorized as vacant.

During Project operation, additional impacts on land use should be infrequent and minimal. Other than occasional maintenance and repair activities that could have impacts similar to those described in Section 2.5 (Project Construction), the Project should not interfere with on-going land use (e.g., farming activities). As mentioned, by supplementing the income of participating farmers, the Project will help keep farms in operation and the land in agricultural use. The presence of wind turbines may also limit or prevent the conversion of agricultural land to seasonal or permanent residential use.

However, based on EDR's experience with existing wind power projects (e.g., Madison, Fenner, and Maple Ridge), the Project may result in a perceived change in land use in many areas of the town. As discussed in Section 3.5, the visibility and visual impact of the wind turbines will be highly variable based upon distance, weather conditions, sun angle, the extent of visual screening, viewer sensitivity and/or existing land uses. However, the remote/rural character of the area may be impacted in those locations where a significant number of the proposed turbines can be seen, or where the turbines can be viewed from foreground distances (i.e., under 0.5 mile).

In addition, as indicated in the VIA included as Appendix J, the landscape surrounding this Project will retain its open space character and overall spatial organization once the Project is in place. Although there are some intrusions to the vertical and overhead planes in the landscape within the Project Site, the surrounding landscape retains much of its integrity because the open sky, topography, and existing patterns of land use will remain dominant. However, the Howard Wind Power Project will introduce new elements (i.e., wind turbines) into the existing landscape, which could be considered a change in community character. It is worth noting however, that the introduction of these new elements will, in fact, help maintain the existing community character by helping area farms remain in business, and slowing the trend of farm abandonment and conversion to successional vegetation and residential development.

It is also worth noting that community character evolves over time, and wind power can now be considered an integral (if not essential) part of the evolving agrarian landscape. This evolution is evident along portions of U.S. Route 20 (a designated scenic byway) in Madison County, where the presence of two wind power projects within approximately 5 miles of Route 20 have helped to maintain the agrarian community character. As indicated in The U.S. Route 20 Byway Strategy (Saratoga Associates, 2004), "The farming community is a critical part of why the Route 20 Byway is what it is today. These family-owned businesses provide the backdrop and frame the scenic and cultural beauty that the Route 20 Byway has to offer. These independently owned and operated establishments are important contributors to the economic vitality of the communities that define the Route 20 Byway. Programs and initiatives that support the successful operation of these businesses should be a fundamental objective of the Route 20 Byway." Therefore, by dissuading the trend of farm abandonment (and subsequent conversion of the landscape), wind power projects, such as the proposed Howard Wind Power Project, contribute to the economic vitality that helps define an agricultural-dominated community character.

3.13.3 Proposed Mitigation

The Project is compatible with the agricultural land use that dominates the Project Site. However, the Project will impact agricultural activities (at least temporarily) and will result in a change to community character and perceived land use throughout the area.

To minimize and/or mitigate impacts to active agricultural land and farming operations, Project siting and construction will fully comply with NYSA&M agricultural protection guidelines (see Appendix E). These mitigation measures include:

- Limiting permanent road widths to a maximum of 16 feet or less, and where possible, following hedgerows and field edges to minimize loss of agricultural land.
- Having roads that must cross agricultural fields stay on ridge tops and other high ground to minimize cut and fill as well as potential drainage problems.
- Avoiding disturbance of surface and subsurface drainage features (ditches, diversions, tile lines, etc).
- Prohibiting vehicular access to turbine sites until topsoil has been stripped and permanent access roads have been constructed.
- Limiting vehicular access to construction roads only.
- Prohibiting stripping of topsoil or passage of cranes across agricultural fields during saturated conditions when such actions would damage agricultural soils.
- Avoiding blocking of surface water drainage due to road or installation or stockpiled topsoil.
- Maintaining access roads throughout construction so as to allow continued use/crossing by farmers and farm machinery.
- Temporarily fencing/securing around open excavation areas in active pastureland to protect livestock.
- Disposing of excess concrete offsite (unless otherwise approved by the environmental monitor and the landowner). Under no circumstances shall excess concrete be buried or left on the surface in active agricultural areas.

- Washing of concrete trucks, if necessary, outside of active agricultural areas in locations approved by the environmental monitor.
- Restricting crane set-up, erection, and breakdown activities to designated access roads and work pads at the turbine sites.
- Stabilizing restored agricultural areas with seed and/or mulch.
- Removing and disposing of all construction debris offsite at the completion of restoration.
- Compensation for damaged/lost crops.

Beyond reducing impacts to agricultural land, other mitigation measures that will be undertaken to reduce the impact of the Project on land uses are listed below. These include:

- Locating all electrical collection (interconnect) lines underground or, where following existing public roads, locating all interconnect lines underground or within an existing ROW when aboveground.
- Lighting towers only to the extent necessary to comply with FAA requirements. An application has been submitted to the FAA for approval, and the FAA has conducted an Aeronautical Study for each turbine location, which is included in Appendix Q. These studies indicated that only 10 of the proposed 25 turbines will require lighting in accordance with FAA guidelines. Lighting for the substation and other ground level facilities will be kept to a minimum and generally operated by switch or motion detector.
- Not affixing television, radio or other communication antennas or advertising signs (other than the turbine manufacturers logo) to the towers or any other Project structures.
- Utilizing tubular towers and finishing structures painted with a single, non-reflective matte finish color.
- Avoiding use of guy wires on permanent meteorology towers.
- Installing turbines in locations where proximity to existing fixed broadcast, retransmission, or reception antenna for radio, television, or wireless phone or other personal communications systems, will minimize potential electromagnetic interference with signal transmission or reception.
- Designing all Project components in a way that minimizes the impacts of land clearing and the loss of open space.
- Locating Project components so as to minimize impacts on state and federal jurisdictional wetlands.
- Managing storm water run-off and erosion control in a manner consistent with all applicable state and federal laws and regulations.

- Removing all solid waste, hazardous materials and construction debris from the site and managing its disposal in a manner consistent with all appropriate rules and regulations.

These actions will assure that adverse impacts on land use and zoning are minimized or mitigated to the extent practicable.

4.0 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project will result in significant long-term economic benefit to participating landowners as well as to the Town of Howard, the local school districts, and Steuben County. When fully operational, the Project will provide up to 62 MW of electric power generation without consuming water and without emitting pollutants or greenhouse gases into the atmosphere. The development of the site is consistent with surrounding land uses and will help maintain the area in agricultural use.

Despite the positive effects anticipated as a result of the Project, its construction and operation will necessarily result in certain unavoidable adverse impacts to the environment. The majority of the adverse environmental impacts associated with the Project will be temporary, and will result from construction activities. Site preparation (e.g., clearing, grading), improvement of local roads, and the installation of access roads, turbines, interconnects, staging areas, the O&M building, meteorological towers, and the substation will have short-term and localized adverse impacts on the soil, water, agricultural, and ecological resources of the site. This construction will also have short-term impacts on the local transportation system, air quality, and noise levels. These impacts will largely result from the movement and operation of construction equipment and vehicles, which will occur during the anticipated 6-month installation of the Project. The level of impact to each of these resources has been described in Section 3.0 of the DEIS, and will generally be localized and/or of short duration.

Long-term unavoidable impacts associated with operation and maintenance of the Project include turbine visibility from many locations within the Town of Howard (and adjacent townships during favorable weather conditions). The presence of the turbines will result in a change in perceived land use from some viewpoints, and the turbines will contrast with the landscape (to varying degrees) where visible. The Project also may function to keep land within the Project Site in agricultural use, thus protecting open space and existing land use patterns. Project development will also result in an increased level of sound at some receptor locations (residences) within the study area, a relatively minor loss of agricultural and forest land, wildlife habitat changes, and some level of avian and bat mortality associated with bird/bat collisions. As described in Section 3.0, these impacts are not considered significant.

Although adverse environmental impacts will occur, they will be minimized through the use of various general and site-specific avoidance and mitigation measures. With the implementation of these mitigation measures, the Project is expected to result in positive, long-term overall impacts that will offset the adverse effects that cannot otherwise be avoided.

The following subsections summarize general mitigation and avoidance measures that have been incorporated into the Project design, and specific mitigation and avoidance measures proposed to minimize adverse impacts to specific resources.

4.1 GENERAL AVOIDANCE AND MITIGATION MEASURES

General mitigation measures include compliance with the conditions of various state and federal regulations that govern Project development, as well as the inherent characteristics of the Project. The primary government review/approval processes that apply to the Project include:

- State Environmental Quality Review Act (SEQRA).
- New York State Department of Transportation (NYSDOT) and Steuben County Department of Public Works (DPW) highway regulations.
- Federal Clean Water Act regulations (Section 404 permit).
- NYSDEC water resources regulations (Section 401 water quality certification).
- Town of Howard Wind Energy Facilities law.
- NYSDEC SPDES regulations (stormwater management).
- NYS Agricultural Districts law.
- Occupational Safety and Health Administration (OSHA) regulations (standard conditions for safe work practices during construction).

SEQRA regulations require public input into the environmental review of proposed development projects so that potential adverse impacts can be identified prior to Project implementation and avoided or mitigated to the greatest extent practicable. This DEIS was prepared in accordance with these regulations, and provides a primary means by which the potential costs and benefits of the Project are described and weighed in a public forum. Compliance with SEQRA regulations will assure that public and agency comments are solicited and appropriately addressed, Project alternatives are evaluated, and potential adverse impacts are identified and mitigated to the greatest extent practicable. Response to comments and preparation of a Final Environmental Impact Statement (FEIS) will provide the information necessary for the lead agency and other involved agencies to draw conclusions (Findings Statement) regarding the Project's overall environmental impacts, and impose conditions on SEQRA approval, if necessary.

Compliance with the other various federal, state, and local regulations governing the construction and design of the proposed Project also will serve to minimize adverse impacts. Construction activities and Project engineering will be in compliance with state and local building codes and federal OSHA guidelines to protect the safety of workers and the public. Federal and state permitting required by the USACOE and/or the NYSDEC will serve to protect water resources, along with implementation of a state-approved SPDES permit. Highway permitting at the local, county, and state level will assure that safety, congestion, and damage to highways in the area is avoided or minimized. Project design has employed the protective measures and siting criteria required by the Town of Howard Wind Energy Facilities law. The Project's siting criteria, guidelines, and design standards that serve to avoid or minimize adverse environmental impacts include the following:

- Siting the Project away from population centers and areas of high-density residential development.
- Siting turbines in accordance with setback requirements found in the Town of Howard Wind Energy Facilities law, which minimizes various environmental impacts.
- Following NYSA&M Agricultural Protection Guidelines.
- Utilizing existing disturbed areas for stream and wetland crossings whenever possible.
- Siting turbines primarily in open field areas to minimize forest clearing and potential impacts to bats.
- Using existing farm roads for turbine access whenever possible, to minimize impacts to soil, ecological, and agricultural resources.
- Designing any overhead transmission in accordance with Avian Power Line Interaction Committee (APLIC) guidelines to minimize impacts on birds.
- Designing all buried electrical interconnect in a manner that denies any possibility of stray voltage.
- Designing, engineering, and constructing the Project in compliance with various codes and industry standards to assure safety and reliability.
- Limiting turbine lighting to the minimum allowed by the FAA to reduce nighttime visual impacts, and following lighting guidelines to reduce the potential for bird collisions.
- Following construction procedures in accordance with Best Management Practices for sediment and erosion control.
- Installing turbines with appropriate grounding and automatic shutdown/braking capabilities to minimize public safety concerns.

During Project operation, a thorough analysis will be conducted prior to initiating any major repair to assure that any potential environmental impacts are avoided or minimized. At the very minimum, all major repairs (and associated activities) will adhere to the requirements of appropriate governing authorities, and will be in accordance with the conditions of all applicable federal, state, and local permits. If new permits are required as a result of repair activities, these permits will be obtained prior to initiating the necessary activities. In addition, the Project operator will work with the Town of Howard and any potentially affected landowner(s) to assure that impacts are avoided and/or minimized, and any specific concerns are accounted for.

4.2 SPECIFIC MITIGATION MEASURES

Project development and operation will also include specific measures to mitigate potential impacts to specific resources. These were described in detail in Section 3.0, but generally include the following:

- Developing and implementing a complaint resolution procedure to address community concerns throughout Project construction and operation.
- Developing and implementing various plans to minimize adverse impacts to air, soil, and water resources, including a dust control plan, sediment and erosion control plan, and Spill Prevention, Control, and Countermeasure (SPCC) plan.
- Undertaking a pre-construction breeding bird survey to avoid impacting any listed species during construction that may breed in the area.
- Documenting existing road conditions by video, developing a road improvement plan, and undertaking public road improvement/repair at no cost to the town or county.
- Evaluating Project impacts on birds and bats through post-construction avian and bat monitoring studies
- Developing a historic resource mitigation program in consultation with the SHPO.
- Entering into a PILOT agreement with the local taxing jurisdictions to provide a significant and predictable level of funding for the town, county, and school districts over the first 20 years of Project operation.
- Developing an emergency response plan with local first responders.

4.3 ENVIRONMENTAL COMPLIANCE AND MONITORING PROGRAM

In addition to the mitigation measures described above, Howard Wind will develop an environmental compliance program and employ environmental monitors to oversee compliance with environmental commitments and permit requirements. The environmental compliance program will be similar to that utilized on the Maple Ridge Wind Farm project in Lewis County (TtEC, 2005), and will include the following components:

1. Planning – Prior to the start of construction, the environmental monitors will review all environmental permits and, based upon the conditions/requirements of the permits, prepare an environmental management document that will be utilized for the duration of the Project. This document will distill and clearly present all environmental requirements for construction and restoration included in all Project permits and approvals.

2. Training – The environmental monitors will hold environmental training sessions that will be mandatory for all contractors and subcontractors. The purpose of the training sessions will be to explain the environmental compliance program in detail, prior to the start of construction.

3. Preconstruction Coordination – Prior to construction, the contractor(s) and the environmental monitors will conduct a walkover of areas to be affected by construction activities. This walkover will identify landowner concerns, sensitive resources, limits of clearing, proposed stream or wetland crossings, and placement of sediment and erosion control features. The limits of work areas, especially in sensitive resource areas, will be defined by flagging, staking or fencing prior to construction, as needed.

4. Construction and Restoration Inspection – The monitoring program will include the inspection of construction work sites by the environmental monitor. The monitor will be present during construction at environmentally sensitive locations, will keep a log of daily construction activities, and will issue periodic/regular reporting and compliance audits. Additionally, the monitor will work with the contractors to create a punch list of areas for restoration in accordance with issued permits. In accordance with NYSA&M requirements, Howard Wind or an environmental monitor will maintain a monitoring presence for two years following site restoration (to evaluate areas disturbed during construction and to ensure that agricultural and ecological functions and values are restored and maintained over the long term).

5.0 ALTERNATIVES ANALYSIS

The following alternatives to the proposed action are described and evaluated: no action, alternative Project area, alternative Project design/layout, alternate Project scale and magnitude, and alternative technologies. These alternatives offer a potential range and scope of development for comparative analysis and consideration.

5.1 NO ACTION

The no action alternative assumes that the Project Site would continue to exist as active agricultural land, residential property, vacant land, and forestland. This no action alternative would not affect current land use, ambient noise conditions, traffic or public road conditions, television/communication systems, and would maintain community character, economic, and energy-generating conditions as they currently exist.

Under this alternative, no wind turbines or infrastructure (e.g., access roads, electrical interconnects, and substation) would be developed on the site. Consequently, none of the environmental impacts associated with Project construction and operation would occur. In addition, no economic benefits would accrue to the area. These unrealized economic benefits would include income from construction jobs ($2.351 million-$2.822 million), annual income from permanent jobs ($375,000), annual lease payments to the landowners ($624,000-$832,000), and annual PILOT payments to the affected county, town, and school districts ($3000,000-$4000,000). The annual PILOT revenues of up to $400,000 for the involved county, town, and school districts are expected for the first 20 years of Project operation amount to a total of $8,000,000. Under the no action alternative, multiplier effects from these economic benefits would also not be realized (see Section 3.9 and Appendix O).

In addition, to the extent that the Project helps supplement farm income and keeps land in active agricultural use, the no action alternative could have an adverse impact on land use and grassland bird habitat. As family farms go out of business, the land is either incorporated into larger corporate farming operations, converted to residential use, or allowed to revert to successional communities. All of these possibilities would result in a change to the Town’s existing character and available wildlife habitat. Furthermore, the benefits of adding between 60 and 80 MW of clean, renewable electric energy to the power grid would be lost, and reliance on fossil-fuel-fired generators, which contribute to emissions of sulfur dioxide (a precursor of acid rain), nitrogen oxide (a smog precursor), and carbon dioxide (a greenhouse gas) would continue unabated. Given the short-term nature of anticipated construction impacts and the generally minor long-term impacts of Project operation, as compared to the significant economic benefits that the Project would generate, the no action alternative is not considered a preferred alternative.

5.2 ALTERNATIVE PROJECT AREA

Under 6 NYCRR § 617.9(b)(5)(v), site alternatives addressed in an EIS may be limited to parcels owned by, or under option to, a private Project sponsor. Howard Wind does not own, or have under option, any parcels other than the ones that constitute the Project Site. Therefore, there is no requirement to evaluate any alternative Project areas. Nonetheless, this section provides background information on the selection of the Project Site to facilitate understanding of the criteria that Howard Wind employed.

The selection of wind turbine locations is constrained by several factors that are essential for the Project to operate in a technically and economically viable manner. These factors include the following:

- adequate wind resource
- adequate access to the bulk power transmission system, from the standpoints of proximity and ability of the system to accommodate the interconnection and accept and transmit the power from the Project
- contiguous areas of available land
- compatible land use
- willing land lease participants and host communities
- limited sensitive ecological resources
- limited population/residential development

The Applicant began a search for appropriate Project sites that had these characteristics within Steuben County in June 2004. The analysis of potential sites concluded that many other locations in the region presented significant constraints on wind power development, including economically unviable wind resources, incompatible land uses, lack of contiguous land, proximity to population centers, or unsuitable transmission facilities (either too far to connect or in need of major system upgrades).

The Applicant selected the proposed site because of the quality of the wind resource, the ease of access to the site, relatively low population density, positive feed-back from landowners and town officials, and the relative lack of sensitive resources. These factors combined to make the proposed site desirable from the standpoint of wind power development. Based upon site evaluations performed throughout the region, either other potential locations did not have the same combination of desirable features or were already under development.

5.3 ALTERNATIVE PROJECT DESIGN/LAYOUT

Howard Wind's ability to develop a significantly different layout within the Project Site is constrained by the need to maintain required set-backs, adequate spacing between turbines, and to limit environmental impacts. Keeping the turbines on high-elevation sites with adequate wind, staying 400 feet from roads and property lines, and 1,000 feet from residences, leaves little room for modification of the proposed Project layout. In addition, the turbines must have adequate separation to avoid energy losses associated with wake turbulence. The turbines and other Project components also must be sited so as to minimize loss of active agricultural land and/or interference with agricultural operations. Avoidance of wetlands, streams, forested areas, and steep slopes to the extent practicable, further reduces available siting alternatives. Proposed turbine siting must also satisfy landowner agreements/preferences. All of these factors have guided the location of potential turbine sites, and limit the ability to significantly change the proposed configuration.

The proposed layout of 25 turbine sites represents a carefully achieved balance of energy production and environmental protection. Substantive relocation of any turbine would have a ripple effect, in that the location of other turbines would have to be reexamined and possibly changed to maintain an efficient/workable Project design. Therefore, reduction of environmental impacts in one location could result in increased impact in another location and/or reduced power generation. In the case of visual impact, removal or relocation of one or two individual turbines from the 25-turbine array is unlikely to result in a significant change in Project visibility and visual impact from most locations.

The 25 turbine sites have been selected based on input and guidance received from landowners and Project cultural resource, noise, and ecological consultants to assure that adverse impacts have been reduced to the extent practicable. In addition, on-site investigations of the Project layout were conducted by potential construction contractors and engineers to assure that the current layout is feasible and constructible. EDR personnel also participating in this investigation to assure that ecological/agricultural considerations were accounted for, and to assure that the Project layout minimizes ecological/agricultural impacts to the extent practicable.

As to turbine selection, the wind industry is generally moving toward the use of larger wind turbine generators, since they are generally more cost-effective (i.e., have a more favorable ratio of the rotor-swept area to generator size). Use of smaller turbines would not significantly reduce environmental impacts. If installed at the same density, the number of tower sites, length of access road, and length of electric interconnect would not be reduced. Thus, impacts would be roughly equal, while potential power generation would be significantly reduced through the use of smaller turbines. To maintain an equivalent level of power generation, more of the smaller turbines would be required. This would increase temporary and permanent disturbance to soils, vegetation, and agricultural resources as the number of towers and the length of required access road and interconnect increased. Potential operational impacts (e.g., noise, avian mortality) would also likely increase with a larger number of smaller machines. In terms of visibility and visual impact, while smaller turbines might be marginally less visible, they would still be very tall structures and their higher density/greater number could actually increase the Project's visual impact. For example, to achieve 62 MW of total nameplate capacity with a 1.5 MW generator (the smallest of the currently available turbines typically used for commercial wind farms), approximately 41 wind turbines would be required. Several studies have concluded that people tend to prefer fewer larger turbines to a greater number of smaller ones (Thayer and Freeman, 1987; van de Wardt and Staats, 1988). Also, given the Project set-backs and other siting constraints described previously, it is questionable whether a significantly larger number of smaller turbines could be accommodated within the Project Site.

The Project Site, as with most places in New York State, has positive wind shear, which means that the average wind velocity increases along with the height of the wind turbine tower. Eighty-meter towers are the most common towers now commercially available; use of a smaller tower would substantially increase the cost of energy from the facility. As mentioned previously, use of shorter towers (e.g., 65 to 70 meters) would not reduce impacts associated with road and interconnect construction, and would only marginally reduce visual impacts.

In terms of other Project components, the Project is using tubular steel towers instead of lattice, and free-standing meteorological towers instead of guyed structures. Both of these alternatives are believed to reduce potential avian collision impacts and also minimize visual impacts associated with the Project. Permanent access road widths will be the minimum necessary to maintain the Project, and all on-site electrical interconnects will be placed either underground or along public roads within an existing overhead utility ROW. These actions will further minimize visual impacts associated with the Project.

Permanent access roads have been sited in an effort to minimize loss of agricultural land and impacts on farming operations. To this end, Project access roads will be reduced from a construction width of 40 feet to an operation/maintenance width of 16 feet (unless determined otherwise through landowner requests and/or negotiations). In addition, the total linear distance of access road is a result of an effort to minimize impacts to agricultural and ecological resources. Shorter, more direct, routes are a more desirable alternative from a Project development/cost perspective. However, by following siting guidelines such as routing access roads along field edges, this alternative was rejected.

Consequently, Howard Wind believes that alternative Project designs are likely to result in equal or greater adverse environmental impacts, while yielding lower electrical output. They are therefore considered less desirable than the proposed design.

5.4 ALTERNATIVE PROJECT SCALE AND MAGNITUDE

As discussed in the previous section, Project components of alternative size and number were considered. A Project of significantly more, or fewer, turbines would pose challenges to the technical or economic feasibility of the Project. If the proposed number of turbines were significantly reduced, the maximum benefit of the available wind resource would not be realized. If the turbine number were even moderately reduced, the Project might cease to be economically viable due to the high fixed costs of both development and interconnection with the power grid. It should be noted that other projects proposed within New York State that have similar wind resources are contemplating similar size projects (between 50 and 100 MW), which correspond with market place factors and the economics of connecting to a bulk power line (NYISO website).

As with environmental impacts, economic benefits would also be reduced proportionately with a smaller project. Fewer landowners would participate in the Project, and therefore, fewer landowners would realize direct economic benefits. In addition, PILOT payments to the county, town, and school districts (which are typically developed on a per MW basis), as well as construction expenditures, would be proportionally reduced.

Howard Wind is conducting business in a wholesale electric market that is competitive and price-sensitive. Wind power projects produce both electric energy and Renewable Energy Certificates (RECs), which represent the environmental attributes of power produced by a renewable resource (USDOE website). These RECs can be sold separately to buyers seeking to acquire those associated attributes. The wholesale electric market has few buyers interested in acquiring electric power generated intermittently. Consequently, the magnitude of the Project as a whole, as well as the size of the individual turbines, is necessary to produce power at a cost that is competitive within this market environment.

As mentioned previously, various siting constraints dictate the size and layout of a wind power project. These constraints make a significantly larger number of turbines within the Project Site highly unlikely. A larger project would result in location of wind turbine towers in areas that do not have ideal wind resources, and would also require installation of more turbines in areas with more sensitive resources and/or higher population density. Although a larger facility would theoretically have more economic value, the greater environmental impacts make it harder to justify the increased power generation potential of the Project.

5.5 ALTERNATIVE TECHNOLOGIES

The turbines proposed for the Project will utilize the latest in wind power generation technology to enhance Project efficiency and safety, and minimize impacts such as noise and bird collisions. Alternative power generation technologies, such as fossil-fuel and biomass combustion, would pose more significant adverse environmental impacts, particularly on air quality, but also on land use, aesthetics, and water resources. Most fossil fuel-fired generating facilities would require significant amounts of water to operate, the use of which may pose impacts to surface water or groundwater resources, as well as fish and other aquatic organisms. Nuclear power plants have not been constructed in the U.S. for over 25 years, due primarily to public opposition, high cost, and concerns over the safe storage and disposal of nuclear waste. These plants also present potential public safety and security/terrorism concerns. Conventional power plants also would not advance the RPS goal of generating 25% of the state's power by 2013.

In regard to other renewable sources of generation, hydroelectric plants have significant impacts on terrestrial and aquatic ecological resources, land use, and aesthetics. In addition, they can only be developed in places with appropriate water volumes and topographic conditions (which do not exist within the Project Site). Other renewable energy technologies, such as solar power and hydrogen, are still either cost-prohibitive or in earlier stages of technological development. Aside from cost constraints, utility-scale solar power is hard to justify in an area such as Western New York, where available sunshine as well as government subsidies are limited. Currently, wind is the only renewable energy source that can help meet energy needs in a technologically and economically efficient manner. It can also do this without the emission of greenhouse gases and other environmental impacts that alternative power generation technologies would create.

5.6 ALTERNATIVE CONSTRUCTION PHASING

Howard Wind proposes to construct the Project in a single phase during a single construction season. Single phase construction will result in a more efficient construction process, with a shorter duration of construction-related impacts than a multiple phase construction approach. Single phase construction will allow resources such as soils, wildlife, and vegetation, that are temporarily impacted by construction, to begin to recover and/or habituate sooner. In contrast, a multiple phase construction process would result in a longer period of construction disturbance, and would be less economically efficient for both Howard Wind and the local beneficiaries of the direct and indirect economic benefits of the Project.

6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed Project will require the irreversible and irretrievable commitment of certain human, material, environmental, and financial resources, as described below. For the most part, the commitment of these resources will be offset by the benefits that will result from implementation of the Project.

Human and financial resources have already been expended by Howard Wind, the State of New York (i.e., various state agencies), Steuben County, and the Town of Howard for the planning and review of the Project. The expenditure of funds and human resources will continue to be required throughout the permitting and construction phases of the Project (e.g., for environmental reviews and permitting, site plan approval, building and construction inspections).

The Project also represents a commitment of land for the life of the Project. Specifically, the approximately 26.5 acres of land to be developed for wind turbines, access roads, and substations will not be available for alternative purposes for the life of the Project. However, because the turbines/towers could be removed, and the land reclaimed for alternative uses at some future date, the commitment of this land to the Project is neither irreversible nor irretrievable.

Various types of construction materials and building supplies will be committed to the Project. The use of these materials, such as gravel, concrete, steel, etc., will represent a long-term commitment of these resources, which will not be available for other projects. However, some of these materials (e.g., steel, gravel) will be retrievable following the operational life of the Project, and will likely be retrieved in accordance with Project decommissioning.

Energy resources also will be irretrievably committed to the Project, during both the construction and operation of the Project. Fuel, lubricants, and electricity will be required during site preparation and turbine construction activities for the operation of various types of construction equipment and vehicles, and for the transportation of workers and materials to the Project Site. However, the energy resources utilized to construct and operate the Project will be minor compared to the energy generated by the Project and made available to the people of New York State.

7.0 GROWTH INDUCING IMPACTS

Certain proposed actions covered under the SEQRA process have the potential to trigger further development by either attracting a significant local population, inviting commercial or industrial growth, or by inducing the development of similar projects adjacent to the built facility. The proposed Project does not require a work force greater than approximately three employees during operations, and therefore will not lead to significant growth in local population or housing. Although it will support the local economy through the purchase of goods and services, the type and level of expenditures are not of the sort that would generate significant growth of businesses that serve the proposed facility. Therefore, secondary/indirect impacts resulting in local growth are not anticipated to occur as a result of the proposed action.

The Howard Wind Power Project is proposed, in part, because of the presence of existing resources and facilities that allow the Project to be economically viable. Specifically, the availability of adequate wind and the presence of an existing transmission line allow for generation and transmission of the Project's electric output to the state power grid. The occurrence of these resources/facilities might suggest that other wind power projects could be proposed on adjacent lands. However, this would be the case with or without the proposed Project. Its presence alone will not encourage the development of additional wind power projects in the area. In fact, because existing transmission facilities have limited additional capacity, future projects will be more difficult to develop if such development could only be accommodated by upgrading the existing transmission line. If this were the case, such upgrades would likely make future projects less economically viable. In addition, landowner willingness and environmental sensitivity play a significant role in the location of wind power projects. As currently proposed, the Project maximizes the available land resource of willing landowners while maintaining environmental sensitivity. Any additional wind power development in the Town of Howard is likely to be limited due to the lack of an available wind resource, set-back constraints, more significant environmental impacts, and lack of landowner participation.

8.0 CUMULATIVE IMPACTS

In accordance with 6 NYCRR § 617.9(b)(5)(iii)(a), SEQRA requires a discussion of cumulative impacts where such impacts are "applicable and significant." Cumulative impacts are two or more individual environmental effects which, when taken together, are significant or that compound or increase other environmental effects. The individual effects may be effects resulting from a single project or from separate projects. Where individual effects of the Project may interact with other effects of the Project, such potential cumulative impacts have been addressed in Section 3.0 of the DEIS.

It should be noted that the New York State Supreme Court recently issued a Decision and Judgment on *Advocates for Prattsburgh Inc. et al vs Steuben County Industrial Devel. Agency* (Index # 006/04099), in which a petition was filed to annul the Findings Statement that approved the Final Generic Environmental Impact Statement concerning the Ecogen, LLC Wind Farm Project. On January 5, 2007 Justice Harold L. Galloway dismissed this petition. When discussing segmentation and cumulative imapcts in the Decision and Judgment, Justice Galloway concluded the following:

*"Under SEQRA, it is required 'that reasonably related long-term, short-term and cumulative effects, including other simultaneous or subsequent actions included in any long-range plan that are likely to be taken as a result thereof, be considered'…'Segmentation, which is dividing the environmental review of an action in such a manner that the various stages are addressed as though they were independent, unrelated activities, needing individual determinations of significance * * * is contrary to the intent of SEQRA * * *. The prohibition against segmentation guards against two related evils: the first occurs when a project which would have a significant effect on the environment is split into two or more smaller projects, with the result that each falls below the threshold requiring review * * *; the second * * * occurs when a project developer wrongly excludes certain activities from the definition of his project for the purpose of keepion to a minimum its environmentally harmful consequence, thereby making it more palatable to the reviewing agency and community'…In this case Ecogen's project and the Wind Farm Prattsburgh project 'are independent of each other and are not part of an integrated or cumulative development plan'…A cumulative analysis of the two projects was therefore not required."*

Notwithstanding the discussion above, this section addresses the potential cumulative impacts that may arise from interactions between the impacts of the Project and the impacts of other projects. In general, cumulative impact analysis of external projects is required where the external projects have been specifically identified and either are part of a single plan or program, or there is a sufficient nexus of common or interactive impacts to warrant assessing such impacts together. Some cumulative impacts are the simple additive effect of the projects (i.e., each will disturb a certain amount of ground surface, wetlands, or stream crossings). Also each will provide a certain economic benefit to the host community. These additive impacts can be quantified by simply tallying the total impacts resulting from each project, to the extent that such information is known and has been publicly presented. Certain other cumulative impacts may not simply be additive and therefore need a certain level of further analysis. The subsections below discuss whether there are identified projects for which a cumulative impact analysis is required, and assess the extent to which the impacts of such projects will be cumulative with the impacts of the Howard Wind Power Project.

Existing and Approved Projects

There are currently no operating or fully approved utility-scale wind power projects in Steuben County. The nearest existing project is the Wethersfield Wind Farm, a 10 turbine, 6.6 MW wind energy facility located in the Town of Wethersfield in Wyoming County. The Wethersfield facility is located approximately 50 miles from the Project Site, and therefore does not have an impact on the Project Site or the surrounding area within and near the Town of Howard.

Howard Wind is not aware of any other existing or approved projects within the Town or surrounding area that do, or if constructed, would, have environmental effects that would interact with those of the Project.

Proposed or Future Projects

Across Steuben County and New York State, several additional wind-powered generating facilities are in the project planning and development phases. The review and approval status of these projects is highly variable, ranging from preliminary site investigations to those with completed system reliability impact studies (requirement of NYISO), detailed project plans, and landowner agreements. The NYISO reviews projects in three main phases: submittal of an interconnection request, preparation of a feasibility study, and completion of a system reliability impact study. This review process separates projects, initially by feasibility to connect to the New York power grid via a selected transmission facility. Proposed projects in any phase of project review by the NYISO are listed on a comprehensive queue listing maintained by NYISO on their website http://www.nyiso.com. It is reasonable to assume, that wind power projects with in-progress system reliability impact studies and with upcoming proposed operation dates may be considered 'proposed' or 'future' projects for the purposes of cumulative impact analysis.

In Steuben (and Yates) County, eight additional projects are considered proposed projects that may fall into this category (NYISO, queue updated 12/12/2006). These include the following:

- Ecogen Prattsburgh/Italy Valley Wind Farm (79.5 MW)
- Prattsburgh Wind Park [WindFarm Prattsburgh] (75 MW) proposed by UPC Wind Management, LLC and Global Winds Harvest, Inc.
- Hartsville Wind Farm (50 MW) proposed by Airtricity Developments, LLC
- Canisteo Hills Windfarm (149 MW) proposed by Invenergy NY, LLC
- Paragon I Wind Generation (100 MW) proposed by Clipper Windpower, Inc.
- Canandaigua II [Dutch Hill] (42 MW) proposed by UPC Wind Management, LLC
- Canandaigua Wind Farm [Cohocton] (82 MW) proposed by UPC Wind Management, LLC
- Paragon II (150 MW) proposed by Clipper Windpower Development, Inc.

To obtain additional information about these projects, Howard Wind reviewed data available from the NYISO website, which revealed that the precise location of most of these proposed facilities is not publicly available. As a result, Howard Wind is not able to identify the actual locations or proposed layout/design of most of these projects, and therefore is not able to provide a detailed cumulative impact analysis. The exceptions are the Ecogen Prattsburgh/Italy Valley Wind Farm, which has been the subject of a Final Generic EIS issued by SCIDA, WindFarm Prattsburgh, which released a DEIS on June 22, 2006, the Canandaigua II (Dutch Hill) project, which released a DEIS on December 20, 2006, and the Canadaigua Wind Farm (Cohocton), which released a DEIS on April 20, 2006 (and subsequently released a Supplemental DEIS on December 20, 2006). In addition, an EAF (dated March 23, 2006) was submitted to SCIDA for the Hartsville Project, which included a preliminary project layout.

It is important to note that the assumption that one or more of the proposed Steuben County projects would complete the NYISO review; complete SEQRA review; complete state, federal, and local permitting; receive funding; and be constructed is also speculative. Any, or all of the proposed projects in Steuben County may not be approved and/or constructed, and therefore would not contribute to cumulative impacts associated with the construction and operation of the Howard Wind

Power Project. Nonetheless, for purposes of this DEIS, Howard wind assumes that all of the proposed projects will be approved and constructed, and provides the following analysis of potential cumulative impacts to the extent ascertainable. In most cases, only limited information about the other projects is available, so only a limited analysis is possible.

<u>Hartsville Project</u>

The Hartsville Wind Farm is proposed to be constructed south of the City of Hornell and west of the Village of Canisteo, in the Towns of Hartsville and Hornellsville. According to the preliminary information provided to SCIDA, this project is proposed to include approximately 22 wind turbines. At its closest point (as measured to the nearest turbine), the Hartsville Wind Farm is located approximately 7 miles southwest of the Howard Wind Power Project. The physical separation of these two projects indicate that cumulative construction impacts (traffic, noise, dust, etc.) will not occur. With respect to operational impacts, the Hartsville project will not create cumulative noise and shadow flicker impacts due to its distance from the Howard Project.

Cumulative impacts arising from simultaneous operation of both projects are anticipated to be limited to visual and avian impacts. Cumulative avian impacts may occur, regardless of the distance between proposed facilities. Based upon the results of the avian risk assessment performed for the Howard Project, avian collision with wind turbines is estimated to range from 55 to 66 birds annually (assuming a national and outside California average of 2.19 and 1.836 fatalities per turbine per year). Applying the same assumption to the 22 proposed Hartsville turbines results in an estimated range of 40 to 48 avian fatalities per year for the Hartsville project. Therefore, the cumulative avian impact of the Howard and Hartsville projects may be as high as 114 fatalities per year. While this number may sound large, as the radar data in Appendix I indicates, it is a tiny fraction of the population that migrates through or resides in this area, and would not be biologically significant for any of the affected species.

Cumulative visual impacts are not anticipated to be significant, due to the distance between the two projects. If the Hartsville project is visible from the same vantage points as the Howard Project, it will typically appear as a background feature in any foreground or midground view that includes the Howard Wind Power Project. Although a project may be visible from many miles away, its visual impact diminishes significantly at distances over 3.5 miles (Eyre, 1995). However, to provide an analysis of potential cumulative impacts of both projects, a cumulative viewshed analysis was prepared. To accomplish this, the 10-mile radius topographic and vegetation analyses (based on maximum blade tip height) for the Howard Wind Power Project were overlaid on viewshed analyses prepared for the Hartsville project (because a specific height was not indicated in the Harstville EAF submitted to SCIDA, for a worst case analysis a 127 meter (416 foot) maximum turbine height was assumed for the Hartsville turbines). The viewsheds for the two projects were then plotted on a base map and areas of viewshed overlap identified (see Appendix J).

Considering the screening effect of topography only, this analysis indicated potential cumulative visibility of these two projects in approximately 15% of their overlapping 10 mile-radius study areas. The majority of this area was on elevated ridgetops and the upper valley slopes. However, some lower valley walls and valley floors also had potential visibility of both projects, especially along the Cunningham Creek, Crosby Creek, Purdy Creek, Fall creek, and Bennett Creek, and Baker Creek valleys. Taking into account the screening effect of forest vegetation, the viewshed analysis indicates that potential views of both projects are restricted scattered open ridgetop locations, and a few valley floor locations in the Purdy Creek and Bennett Creek valleys, which make up less than 1% of the overlapping study areas for the two projects. Areas of actual visibility are anticipated to be much more limited than indicated by the viewshed analysis, due to the slender profile of the turbines (especially the blade, which make up the top 150 feet of the turbine), the effects of distance, and screening from hedgerows, street trees and structures, which are not considered in the viewshed analysis.

Cohocton and Dutch Hill Projects

The Cohocton Wind Farm is proposed to be constructed adjacent to the Cohocton River Valley in the Town of Cohocton. This project is proposed to include a maximum of 36 turbines, each with a generating capacity of 2.5 MW. At its closest point (as measured to the nearest turbine), the Cohocton Wind Farm is located approximately 7 miles north-northwest of the Howard Project. The Dutch Hill site is located directly west of the proposed Cohocton Wind Power Project, across the Cohocton River Valley, in the Town of Cohocton. The Dutch Hill project is proposed include16 turbines, each with a generating capacity of 2.5 MW. At its closest point (as measured to the nearest turbine), the Dutch Hill Wind Farm is located approximately 12 miles north-northwest of the Howard Project.

The physical separation of these two projects from the Howard Project indicate that cumulative construction impacts (traffic, noise, dust, etc.) will not occur. With respect to operational impacts, the Cohocton and Dutch Hill projects will not create cumulative noise and shadow flicker impacts due to its distance from the Howard Project.

Cumulative impacts arising from simultaneous operation of both projects are anticipated to be limited to visual and avian impacts. Cumulative avian impacts may occur, regardless of the distance between proposed facilities. As previously indicated, an estimated range of approximately 55 to 66 avian fatalities per year may occur at the Howard Project. Applying the same assumption to the 52 proposed turbines at Cohocton and Dutch Hill increases this number by 114 to a total of approximately 180. Once again, although this number may sound large, it is a tiny fraction of the population that migrates through or resides in this area, and would not be biologically significant (see radar data in Appendix I).

Cumulative visual impacts are not anticipated to be significant, due to the distance between these two projects and the Howard Project. As was the case with the Hartsville project, if either the Cohocton or Dutch Hill project is visible from the same vantage points as the Howard Project, they will typically appear as a background feature in any foreground or midground view that includes the Howard Wind Power Project. In addition, visual impact diminishes significantly at distances over 3.5 miles (Eyre, 1995).

However, to provide an analysis of potential cumulative impacts of the Howard Project with the Cohocton and Dutch Hill projects, a cumulative viewshed analysis was prepared. To accomplish this, the 10-mile radius Howard Wind Power Project topographic and vegetation analyses (based on maximum blade tip height) were overlaid on the same viewshed analyses prepared for the proposed Cohocton Wind Power Project and the Dutch Hill Farm Project. The viewsheds for the three projects were then plotted on a base map and areas of viewshed overlap identified.

Based on the screening effect of topography alone, it appears that areas with potential simultaneous views of these three projects are limited to higher elevation ridgetops and slopes. Valley areas, where the majority of sensitive receptors are located (including all of the villages, hamlets, and major roads) generally will not have the potential for simultaneous views of the Howard project and either of the other two projects. Factoring vegetation into this cumulative viewshed analysis essentially eliminates wooded sites from the area of potential cumulative project visibility. Areas indicated as having views of all three projects on the cumulative vegetation viewshed map are limited to open fields on some slopes and hilltops, which in total amount to approximately 1.2% of overlapping 10 mile-radius study areas (see Appendix J). Areas of actual visibility are anticipated to be much more limited than indicated by the viewshed analysis, due to the slender profile of the turbines (especially the blade, which make up the top 150 feet of the turbine), the effects of distance, and screening from hedgerows, street trees and structures, which are not considered in the viewshed analysis.

Ecogen and WindFarm Prattsburgh Projects

The Ecogen Prattsburgh/Italy Wind Farm and the WindFarm Prattsburgh Project are proposed to be constructed in close proximity to each other in the Towns of Italy (Yates County) and Prattsburgh (Steuben County). Both of these projects are located greater than 12 miles north of the Howard Wind Power Project. Due to the separation of these projects from the Howard Wind Power Project, they will not result in cumulative construction impacts. With respect to operational impacts, these two projects will not create cumulative noise or shadow flicker impacts due to their distance from the Howard Project.

Cumulative impacts arising from simultaneous operation of the three projects are anticipated to be limited to visual and avian impacts. Cumulative avian impacts may occur, regardless of the distance between proposed facilities. Based upon the information presented in the WindFarm Prattsburgh DEIS, if as many as 6 birds per turbine per year are killed (i.e., the high end of what has been observed at other projects), total annual collision mortality could be as high as 264 birds (EDR, 2006). As previously indicated, the avian analysis conducted for the Howard Project indicated an estimated range of 1.83 to 2.196 fatalities per turbine per year, resulting in approximately 55 to 66 fatalities per year. Therefore, cumulative avian mortality for both the WindFarm Prattsburgh and Howard projects is estimated to be approximately 162 birds per year. Assuming the same maximum per turbine mortality rate, and approximately 50 turbines at the Ecogen project, would increase this number to 272. These cumulative avian impacts are not anticipated to be biologically significant for any of the affected species.

Due to the distance between these two projects and the Howard Project, the cumulative visual impact will be highly variable (and likely to be non-existent in most instances), and will depend upon weather conditions, the number of turbines visible, proximity of the turbines to the viewer, the landscape setting, and the viewer's attitude toward wind power. It should also be noted that at its closest point (as measured to the nearest turbine), the WindFarm Prattsburgh project is located approximately 15 miles north of the Howard Project. Further, a definitive turbine layout is not yet publicly available for the Ecogen project (i.e., the Generic DEIS identifies 99 potential turbine sites for approximately 53 proposed turbines). Therefore, based upon distance to WindFarm Prattsburgh and the lack of a definitive Ecogen turbine layout, additional analysis regarding the potential cumulative visual impacts of these two projects with the Howard Project is not warranted.

Other Steuben County Wind Energy Projects

It is reasonable to assume, based upon the limited information available on the remaining proposed wind energy projects in Steuben County, that the proposed project sites for these projects are located from 10 to 30 miles from the Project Site. Given that, cumulative impacts to area residences from noise or shadow flicker are unlikely, as the turbines would not overlap or be interspersed with proposed Howard turbines (i.e., be located within 0.5 mile of each other). However, potential cumulative impacts could include construction-related impacts to area roads and bridges. This would only occur if two or more projects were constructed simultaneously and if they used the same construction delivery routes. Should this situation arise, coordination of transportation routes would be undertaken by the involved project developers to assure that the duration and extent of impact is minimized and that road repair/restoration work is accomplished at the appropriate time, and at not cost to the affect jurisdictions.

The most likely cumulative impact resulting from the construction of multiple proposed wind power projects within the county would be the effects on visual/aesthetic resources and community character. The cumulative impact of multiple projects will be highly variable depending upon the number of turbines visible, their proximity to the viewer, the landscape setting and the viewer's attitude toward wind power. If multiple projects were visible from a particular viewpoint, the typical scenario would have portions of one project being visible in the foreground or midground while another is visible in the background. Although a project may be visible from many miles away, its visual impact diminishes significantly at distances over 3.5 miles (Eyre, 1995). In addition, long distance views across Steuben County are highly variable and often screened by valley topography and forest vegetation. As indicated in the cumulative viewshed analysis prepared as part of the VIA (Appendix J), visibility of multiple projects (if they are ultimately built) would generally be restricted to elevated, open (agricultural) ridgetops, where residential density is generally lower (as opposed to villages and hamlets which are often located in valley settings and have limited outward views to the landscape due to the presence of building and trees and intervening topography).

9.0 EFFECTS ON USE AND CONSERVATION OF ENERGY RESOURCES

The proposed Project will have significant, long-term beneficial effects on the use and conservation of energy resources. The operating Project will generate between 60 and 80 MW of electricity without consuming cooling water or emitting pollutants. Assuming that the average house in Western New York uses approximately 10-megawatt hours of electric power per year, and assuming the Project generates approximately 30% of its nameplate generating capacity, this is enough power to support approximately 20,000 homes in New York State (on an average annual basis). The Project will add to and diversify the state's sources of power generation, accommodate growing power demand through the use of a renewable resource (wind), and over the long term may displace some of the state's older, less efficient, and dirtier sources of power.

It will also facilitate compliance with the Public Service Commission (PSC) "Order Approving Renewable Portfolio Standard Policy", issued on the 24th of September 2004. This Order calls for an increase in the percentage of renewable energy used in the state to 25% (from the then level of 19%) by the year 2013. The principal benefits of the Project are also in accordance with the 2002 State Energy Plan (New York State Energy Planning Board, 2002), namely:

- "Stimulating sustainable economic growth"
- "Increasing energy diversity…including renewable-based energy"
- "Promoting and achieving a cleaner and healthier environment"

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