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Description of the Proposed Action

1.1 Description of the Proposed Action

1.1.1 Project Overview and Definitions

Noble Ball Hill Windpark, LLC (Noble) is proposing to construct and operate a wind energy facility (Project) in the Towns of Villenova and Hanover (Chautauqua County), located in Western New York State (NYS) (see Figure 1.1-1). The Project consists of generation and transmission components (see Figure 1.1-2).

More specifically, the Project will include the following:

- Installation and operation of 60 wind turbines (49 in the Town of Villenova and 11 in the Town of Hanover) with a capacity of 90 megawatts (MW) within an approximate 13,658-acre Project Area in the Towns of Villenova and Hanover (see Figure 1.1-2).
- Construction and use of approximately 16 miles of access roads (13 miles in the Town of Villenova and 3 miles in the Town of Hanover) that will connect each wind turbine to a town or county roadway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities as well as emergency services, if needed. After construction, the 35-foot access road will be scaled back to 16 feet, allowing Noble to use the existing roadway for maintenance and operational purposes; and
- Construction and use of an electrical collection system that will allow delivery of electricity to a new substation to be constructed in the Town of Hanover. Where practical, the electrical collection system will be installed underground along the same right-of-way (ROW) corridor as the access roads. A total of 23.8 miles of collection lines (including underground collection lines collocated with access roads) will be installed (18.7 miles in the Town of Villenova and 5.1 miles in the Town of Hanover). Approximately 8.5 miles will be installed within new ROWs over private lands between turbines (7.3 miles in the Town of Villenova and 1.2 miles in the Town of Hanover). As currently designed, nearly the entire the collection system will be installed underground. A total of 174 feet (0.03 miles) of overhead collection lines will be installed in the Town of Villenova. No overhead collection line will be required in the Town of Hanover.

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- Construction and use of a new substation (Hanover substation) within the Project Area in the Town of Hanover that will tie into a new 115-kilovolt (kV) transmission line. The substation footprint will be approximately 200 by 300 feet. The substation will be located on and have direct access to Hurlbert Road.
- Construction and use of a switchyard within the Project Area in the Town of Hanover. The switchyard footprint will be approximately 300 by 500 feet. The switchyard will be located on and have direct access to Bennett State Road (County Route 85).
- Construction and use of a 6-mile overhead 115 kV transmission line, sited within the Town of Hanover, to transfer the energy from the new substation to the new switchyard. The proposed switchyard will provide a connection to the existing 230 kV National Grid transmission line that provides access to the grid.

Turbine Description

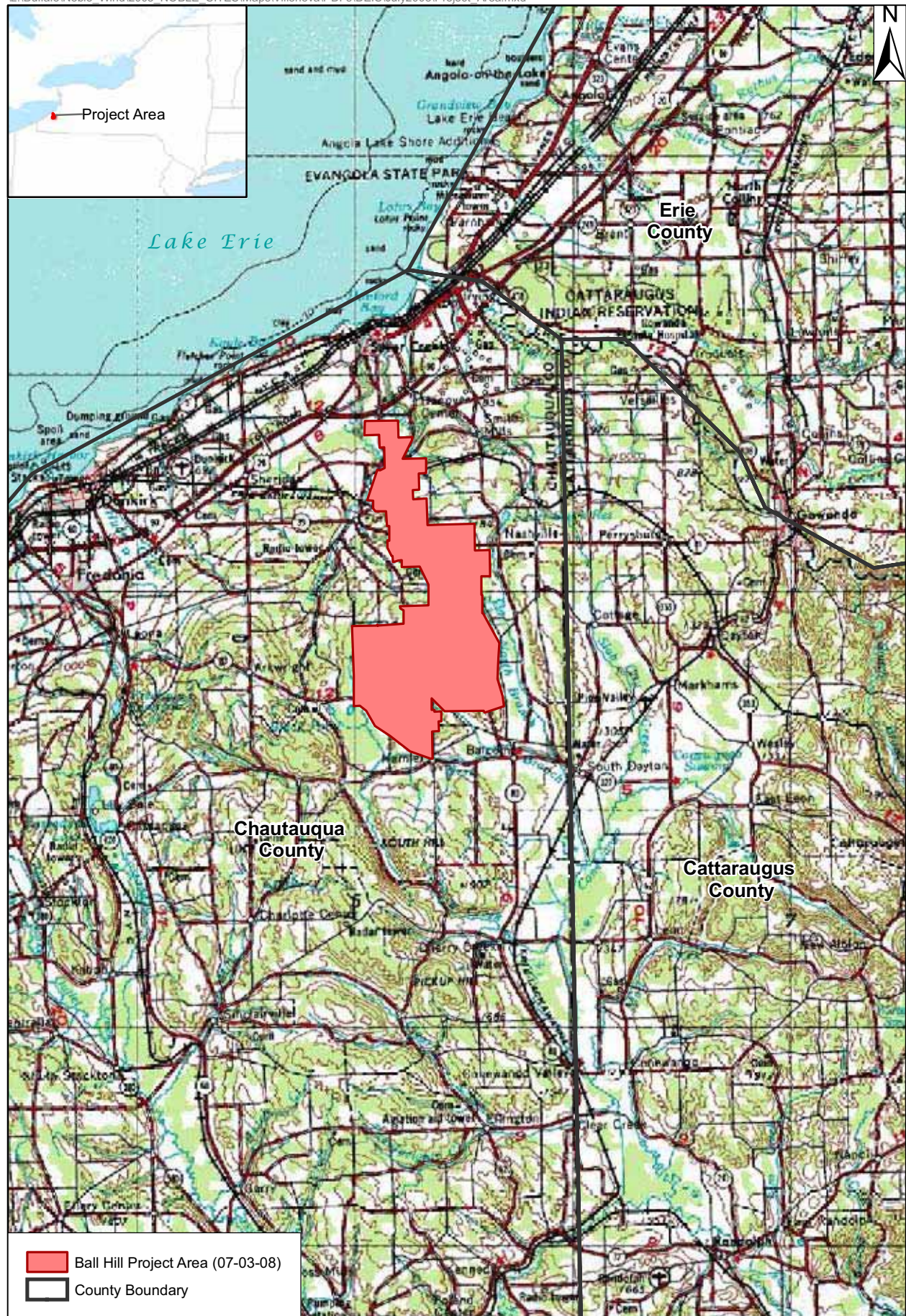
The wind turbines that will be installed at the Project will be the General Electric (GE) 1.5 sle model, an 80-meter high, modular tower system (MTS), T-flange wind turbine generator¹. The turbine is a three-bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 253 feet (77 meters). The blades will be approximately 136 feet (41 meters) from the ground. The nacelle is located at the top of each tower and contains the electrical generating equipment. The turbine rotor and nacelle are mounted on top of a tubular tower, giving a rotor hub height of 263 feet (80 meters) (see Figure 1.1-3). The maximum height for the turbine is 389 feet (118.5 meters) when a rotor blade is at the top of its rotation. Once installed, each wind turbine will occupy a round, slightly exposed base approximately 18 feet (5.5 meters) in diameter.

Definitions

The following terms are used throughout this document to describe the proposed action.

- **Project.** “Project” refers to all activities involved in the construction and operation of the windpark described above and all components thereof, including but not limited to wind turbines (including blades, towers, pads, and foundations); electrical transmission and collection lines and poles; trenches; access roads; and related structures.
- **Project Area.** The Project Area is denoted by the outer boundary of the geographic area that includes all turbine sites, access roads, transmission line and collection system components, substation, and switchyard.

¹ GE’s 1.5 SLE model can produce 1.5 megawatts. The SLE model uses a 77-meter-diameter rotor. “MTS” designates the type of tower configuration; a T-flange is the type of flange used to connect the tower directly to the foundation.



0 2.5 5 10
Miles

Source: USGS 1:250,000 Topographic Map
Quadrangles: Buffalo, 1967.

**Figure 1.1-1 General Project Area
Noble Ball Hill Windpark**

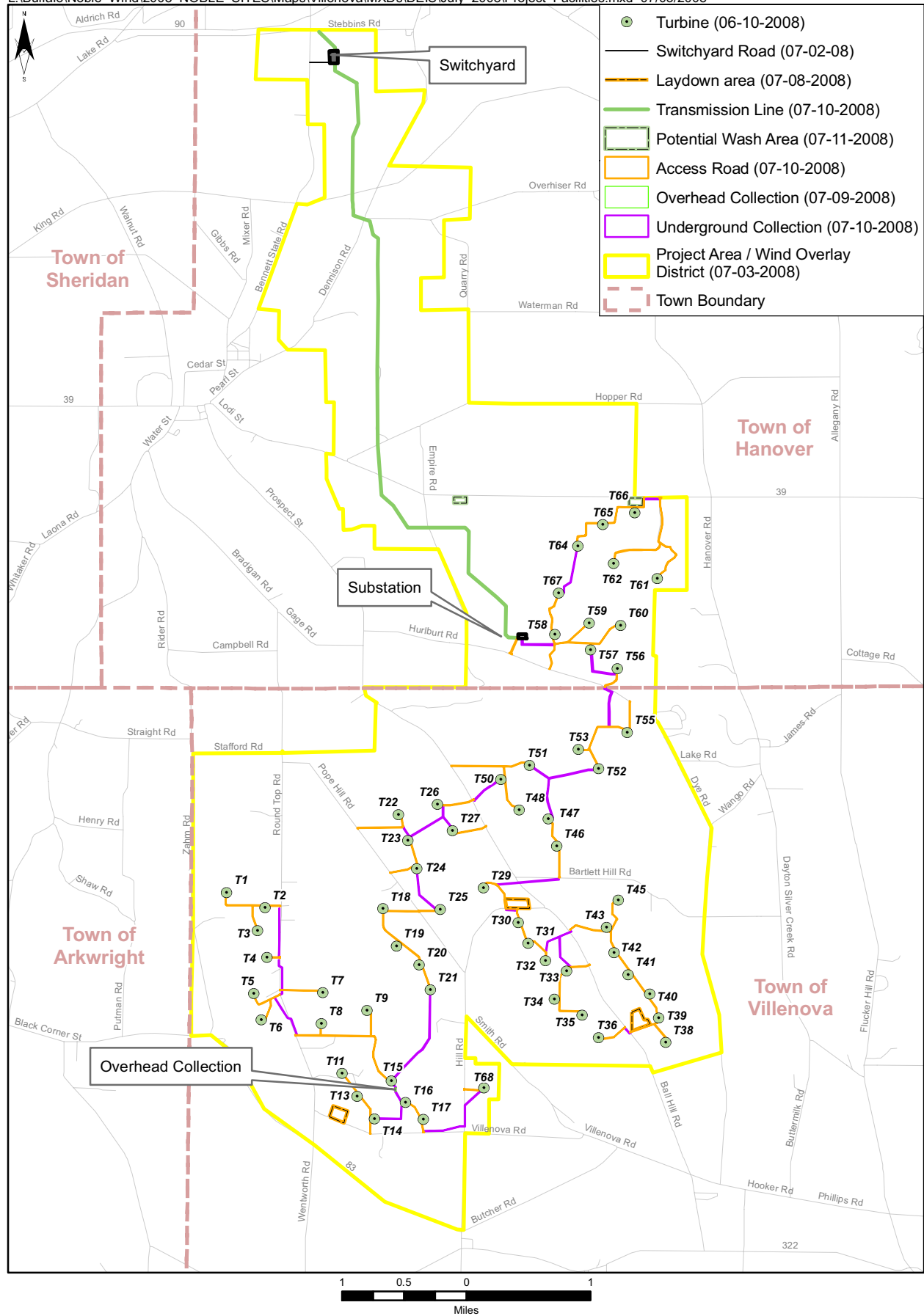
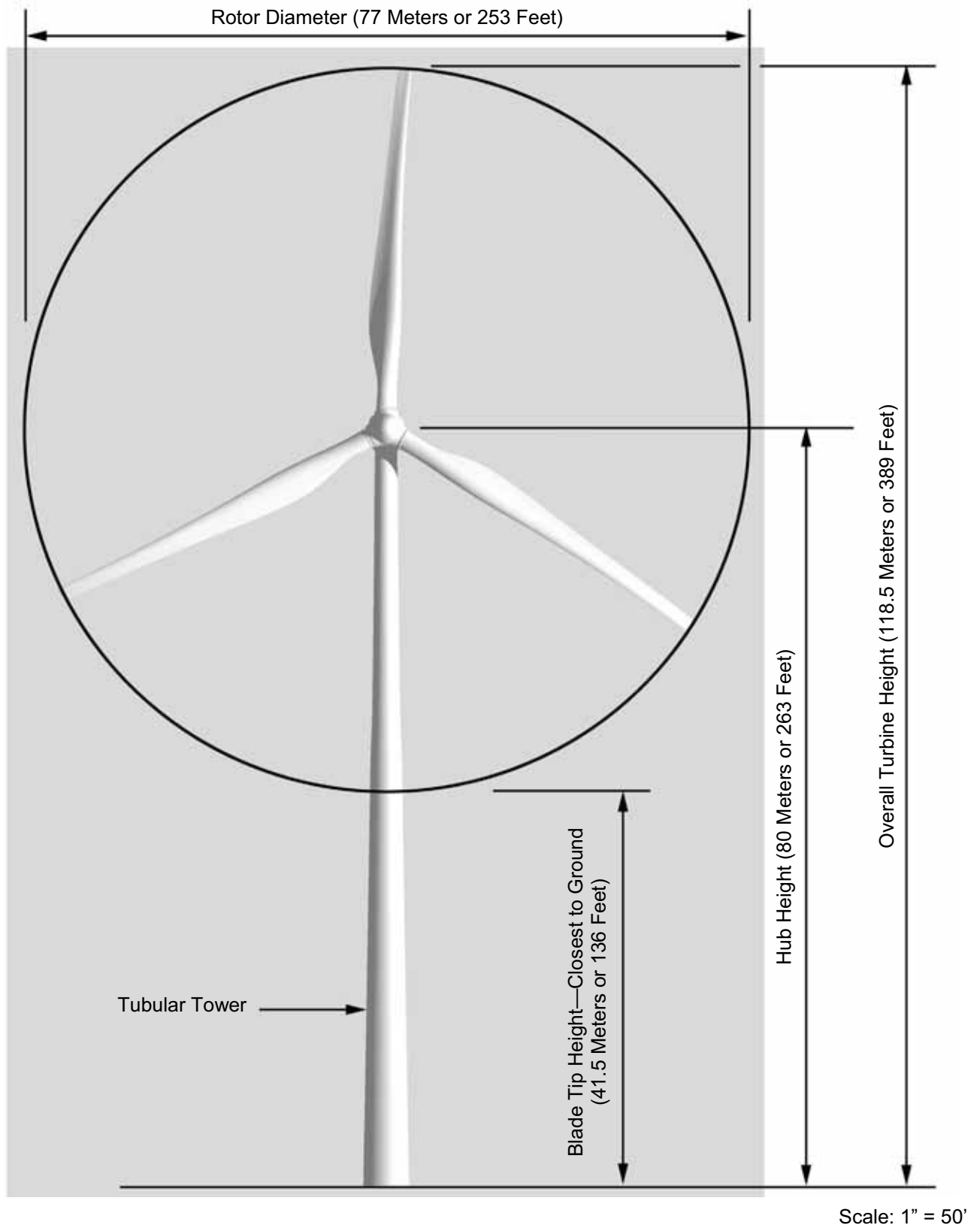


Figure 1.1-2 Noble Ball Hill Project Facilities
 Noble Ball Hill Windpark



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- **Wind Overlay District.** The Wind Overlay District is defined by the 2007 Town of Villenova Local Law 1 as a zoning district that encompasses part or parts of one or more underlying districts and that establishes requirements for wind energy facilities. For this project, the term “Wind Overlay District” is synonymous with “Project Area.”
- **Project Site.** The Project Site contains all parcels of the Project Area that have the potential to be permanently or temporarily disturbed as a result of the construction or operation of Project facilities (including wind turbines, electrical collection and transmission lines, utility trenches, utility poles, access roads, staging areas, and other related structures). Noble has obtained property interests or is in the process of finalizing negotiations for all parcels that will host Project components or for which a setback waiver within the Project Site is required.
- **Turbine Cluster.** A turbine cluster is one or more wind turbines in geographic proximity that are served by a single system of access roads and collection lines.
- **Turbine Site.** The turbine site is a maximum of a 300 by 300 square foot staging area used during construction of wind turbines, including a foundation for that structure, a gravel crane pad, and the surrounding construction/maintenance area. Within the 300 by 300 square foot staging area, an approximately 200 by 200 square foot area will be cleared and graded to a slope of 5% or less to facilitate the layout of turbine components. Disturbance outside of this 200 by 200 square foot area will generally be limited to selective tree cutting necessary for rotor assembly and storage of excess topsoil, subsoil, or woody material, including roots, logs, and/or wood chips. The turbine site refers to the total area associated with each turbine that will experience temporary impacts during construction, as described. Once installed, permanent impacts at each turbine site will include a 120-foot by 40-foot gravel crane pad, which will be left in place post-construction, and each wind turbine will permanently occupy a round, slightly exposed base approximately 18 feet in diameter.

1.1.2 Project Area Description

Noble considered the location of the Project within an area of approximately 13,658 acres in the Towns of Villenova and Hanover (Chautauqua County), New York. Land uses within the Project Area are predominantly a mixture of forested (approximately 7,244 acres) and agricultural (approximately 5,510 acres) land. Additional acreage consists of wetlands, roads and other paved surfaces, scattered residences, buildings, and open water features such as farm ponds. (Wetland delineations in the Project Area are described in Section 2.7, Wetlands: Environmental Setting, and Appendix G.) The principal agricultural enterprise is dairy farming. Corn and hay are the main crops, but some small grain is grown. The northern portion of the Project Area in the Town of Hanover includes vineyards and orchards. Most of the natural stands are represented by mixed hardwoods

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dominated by sugar maple, red oak, black cherry, white ash, and American beech. Current and historic silviculture is evident throughout the Project Area.

1.1.3 Project Site Description

The Project Site consists of approximately 5,569 acres (approximately 3,669 acres in Villenova and 1,900 acres in Hanover) within the approximate 13,658-acre Project Area. The Project Site includes the maximum 60-foot ROW (40-foot ROW in wetland and stream crossing areas) for 16 miles of roads and adjacent electrical collection lines (236 acres); the turbine sites (126 acres); the collection system ROW (28 acres); the transmission line (73 acres); 20 acres of equipment laydown area; and 5 acres for the operations and maintenance building site.

1.1.4 Turbine Clusters

The Project Site has been further divided into turbine clusters that are served by a series of access roads and an electrical collection system consisting of multiple circuits. Each cluster is identified by the primary access road to the turbine grouping (i.e., Cluster 1 is served by Access Road 1). The clusters are noted on Figure 1.1-2 and are identified in Table 1.1-1.

Table 1.1-1 Turbine Clusters

Cluster Number	Turbine Numbers Included in the Cluster	Access Road Serving the Cluster	Municipality
Cluster 1	Turbines T1, T2, and T3	1	Town of Villenova
Cluster 2	Turbines T4	2	Town of Villenova
Cluster 3	Turbines T5 and T6	3	Town of Villenova
Cluster 4	Turbines T7	4	Town of Villenova
Cluster 5	Turbine T8, T9, and T10	5	Town of Villenova
Cluster 6	Turbines T11, T13, and T14	6	Town of Villenova
Cluster 7	Turbines T16 and T17	7	Town of Villenova
Cluster 8	Turbine 68	8	Town of Villenova
Cluster 9	Turbines T18, T19, T20, and T21	9	Town of Villenova
Cluster 10	Turbines T25	10	Town of Villenova
Cluster 11	Turbines T23 and T24	11	Town of Villenova
Cluster 12	Turbines T22	12	Town of Villenova
Cluster 13	Turbine T26	13	Town of Villenova
Cluster 14	Turbine T27	14	Town of Villenova
Cluster 15	Turbine T29	15	Town of Villenova
Cluster 16	Turbines T30, T31, and T32	16	Town of Villenova
Cluster 17	Turbines T33, T34, and T35	17	Town of Villenova
Cluster 18	Turbines T36	18	Town of Villenova
Cluster 19	Turbine T38	19	Town of Villenova
Cluster 20	Turbines T39, T40, T41, T42, T43, and T45	20	Town of Villenova
Cluster 21	Turbines T46 and T47	21	Town of Villenova
Cluster 22	Turbines T48, T50, and T51	22	Town of Villenova
Cluster 23	Turbines T52, T53, and T55	23	Town of Villenova

Table 1.1-1 Turbine Clusters

Cluster Number	Turbine Numbers Included in the Cluster	Access Road Serving the Cluster	Municipality
Cluster 24	Turbines T56	24	Town of Hanover
Cluster 25	Turbines T57, T58, T59, T60, and T67	25	Town of Hanover
Cluster 26	Turbines T64, T65, and T66	26	Town of Hanover
Cluster 27	Turbines T61 and T62	27	Town of Hanover

1.2 Detailed Description of the Proposed Action

1.2.1 Project Description

Appendix A includes engineering details for the Project Site including the locations of turbines, access roads, transmission line, and electrical components. Construction of the Project is expected to begin in March 2009 and end in November 2009; however, weather and other factors may increase construction duration to 12 months and/or delay the start of construction.

Selection of the various Project components were based on several factors, including experience of the manufacturer, engineer, or vendor and suitability of the specific component to this geographic location and wind resource.

Turbine Description

As discussed in Section 1.1, the wind turbines that will be installed at the Noble Ball Hill Windpark will be General Electric (GE) 1.5-megawatt (MW), 80-meter, modular tower system (MTS) sle, T-Flange wind turbine generators. The turbine consists of a three-blade rotor 77 meters in diameter and centered 80 meters aboveground. The maximum height of each turbine will be 389 feet when the rotor blade is at the top of its rotation, and each with an approximate 18-foot diameter, slightly exposed concrete foundation. Each turbine included within the Project will have a nominal output of 1.5 MW. These turbines are the same model as those which Noble has constructed at other sites in northern and western New York State (NYS). There are other sites currently under development by Noble utilizing the same model turbine. This turbine is well suited to the wind resource characteristics of New York and has been successfully implemented by Noble at other New York projects. As a result, Noble has established a long-term relationship with General Electric (GE) that guaranteed access to turbines for this project which allows for construction to begin as soon as all approvals are received. Appendix A includes the drawings, specifications, and power curves of these turbines.

Power from the turbines is fed through a breaker panel at the turbine base inside the tower and is interconnected to a pad-mounted step-up transformer that steps the voltage from 575 volts as generated by the turbine to 34,500 volts (34.5 kilovolts [kV]). The pad-mounted transformers are located near the base of each tower and are interconnected on the high voltage side to underground cables that connect the turbines together electrically.

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The turbines will require lighting in accordance with Federal Aviation Administration (FAA) standards to avoid hazards to aviation. Aviation warning lights will be limited to the minimum required by the FAA (e.g., if allowed by the FAA, lights will be installed on turbines around the Project perimeter, and those within the perimeter will be spaced a half mile apart, rather than on all structures). There will be no lights during the day. There will be red flashing lights during the night designed at a minimum intensity and duration of time with an illumination pattern that will primarily be directed upward, as suggested by the FAA (see Sections 2.13, Visual Resources: Environmental Setting, and 2.14, Visual Resources: Impacts and Mitigation).

Collection System Description

The Project requires approximately 23.8 miles of underground electric power lines (18.7 miles in the Town of Villenova and 5.1 miles in the Town of Hanover) installed in trenches and about 174 feet (.03 miles) of overhead 34.5 kV electrical power lines in the Town of Villenova to collect the power from the padmount transformers and transfer it to the proposed substation in the Town of Hanover. The underground portion of the collection system will be installed in a trench that is typically 54 inches (4.5 feet) to 66 inches (5.5 feet) deep and generally runs parallel to the Project's roadways in order to reduce disturbances to additional ground. In locations where two or more sets of underground lines converge, pad-mounted junction terminals will be utilized to tie the lines together into one or more sets of larger feeder conductors. There will be one overhead portion (approximately 174 feet) of the collection line which will be installed on 45-to-55-foot wooden utility poles similar to existing utility poles in the area. This section of overhead collection line will not be visible from the road at any location.

The overall electrical system will be designed and constructed in accordance with the guidelines of the New York State Building Code, the Institute of Electrical and Electronics Engineers, the National Electric Safety Code, the National Electrical Code (NEC), the National Fire Protection Agency (NFPA), the New York State Power Authority (NYPA), and overall good utility practice.

Transmission Line Description

The Project requires approximately 6 miles of new 115-kV electrical transmission lines to transfer the power from a new electrical substation in Hanover to a new switchyard in the Town of Hanover adjacent to the 230-kV National Grid Dunkirk-Gardenville Line. The new transmission line will be placed on 73 single pole structures within a 100-foot wide right-of-way (ROW). The poles will range between 65 and 75 feet in height, and spans between poles will generally be 420 feet but may be as much as 550 feet or as little as 240 feet, as a result of alignment, topography, or sensitive area avoidance. The transmission facility has sufficient capacity to transfer the electricity generated by the Project. The System Reliability Impact Study (SRIS) has been completed and was approved by the New York Independent System Operator (NYISO) on June 19, 2008. No system upgrades were identified.

Access Road Description

The Project requires construction and use of approximately 16 miles of access roads (13 miles in the Town of Villenova and 3 miles in the Town of Hanover) that will connect each wind turbine to a Town or County roadway. These roads will be gravel-based, designed to meet the specific load-bearing requirements of trucks transporting concrete, aggregate, and turbine components to the turbine sites. Construction of the 35-foot temporary access roads will require a 60-foot construction ROW. After construction, the 35-foot temporary access roads will be scaled back to a 16-foot operational width allowing Noble to use the existing roadway for maintenance and operational purposes, as well as access by emergency services, if needed.

The Transportation Haul Route Study (see Appendix N) evaluates the potential routing for the delivery of turbine components and identifies where temporary roadway improvements would be required at certain intersections to accommodate the turning requirements of trucks carrying oversize loads. The direction of travel on local roads was carefully considered to minimize the extent of temporary construction required at intersections within the Project Area. After the Project has been constructed, the intersections will be restored to their original condition including traffic sign replacement and roadway resurfacing, if necessary. Specific intersection drawings can be found in Appendix A of the Transportation Haul Route Study (see Appendix N).

Substation and Switchyard Description

A new substation and switchyard will be constructed as part of the Project and will both be located in the Town of Hanover. The main function of the substation is to step up the voltage transported through the collection lines from 34.5 kV to 115 kV. The basic elements of the substation are a control house, a main transformer, outdoor circuit breakers, capacitor banks, relaying equipment, high voltage bus work, metal clad switchgear, steel support structures, an underground grounding grid, and overhead lightning suppression conductors.

The transmission line will transmit the power to the new switchyard to be built by Noble in the Town of Hanover and will connect the power to the existing electrical grid. The basic elements of the switchyard are a control house, outdoor circuit breakers, capacitor banks, relaying equipment, high voltage bus work, steel support structures, an underground grounding grid, and overhead lightning suppression conductors.

All of the main outdoor electrical equipment and control houses will be installed on concrete foundations that are designed for the soil conditions at the substation and switchyard sites.

1.2.2 Construction Overview**Turbine Installation**

Generally, all components of the Project will be installed in the same manner. A maximum 300 by 300-foot temporary staging area will be utilized at each turbine location for laying out equipment, turbine rotor assembly, and stockpiling topsoil. Within the 300 by 300-foot square staging area, generally a 200 by 200-foot square area will be cleared and graded to a slope of 5% or less to facilitate the layout of turbine components. Disturbance outside of this 200 by 200-foot square area will generally be limited to tree cutting necessary for rotor assembly and storage of excess topsoil, subsoil, or woody material including stumps, roots, logs, and/or wood chips. This area may be further minimized to avoid impacts to wetlands and other sensitive resources.

Within the maximum 300 by 300-foot turbine staging area, a gravel crane pad, typically 120 by 40 feet with a slope of 1% or less in all directions, will be installed. The crane pad is used to support the crane as it lifts turbine components to their upright and installed positions. After turbine installation is completed, the crane pad will remain in place for future turbine maintenance. Pad-mounted transformers will be situated at each turbine site so that there are at least 6 feet of clearance between the transformer and any other component. The transformers will be installed in accordance with industry standards.

Each wind turbine will permanently occupy a round, slightly exposed base approximately 18 feet in diameter. Preparation of each turbine site for installation of the foundations will involve excavation of surface materials. Extra care will be used to ensure that topsoil and subgrade materials are kept separated and stockpiled to guarantee the land is returned to its original use. Dewatering is not expected to be required, but will be used where required to maintain the strength of the subsurface load-bearing materials. If bedrock is encountered during excavation activities, an excavator with a large rock bucket will be used or, in locations where the bedrock is more concentrated with depth, an excavator equipped with a hydraulic/pneumatic breaker or rock grinder may be used. Noble does not expect that blasting will be necessary for the Project. In the event that blasting becomes necessary, a detailed blasting plan will be prepared and submitted to the authority having jurisdiction and copied to the Towns of Villenova and Hanover, the Chautauqua County Emergency Services Coordinator, and the Chautauqua County Department of Health for their review (see Section 2.27, Description of the Proposed Construction Plan, for additional discussion on the blasting plan).

During the Project construction phase, the large turbine components (i.e., tower sections, nacelle, and rotor blades), will be transported from GE vendors of Ports of Import and delivered directly to site. Along the Off-Site Haul Route (see Appendix N), an approximately 3-acre off-site equipment staging area will be located along Route 39 near the intersection with Empire Road in the Town of Hanover. This area will be used as temporary short-term staging for verification

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of match marking, a quality receipt inspection, washing², and any necessary rigging adjustments prior to site delivery. Materials, such as cable reels, padmount transformers, and 34.5-kV junction boxes, will be delivered from off-site secured storage directly to site-specific locations to support specific scheduled construction activities. Specific equipment and materials will be delivered to designated turbine sites. Each turbine site will serve as the heavy lift staging area for the erection of that specific turbine.

A total of 28 acres of on-site laydown will also provide storage for materials such as overhead poles, rods, ring forms and other construction materials. The proposed locations of the laydown facilities are depicted on Figure 1.1-2; however, the final locations are subject to change based on landowner consent. The final locations will be identified in the Final Environmental Impact Statement and will avoid impacts to wetlands and archaeological resources. If sited in active agricultural lands, Noble will, to the extent practicable, be consistent with New York State Department of Agriculture and Markets (NYSDAM) guidelines for agricultural mitigation for windpower projects (see Appendix B). Input from landowners will be considered to avoid or minimize impacts to current or future farm operations as a result of laydown areas. The on-site laydown areas will also provide space for Noble and its contractors' construction trailers and parking for construction crews who will be bused to the work sites. Others, including dedicated support staff, quality inspectors, and field engineers, will park off the public roads in designated areas, such as access roads and turbine sites, as needed. Necessary building permits required for placement of construction trailers will be obtained prior to installation.

Collection System Installation

Underground collection lines will be used for the majority of the main collection system. Underground collection lines will be installed, to the extent possible, within the maximum 60-foot ROW area of temporary road disturbance. In areas where underground collection lines will not be installed adjacent to an access road, the ROW width will range between 22 feet where one circuit is installed and up to 50 feet where four circuits will be installed in parallel.

Underground collection lines will be installed via direct burial using either a trenching machine or a track hoe. The cables will generally be buried in a trench to a depth of 4.5 feet. Where multiple circuits are installed parallel to each other, a separation of approximately 8 feet is required between each trench. In the unlikely event that bedrock is encountered within the trench depth during installation, alternatives such as ripping or blasting will be evaluated. Blasting will not proceed until full approvals from the authority having jurisdiction have been obtained.

² In accordance with the State Pollutant Discharge Elimination System (SPDES) permit, washing will be conducted with water only. No detergents, solvents, or other additives will be used. A separate SPDES permit is required for such activities.

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Construction of underground collection lines in narrow trenches in wetlands will not create an impervious boundary; therefore, will not cause any alteration in the subsurface hydrology of wetlands. However, where necessary, trench plugs will be used to prevent migration of water out of the wetland. Pre-existing contours will be restored after the trench is backfilled and the area is revegetated. No permanent filling of wetlands will occur in association with underground collection lines.

Underground collection lines will be installed via trenching at stream crossings. Streams that are not naturally dry at the time of crossing will be temporarily dammed, with the water pumped around the construction area to allow collection lines to be installed in dry conditions. The equipment that will be used to install the collection lines cuts a trench, places the cable, and backfills the trench in a single pass, thereby reducing the duration of stream disturbance.

While the majority of the collection system will consist of underground collection lines, overhead collection lines will be utilized where it is necessary to cross an existing road, along existing roadways, and wherever necessary to minimize environmental impacts in sensitive areas, such as wetlands. Installation of overhead lines will require a 25-foot ROW, where located adjacent to existing roadways, or 35 feet in other areas. The ROW will be cleared of any trees and large woody vegetation that may pose a hazard to the line. Where overhead lines are located adjacent to existing roadways, installation will take place from the edge of the road and the poles will generally be located 10 feet from the road shoulder.

Transmission Line Installation

The transmission portion of the Project includes a new 6-mile overhead transmission line. A 100-foot ROW will be required; all forested areas within the 100-foot ROW will be cleared to avoid interference with transmission lines. During construction, any portion of the ROW may be utilized in upland areas, but equipment travel will generally be limited to a 30-foot travel corridor, where practicable, and temporary 70-foot by 100-foot workspaces at pole locations. If wetland areas are encountered along the transmission ROW, wetland mats will be used within a 30-foot corridor immediately adjacent to the transmission line to accommodate equipment travel. Temporary workspaces at pole locations within wetlands will be reduced to an area 30-foot by 70-foot required for drilling operations.

Construction of the proposed transmission line will occur in four general phases: ROW clearing and preparation, assembly of single-pole structures, stringing of the conductors, and, finally, cleanup and restoration.

The entire ROW width (100 feet) will be cleared of trees and maintained in an herbaceous or shrub/scrub state to provide appropriate transmission system clearance and maintain a reliable operating environment for the transmission line. In areas where woody vegetation needs to be removed from wetlands within the 100-foot ROW, it will be cut by hand and equipment used for removal will be posi-

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tioned outside of the wetland boundary or on mats located within a 30-foot wide construction corridor immediately adjacent to the transmission line. Tree stumps will be left intact except where necessary for pole installation or where they pose a safety related construction constraint (such as within travel paths). In these areas stumps will be removed and disposed of in approved upland, non active agricultural locations.

Wood single poles will be installed to support the conductors. A crew will transport the poles, along with insulators and insulator hardware, to each pole location on the ROW. A drill rig or auger will be used to drill holes for the transmission poles to the required depth. The poles will be lifted individually and set in place by a crane or large forklift. Braces and davit arms will be individually hoisted and framed to the poles. The insulators, clamps, travelers, and other associated hardware will be installed on the pole.

Access Road Construction

Access roads will have a temporary width of 35 feet during construction. The temporary access road will be installed within a maximum 60-foot construction ROW (40 feet in wetlands) that will serve as extra work space to allow for construction of the temporary access road, storage of topsoil, and safe passage of equipment. When collocated with an access road, collection lines will be installed within the 60-foot construction ROW. Roads will be maintained at a permanent width of 16 feet for operation and maintenance of the turbines after the construction phase is complete. Where the roads are maintained above the existing ground grade an approximate 2-foot embankment is required on each side of the road to accommodate the final 16-foot surface. Conservatively, a 20-foot permanent width will be used for all calculations.

The remainder of the construction ROW will be allowed to naturally revegetate. Natural revegetation of the construction ROW is likely to result in the establishment of native plants, due to existing seed banks and adjacent plant communities. An annual rye seed or mulch will be used to temporarily stabilize the soil. If necessary, supplemental seeding/mulching will take place on an as-needed basis. In areas adjacent to agricultural fields, plans for revegetation or seeding/mulching will be discussed with individual farmers so that the re-establishment of vegetation complements each farmer's operation. Periodic removal of woody vegetation will be required to maintain an herbaceous or successional shrub state composed of native species.

The access roads for the Project are gravel roads designed to bear the weight of truck traffic transporting concrete, gravel, and turbine components to the wind turbine sites over the life of the Project. These access roads will also support any emergency or fire service equipment that may need access to the site. The required gravel road base section will be constructed using site-specific geotechnical information considering the load-bearing requirements of construction traffic and equipment delivery. The gravel roads will be constructed on suitable, undisturbed native soil. Geotextile fabric, or a comparable product, will be used to

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separate the native soil/fill from the base material to prevent fine soil particles from migrating into the gravel base material and to preserve road base integrity.

Roads will be constructed with culverts as needed to maintain a water table elevation below the base material to ensure roadbed stability. Roadside ditches will be constructed as dictated by the terrain to convey stormwater runoff away from the roadways. To prevent access by the general public, construction/access roads will be gated where they intersect public roads.

Substation and Switchyard Construction

The switchyard will be designed in accordance with National Grid standards and with the Northeast Power Coordinating Council Criteria for Bulk Power Stations and criteria set for by Homeland Security. The construction of these facilities involves grading, construction of foundations for the transformers, steel work, breakers, control house, and other outdoor equipment; the erection and placement of the steel work and all outdoor equipment; and electrical work for all the required terminations. All excavation, trenching, and electrical system construction work will be done in accordance with the Project Storm Water Pollution Prevention Plan (SWPPP), attached as Appendix E. Prior to construction, site-specific SWPPPs will be submitted to the New York State Department of Environmental Conservation (NYSDEC), as required. Construction work will require the use of bulldozers, a drill rig and concrete trucks, a trencher, a back-hoe, front end loaders, dump trucks, transportation trucks for the materials, boom trucks and cranes, and man-lift bucket trucks. The footprint for the substation will be approximately 200 by 300 feet (1.4 acres) and the footprint for the switchyard will be approximately 300 by 500 feet (3.4 acres).

Environmental Monitoring

Construction activities will be monitored to ensure compliance with applicable permit conditions, the SWPPP, and best management practices (BMPs). To facilitate this, Noble will create a project-specific Environmental Monitoring Plan (see Section 2.27, Description of the Proposed Construction Plan, and Appendix I for more details). The plan will contain permit conditions and other commitments required of Noble during the Environmental Impact Statement (EIS) process including those associated with wetland and stream disturbance, vegetation removal, invasive species control, stormwater management, erosion control, and agricultural impacts. Noble will retain an Environmental Monitor(s) whose duties will include coordination of environmental monitoring activities, documentation, and implementation of mitigation activities as they are conducted, and preparation of a final report available to the Town of Villenova, the Town of Hanover, and involved and interested agencies as needed and/or requested. The Environmental Monitor will have full stop-work authority.

Safety

Prior to the start of construction and pursuant to applicable laws and regulations, a risk analysis will be completed to address any construction risks that are identified. These risks are incorporated into the Emergency Response Plan (ERP)

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which is included in Appendix R. The ERP identifies all required actions and resources required, and will confirm availability and proper training for construction phase risks. This plan details the actions to be taken by the site manager and staff should an emergency or fire occur and it sets forth the lines of communication in the event of a fire or other emergency. The ERP is included in Appendix R and will be updated with the most current information prior to construction.

In addition, Noble maintains a Health, Safety and Environmental Management System (see Appendix R) program which summarizes the procedures to be implemented on a Noble project.

1.2.3 Operation and Maintenance

The turbines are designed and anticipated to be operable 365 days a year and 24 hours a day. Downtime for preventive maintenance and/or malfunctions may reduce operating hours. The turbines will generate electricity only during times of sufficient wind.

Noble plans to operate the Project with eight full-time employees. Six of these employees will perform routine, preventative maintenance and unplanned work on the turbines under an operations and maintenance contract. A facility manager and an administrative assistant will be responsible for all operations and maintenance of the site, including administration and direction of turbine maintenance, technical oversight as required by the manufacturer, and operational coordination with both the utility grid system and local landowners. Large repair tasks will be accomplished using both Project employees and contractors. Noble will construct an operations and maintenance (O&M) facility on approximately 5 acres within the Project Area, which would house these activities. The O&M building will be approximately 50 feet by 100 feet (see Appendix A). The O&M facility may be constructed within one of the laydown areas depicted on Figure 1.1-2 however, the final location is subject to change based on landowner consent. The final location will be identified in the Final EIS and will avoid impacts to wetlands and archaeological resources.

The operational staff will maintain the turbines, including routine maintenance, long-term maintenance, and emergency work. Routine maintenance for the turbines will include testing lubricants for contaminants, changing lubricants, calibrating and testing electronic systems, and tightening bolts and components. Routine maintenance is generally completed on a scheduled basis by climbing the tower using the internal ladder and doing the work with normal hand tools and electrical testing equipment. Long-term maintenance may include replacement/rebuilding and cleaning larger components, such as generators and gearboxes, testing electrical components, and refurbishing blades. In all cases, the facility staff will be responsible for facilitating the needed repair either through internal resources or with the aid of additional contractor support. In the event that temporary impacts are required for future maintenance, Noble will obtain necessary permits from the United States Army Corps of Engineers (USACE) and NYSDEC on an as-needed basis.

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Emergency work also may be required as the result of a system or component failure. Certain unplanned work, such as blade repairs or repairs to other large components, may require the use of a crane to complete the work.

It is expected that the Project will require only minimal use of herbicides to control vegetation along access roads, turbine maintenance areas, or electrical collection ROWs. Generally these areas are not expected to promote vegetation growth because of the use of geotextile fabric and gravel construction and the periodic use of the access roads by vehicles. If the use of herbicides becomes necessary to control vegetation, application will be performed by a certified contractor and in accordance with all applicable regulations and BMPs. The natural vegetative conditions will be preserved to the maximum extent practicable throughout the Project Area and no sites will be maintained devoid of vegetation. Maintenance of all cleared areas and periodic removal of vegetation will consist of trimming trees and clearing undesirable vegetation by side trimming, cutting, and mowing to: 1) control re-sprouting of undesirable tall growing species to maintain safe clearance within wire security zones; 2) remove vine growth from poles; 3) clear access paths to overhead equipment; 4) protect underground collection lines from root damage; and 5) maintain erosion and sediment control devices. In some cases, spot control of invasive species might be required. Maintenance of clearance distances around aboveground electrical lines will be limited to a minimum of a 5-foot radius around conductors as recommended by the manufacturer's specifications, as necessary, to prevent interference with power cables.

Any and/or all materials used during the inspection and maintenance of Project equipment will follow a strict material safety data sheet (MSDS) program and, when required, will include documented, dedicated control of excess materials as well as off-site disposal of waste materials at licensed facilities with an emphasis on recycling whenever possible.

1.3 Project Alternatives

This section discusses Project alternatives and describes the process used to select the Project Site and the locations of all Project facilities within the Project Area. The alternatives evaluated in this section include: the no-build alternative; alternative project location and design; alternative Project and turbine sizes; and alternative turbine technologies. The Project Area was selected through a systematic process that considered (1) the location of wind resources in New York State (NYS); (2) the availability of existing roads and utility interconnections; (3) the availability of land with landowners willing to sign easements for their property; (4) community support; (5) the presence of environmental constraints, including visual and noise impacts, impacts on wetlands and streams, and important wildlife habitat; and (6) the presence of land use constraints including zoning and building restrictions. The selection process was designed to facilitate the evaluation of different potential project sites and turbine locations as Noble obtained property rights within a preferred project area sufficient to develop a wind energy facility.

1.3.1 Project Alternatives Evaluated**No-Build Alternative**

The no-build alternative assumes that the Project would not be built. Selection of the no-build alternative would preclude the development of a windpark in an area with favorable wind resources and infrastructure to support such a project. Wind-powered electricity generation presents a no-air emissions alternative to fuel-based resources. In the northeastern United States, viable wind energy project sites are limited and those that do exist are primarily located in areas that will have similar social and environmental concerns. Therefore, the selection of the no-build alternative would continue the reliance in the northeast predominantly on non-renewable energy resources (e.g., fossil fuels and nuclear materials). Energy production with such non-renewable sources results in severe direct and indirect adverse environmental impacts (e.g., air emissions, water consumption, toxic effluents and thermal emissions, by-product wastes, significant infrastructure needs and related land use impacts, visual impacts, noise impacts, traffic impacts, and health impacts), and socioeconomic effects (e.g., decreased energy diversity and reliability, fluctuating and increased consumer costs, and uncertainties regarding the ability to meet increasing energy demands).

Furthermore, the benefits of the addition of approximately 90.0 MW of clean, renewable electric energy to the power grid would be lost. Electric generation by fossil fuel-fired facilities presents serious consequences in the form of, among other things, air emissions (i.e., carbon dioxide, sulfur dioxide, nitrogen oxides, particulate matter, and mercury). The adverse environmental and health effects of air emissions from combustion of fossil fuels are well-documented and include global warming, acid rain, smog, respiratory health effects, and significant long-term impacts on wildlife. Air emissions and global warming have been cited as serious concerns for bird populations in North America in *A Birdwatcher's Guide to Global Warming* (Price and Glick 2004). This guide advocates renewable energy sources such as wind to help slow global warming and reduce the threat it poses to people and wildlife.

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

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Beyond environmental impacts, fossil fuel power plant facilities also have significant adverse socioeconomic effects. Strict air emissions regulations and control measures, along with other environmental requirements to permit new or re-powered fossil fueled facilities, have increased the capital and operating costs of power plants and the ultimate cost of electricity for the consumer.

Further, the infrastructure required for efficient energy distribution is in some instances lacking, leading to price fluctuations and unreliability of energy supply. For example, although natural gas is heralded as the cleanest of the fossil fuels, it nonetheless has substantial drawbacks, both socioeconomic and environmental. Natural gas is transported through a network of pipelines throughout the country, but this network is not always capable of transporting the required gas to various regions. This results in significant price swings and increased costs to consumers due to supply and demand forces. In extreme instances, supply disruptions may force use of dirtier fuels such as fuel oil.³ In addition, natural gas facilities suffer from many of the same adverse environmental impacts as do coal-fired and oil-fired plants, particularly with respect to water withdrawals, thermal releases, and visual impacts. Thus, fossil fuel-fired facilities, which depend on non-renewable resources, have undeniable and well-defined significant environmental and social costs.

Nuclear facilities pose their own unique set of dangers, including the disposal of radioactive waste (high-level and low-level), impacts on the marine environment from thermal water discharge, and the potential danger of a catastrophic radioactive release as the result of an accident or act of terrorism. Moreover, the stigma associated with, and public perception of, nuclear facilities (both the power plants themselves and radioactive waste disposal sites) render the siting of any new facilities difficult.

In marked contrast, according to the National Renewable Energy Laboratory, wind energy has the following characteristics: 1) economically competitive; 2) a valuable crop of the future for farmers and ranchers; 3) unlike most other electricity generation sources, wind turbines do not consume water; 4) an indigenous, homegrown energy source that contributes to national security; 5) inexhaustible and infinitely renewable; 6) has many environmental benefits; 7) reduces the risk associated with volatile fossil fuel prices; 8) the fuel of today and tomorrow; and 9) can be used in a variety of applications (United States Department of Energy 2005). Wind projects do, however, require appropriate wind resources, and they are generally distributed over a larger land area than fossil fuel facilities. These characteristics make rural areas appropriate for wind project development. Rural areas often are used for farming or logging, and wind energy facilities are wholly compatible with these two land uses. They do not require the Project sponsor to take control of land; instead, an easement is signed and the land remains the property of the rural landowner. Thus, revenues are paid to the landowner, and these

³ Diversity in the mix of energy sources that supply our electricity can help reduce price fluctuations for the consumer.

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monies help sustain economic vitality in the rural area (United States Department of Energy 2003). In addition to easement payments to private landowners, the Project is expected to make significant payments in lieu of taxes (PILOT) and other payments to local taxing jurisdictions, and make road improvements as a result of construction and post-construction remediation. The no-build alternative would deprive the rural area of this direct economic benefit as well as preclude development of an environmentally benign and beneficial energy production technology.

Both the United States' and New York's energy policies explicitly recognize the need to supplement non-renewable energy production resources with renewable energy resources. In 2008, the United States Department of Energy (DoE) developed a plan for wind energy to provide 20% of United States electricity by 2030. The New York State Energy Plan increases the state's use of electricity from wind from 10% by 2000 to 15% by 2020. Thus, they encourage development of renewable sources and support renewable sources as a vital part of the local and national long-term energy strategy (e.g., New York State Energy Planning Board 2002; New York State Public Service Commission 2006).

This Project utilizes a renewable resource, is environmentally benign compared to fossil fuel-fired and nuclear-powered facilities, and is environmentally and socio-economically beneficial (both locally and globally). Due to continued improvements in renewable energy technology, a commercial-sized wind farm, such as the Project, can generate electricity that is competitive with electricity produced from fossil fuels and can do so with significantly lower impact on the overall environment than comparable conventional non-renewable energy projects. The Project is consistent with the long-term energy goals of both the United States and the state of New York. Finally, to the extent that the Project may displace more environmentally harmful means of energy production, it would actually create environmental benefits (including for avian species and other wildlife).

If the No-Build alternative were selected, the economic benefits of the Project would not be realized, including revenues to local taxing jurisdictions, lease revenues for participating landowners, income from operation and maintenance jobs, payments to Project neighbors, and income from construction jobs. The Project, as proposed, will add up to 90.0 MW of electricity from a renewable resource to the New York State Energy Portfolio. If this alternative were selected, the state's energy portfolio would not add this additional renewable capacity.

If the No-Build alternative were selected, the temporary and permanent environmental impacts from construction and operation would not be realized. This includes the potential impacts to the natural environment, such as soils, water quality, wetlands, wildlife habitat, and birds and bats. Overall, the Project will result in the disturbance of approximately 349 acres of land during construction including the permanent conversion of 58 acres (approximately 40 acres in the Town of Villenova and approximately 18 acres in the Town of Hanover) of land for Project facilities, such as turbine pedestals, access roads, turbine crane pads and the sub-

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station and switchyard. The remaining 291 acres of land will be restored to pre-construction conditions. Minimal grading will be required to the turbine sites to level off the areas; however, these alterations will not change the overall topography of the Project Area.

Construction practices, including the building of access roads, installation of turbines, and placement of electrical collection and transmission lines, may impact the condition of groundwater and surface water resources, and ultimately, water quality, through ground disturbance and runoff.

If the No-Build alternative were selected, 16 acres of wetlands would not be disturbed during construction, including less than one half acre permanently impacted by placement of fill. Approximately 5 acres of forested wetland would not be permanently converted to shrub/scrub or emergent wetland as a result of periodic removal of woody vegetation adjacent to access roads and within collection and transmission line corridors.

Selection of the No-Build alternative would prevent a loss of upland vegetation including the removal of existing vegetation, which provides habitat for various wildlife species through minimal clearing of forested, shrub/scrub, and herbaceous vegetation as part of construction activities. Construction-related activities (e.g., clearing for road construction, infrastructure construction, equipment noise, and increased vehicle traffic) can potentially impact birds and bats by causing temporary displacement from habitat.

If the Project were not constructed, the potential impacts to birds and bats through collisions with the turbine blades and towers, overhead collection lines, or transmission lines, displacement from habitat, or influence on migration would be avoided.

Other impacts that would be prevented include visual resources, noise, communication signals, traffic and transportation, land use, socioeconomics, and cultural resources. These impacts are offset by the benefits described above. Environmental impacts are discussed in detail in Section 2, Environmental Setting and Impacts, and its subsections.

Alternative Project Location and Design

Beginning in 2004, Noble undertook a statewide study to identify potential commercial-scale wind generating project areas. Numerous potential project areas were identified in northern and western NYS. The potential areas were evaluated using the following criteria:

- **Availability of sufficient wind resources.** Wind turbines must be sited in locations where there is sufficient wind flow of adequate speeds and duration. Potential project sites were evaluated using topographic maps and the New York State Wind Resource Map produced by TrueWind™ in 2001 and up-

1. Description of the Proposed Action

dated in 2005. Generally, wind speeds averaging at least 7.5 meters per second (m/s) are needed for commercial wind energy project viability.

- **Proximity to existing roads and transmission lines.** Accessibility to an existing utility system to deliver the power generated into the energy grid is a key consideration for wind project siting. Use of existing transmission facilities minimizes environmental impacts associated with construction of new power transmission facilities, which would include clearing ROW and other construction impacts.
- **Availability of contiguous land.** Large, sparsely settled parcels require fewer easements and less encroachment on residential uses. Farmland is particularly important to project development because it offers large amounts of contiguous land. Wind turbines are generally compatible with agricultural practices. Project facilities preclude agricultural production or development on a small portion of each parcel, but generally do not impact land use in the areas adjacent to the turbines or access roads or impede future development on the surrounding land.

Northeastern Chautauqua County was identified as an area with considerable potential for project development. Further analysis of these criteria found the Towns of Villenova and Hanover particularly favorable for wind energy development. Through extensive computer analysis, wind resources in this area were determined to be more favorable in this area than in other areas of Chautauqua County.

The National Grid 230-kV Dunkirk-Gardenville transmission line that runs through the Town of Hanover makes electrical transmission possible in this area. The Noble Ball Hill Windpark transmission line will pass through a new switchyard in the Town of Hanover and connect to the existing National Grid electric line. The availability and proximity of this high-voltage transmission line also enhances the efficiency of the Project, versus delivery at lower voltage, by reducing transmission line “losses.”

The Project Area is accessible via NYS Route 39, NYS Route 72, NYS Route 85, NYS Route 93, and NYS Route 83. Transportation in and through Chautauqua County and the Towns of Villenova and Hanover is provided by a well-developed system of local and county roads. The roads are generally suitable for delivery of the equipment and materials needed to construct and maintain the Project, though some improvements may be necessary. The Project Area also includes many existing farm and logging roads. Improving these existing roads for Project access will minimize the disturbance of additional areas for new roads.

The Project Area is primarily comprised of privately owned lands. Many of the properties are large parcels that are currently or were formerly used for farming activities and have a low population density, making them attractive for wind energy development. Large, sparsely settled parcels require fewer easements and

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less encroachment on residential uses. As stated previously, the presence of agricultural lands is important to wind farms because of their compatibility.

Once a potential Project Area was identified, members of the Noble Project team met with landowners and residents of the community in 2006 and 2007 to determine whether there would be sufficient participation of landowners to develop a viable project. As a result of these discussions and meetings, the Project team determined that there was sufficient support to proceed with development of a wind project. Noble then sought voluntary agreements with landowners for development on their respective property. The Project Site is limited to those locations where Noble was able to enter into the voluntary landowner agreements.

After the potential Project Area was identified based on the above criteria and community outreach was conducted, preliminary analysis of the Project Area was conducted in 2006 to identify any environmental and land use constraints in the Project Area that had the potential to prevent project development (Fatal Flaw Analysis). The specific issues addressed in the Fatal Flaw Analysis included:

- Geology and soils;
- Water resources;
- Wetlands;
- Threatened and endangered species;
- Bird and bat issues;
- Traffic and transportation;
- Land use;
- Environmental justice issues;
- Cultural resources; and
- Visual impacts.

No fatal flaws were identified during this analysis.

Once it was determined that the Project Area satisfied the preliminary screening criteria, the wind resources were further verified through the installation and operation of meteorological towers within the Project Area to collect site-specific data. These data were compared to the NYS Wind Resource Map and modeled to predict electrical production from each potential turbine location.

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Noble obtained agreements with landowners within the Project Area that would allow for the construction of turbines, access roads, substation, switchyard, collection lines, and other Project facilities on their property. The Project Site was not finalized until a sufficient number of landowner agreements were in place to site all of the Project facilities.

When land acquisition activities were completed, an “area constraints map” was developed to determine where turbines, access roads, substation, switchyard and collection system components, and other Project facilities could be located. The first step in this design process was to determine turbine locations. Areas were eliminated from consideration as turbine locations if located on a NYSDEC or NWI-mapped wetland or in an area that appeared to be “wet,” based on a review of soils mapping and or a site investigation. Areas were also eliminated from consideration if they were located:

- Within a legally required setback distance established by relevant local law from a road, residence, or structure;
- Where legally mandated, sound pressure levels would be exceeded as in the case of a residence, school, church, library, hospital, or park;
- In proximity to an airport based on Federal Aviation Administration (FAA) and other applicable requirements; or
- Within a microwave or other radiowave pathway.

Data on the mapped constraints were entered into Windfarmer, a turbine siting modeling program, to determine optimum turbine locations within the Project Area. In addition to the mapped constraints, the Windfarmer model takes into account meteorological data and noise calculations to optimize turbine locations and turbine efficiency within a given area. The turbine locations identified within the Project Area using the Windfarmer program were field-verified to ensure that:

- Impacts on wetlands and other environmentally sensitive areas were avoided to the extent practical;
- Landowner concerns were addressed;
- Setback requirements were met; and
- Engineering constraints, such as steep slopes, were minimized.

Adjustments were made and modeling was repeated until preliminary turbine sites were optimized.

Once turbine locations were selected, access roads and collection lines were sited to minimize impacts to wetlands and other sensitive environmental features,

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maximize use of existing road and transmission infrastructure, avoid engineering constraints such as steep slopes, and meet the approval of individual landowners.

Noble utilized specific criteria for the preliminary siting of collection/distribution lines. “First order” criteria for collection line routing were: (1) shortening the length of circuits to minimize electrical losses and visual and other environmental impacts; (2) availability of property rights; and (3) absence of environmental constraints. Once preliminary collection/distribution routes were identified, the advantages and disadvantages of overhead versus underground collection lines for each segment of the line were considered. Both overhead and underground installations have the potential to impact streams and wetlands. Impacts can be minimized by using various construction techniques, some of which are directional drilling, maintaining buried cable depths in agricultural areas coordinated with landowner operations, and by strategic pole placements. After careful analysis, a primarily underground approach was selected in order to minimize visual impacts to the greatest extent possible. One location was selected for a short overhead crossing in order to avoid impacts to a perennial stream and avoid steep terrain.

Access roads have been sited in accordance with the New York State Department of Agriculture and Markets (NYSDAM) guidelines wherever practicable to minimize loss of agricultural land and impacts on farming operations. In addition, Noble reviewed the location of project facilities with NYSDAM representative Michael Saviola on July 22, 2008.

During the process of field-verifying the proposed turbine locations, access roads, electrical collection, and transmission line placement were also considered. In the interest of minimizing impacts, every effort was made to minimize the number of access road/interconnection systems needed. Each system was designed to:

- Collocate electrical lines and roads within the same corridor, where possible;
- Optimize the use of previously disturbed areas, such as farmlands and roads; and
- Avoid or minimize crossing wetlands and streams.

Once a route was selected based on these primary criteria, a secondary analysis was performed to determine whether the proposed route had any engineering constraints. Where avoidance of agricultural fields was not practical due to other engineering and/or environmental constraints, appropriate placement of access roads, turbines and the collection system was determined in consultation with the individual landowners and the NYSDAM “Guidelines for Agricultural Mitigation for Windpower Projects,” so as to minimize agricultural impact (see Appendix B).

Final Project Design

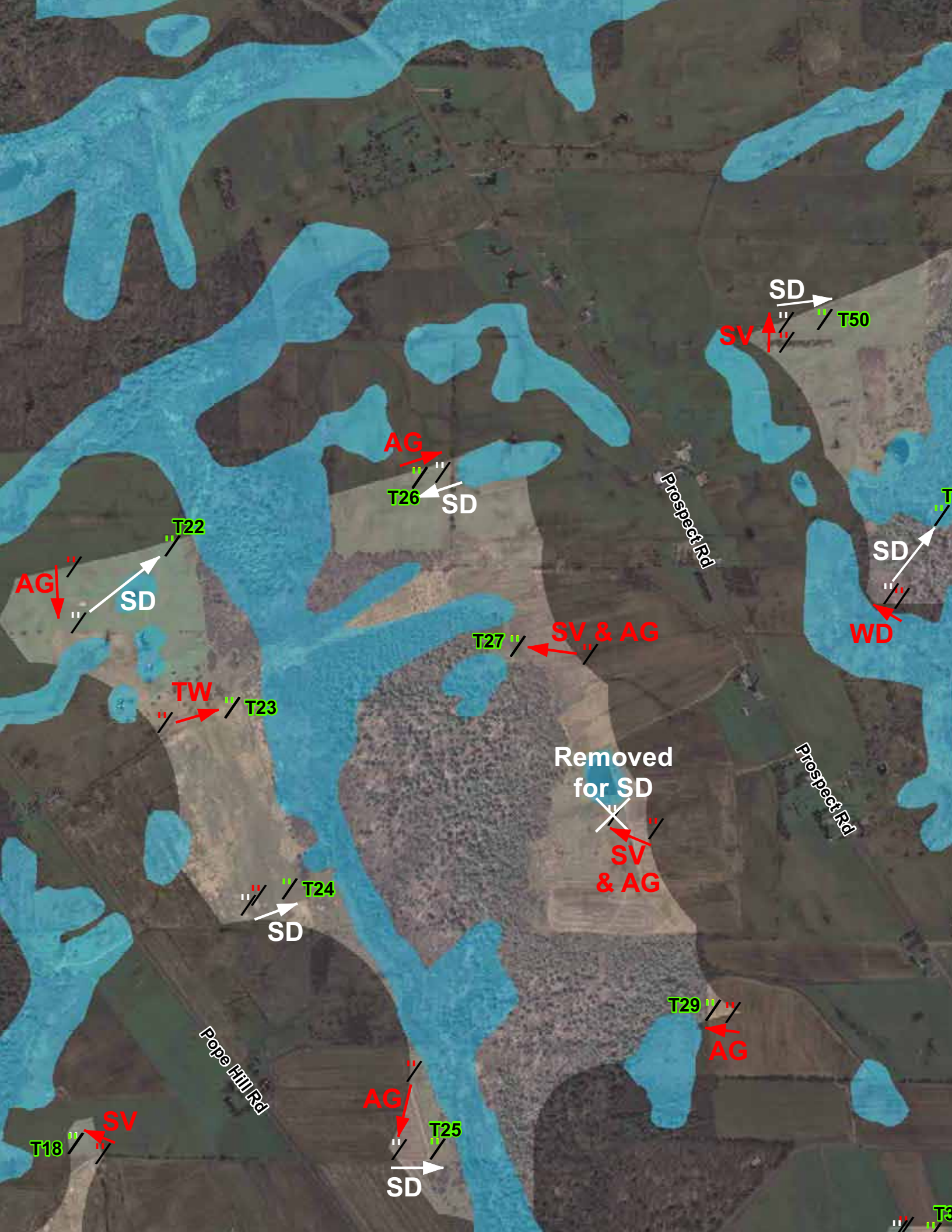
Care was taken to choose a project design that would minimize impact to the use of active agricultural lands. Facilities were carefully sited to minimize impacts to

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agricultural land in consultation with NYSDAM and NYSDAM Guidelines for Agricultural Mitigation for Windpower projects. In addition, landowner concerns, current land use practices, and the Towns' agricultural mitigation standards were considered and are also reflected in the proposed layout of facilities. In accordance with NYSDAM guidance, turbines and access roads located on active farms were placed on the edge of agricultural fields to the greatest extent possible without increasing impacts on wetlands. This minimizes the loss of agricultural land and use of wooded areas. To the extent practical, roads and interconnects were located on the edge of agricultural land to minimize impacts on agricultural operations, including reducing the incidence of crossing drain tiles.

The design and layout of the Project components has been continuously evaluated since the decision was made to pursue a project in the Towns of Villenova and Hanover. Since that time, various turbine totals and layouts were evaluated in an attempt to maximize energy efficiency while minimizing adverse environmental impacts. The Project layout, as proposed, has been engineered to capture the area's high wind energy resource while minimizing wake effects on downwind turbines. A micro-siting map (Figure 1.3-1) depicts the alternative turbine locations that were considered within the Project Area. The original computer-generated optimal siting plan for the turbines was modified based on landowner agreements/considerations and the protection of sensitive resources, such as wetlands, wildlife habitat, and productive agricultural land. The final proposed location of turbines and associated facilities reflects input and guidance received from landowners and Project consultants focusing on noise, land use, and ecological impacts. The proposed layout results in a balance of energy production, environmental protection, and community involvement. Relocation of any single turbine would have a ripple effect, in that the location of all other turbines would have to be re-examined and some possibly changed in order to maintain an efficient and workable Project design. Therefore, reduction of environmental impacts in one location could result in increased impacts in another location and/or reduced power generation. In the case of visual impact, removal, or relocation of one or two individual turbines from a 60-turbine layout is unlikely to result in a significant change in Project visibility and visual impact from most locations.

Each of the proposed turbines has been located outside the boundaries of wetlands. The majority of impacts on wetlands and streams in the current proposed layout result from the need to cross wetlands and streams with access roads and/or collection lines. If the Project layout were to be modified to eliminate all impacts on wetlands, other adverse environmental impacts may occur. Examples of increased impacts include the additional lengths of roads and collection lines that would be required to avoid all wetlands. For every foot of road increased, there would be an increase of up to 60 square feet of disturbance to forest, farmland, and/or wildlife habitat. Each additional mile of road would add approximately 7 acres of soil and vegetation disturbance. The proposed layout avoids impacts on wetlands to the maximum extent possible without a major increase in the length of the roads. In addition to the increased length of roads within the Project Area, layout changes to further reduce wetland impacts would require the construction



SD
SV
T50

AG
T26
SD

T22
AG
SD

TW
T23

SV & AG
T27

SD
WD

Removed
for SD
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& AG

T24
SD

T29
AG

T18
SV

AG
T25
SD

T30

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of additional road entrances at existing public roads to access some turbines that would be otherwise inaccessible due to small wetlands or streams. This would create additional visual impacts on the rural character of the area due to the numerous entrance roads cutting into forests and open spaces and would create additional traffic impacts in the areas and general inconveniences for the people living in the area. The proposed design has as many as seven turbines along one access road with a single entrance from a public road. Relocating the roads to totally avoid wetlands would increase the construction activity that would be visible from public roads. During the siting process proposed roadways were modified to minimize impacts to wetlands, use existing access routes in order to minimize forest fragmentation, complement existing land uses, and avoid cultural resources (see Figure 1.3-2).

As designed, the Project maximizes energy efficiency while minimizing environmental impacts. Consequently, alternative Project designs likely to pose equal or greater risk of adverse environmental impacts while yielding equal or less electrical output were rejected.

A further discussion of the evaluation process to site roads and electrical collection and transmission lines to minimize impacts on wetlands and proposed mitigation strategies is presented in Section 2.8, Wetlands: Impacts and Mitigation, and Appendices G and I.

Smaller Project Size

Noble considered reducing the size of the Project by using a smaller number of turbines. However, reducing the Project's size would reduce its energy portfolio, environmental, and economic benefits. A smaller project would also be less financially viable.

A project consisting of fewer turbines would reduce the localized environmental impacts only marginally. The footprint and visibility of the project would be slightly reduced, thereby also reducing the amount of disturbed forest land, vegetation, and wetlands. Visually, a reduction in the number of turbines may provide a minimal benefit at a particular receptor, but it would do little to change the overall impact of the Project on the regional landscape. Thus, the reduction of the size of the Project would only marginally change its aesthetic profile. Given the minimal impacts to forest land, vegetation, and wetlands of the Project as proposed, as well as the marginal change in the aesthetic profile of the project if smaller, the smaller project alternative does not warrant the loss of generating capacity and related social and economic benefits.

With regard to economic optimization, wind generating projects have certain fixed costs that are relatively independent of the size of the facility. Some of these costs have to do with Project infrastructure. The substation, switchyard, and transmission line, while indeed smaller, utilizing smaller transformers and switching equipment for example, are not proportionately less expensive. Generally, a useful technique to determine an approximate reduction in the cost of project in-

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Infrastructure facilities is to use the ratio of the installed capacity to the 0.6 power times the cost of the known project facility. Other costs which are more nearly absolutely fixed are project “soft costs,” such as construction overheads including mobilization and demobilization costs, costs of field delineation and environmental, archeological and architectural studies, preparation of Environmental Impact Statements, legal fees, and financing costs. The financial viability of a project depends on its ability to recover these fixed costs by maximizing electricity generation.

Prices for electricity produced by the Project are based on the cost to generate electricity. As a fuel-free energy resource, the Project’s main costs are fixed capital costs. To be competitive with other wind projects and other sources of electrical energy, the capital and other fixed costs per kilowatt-hour (kWh) output must be reduced as much as possible by maximizing Project output. Some smaller wind energy projects that have been built have been made possible only because of large financial grants. Reducing Project output without a corresponding reduction in fixed costs will create a negative impact on its overall financial viability and discourage investment. In fact, the cost of borrowed and equity funds to finance the Project will likely be higher because the reduced spread between the cost of production and the retail price of electricity would produce diminished cash flows and decreased security to lenders and equity investors; additionally the best lending rates and lowest equity return demands are offered on larger loans and investments – a smaller project would be disadvantaged in accessing these capital markets. Because most of the fixed costs of a larger wind project would be borne by a smaller facility, the only significant cost savings from a downsized project would be the avoided cost of turbines. Since the fixed costs of the Project comprise a large portion of the construction and operational costs, it is important that the Project be large enough to produce adequate energy to become attractive to power purchasers and investors.

The Project has been sized to maximize its output to defray its fixed costs, maximize its environmental benefits through the production of clean energy, and maximize local economic benefits through landowner easement payments, PILOT, and other direct and indirect local economic benefits, all while minimizing environmental and other impacts on the Project Site. A smaller project would produce fewer global benefits (i.e., clean energy, emissions reductions, and reductions in fossil fuel use). A smaller project would also be contrary to the state’s goals of increasing the use of renewable sources of electricity to the same extent as the Project that has been proposed. In order to meet the state’s goal that 25% of its electrical supply comes from renewable sources by 2013, the state must encourage the development of large-scale projects.

Alternative Turbine Selection

The commercial wind industry has moved toward the use of larger wind turbine generators. This is because they are more cost-effective than smaller machines since energy capture increases more rapidly with rotor diameter than costs increase with rotor diameter. Further, the rotor is centered at higher elevations



Roadway #22

AG

T50

Roadway #13

T26

Prospect Rd

T48

T22

Roadway #12

WD, GW

WD

T27

Roadway #14

T23

Prospect Rd

Roadway #11

T24

Pope Hill Rd

T29

Roadway #15

AG, EN

T18

Roadway #9

T25

Roadway #10

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aboveground where winds are stronger. For land-based use, the industry has developed turbines with generating capacities in the range of 1.5 MW to approximately 3 MW. Smaller turbines are available; however, more turbines would be required to produce comparable amounts of power from smaller turbines. To maintain an equivalent level of power generation within a given project, more of the smaller turbines would be required. This would increase temporary and permanent disturbance of soils, vegetation, and water resources as the number of towers and the length of required access roads and interconnections increases. Potential operational impacts (e.g., noise and 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, higher blade rotation rate, higher density, and greater numbers could actually increase the Project's visual impact. Use of a shorter tower would also substantially increase the cost of turbine maintenance due to higher wind turbulence in the blade area and this would increase the cost of turbine maintenance.

While larger and smaller turbines were an option, ultimately, Noble chose to continue to use GE 1.5 MW turbines. Noble uses this same turbine model for the Noble Bliss and Noble Wethersfield Windparks in Wyoming and Allegany counties as well as sites in northern New York State and Michigan. The continued use by Noble of GE 1.5 turbines was ultimately selected for several reasons: they are among the quietest operating machines, the GE Company is financially strong and fully capable of standing behind its equipment, the turbines incorporate state-of-the-art operating features, and GE and Noble management personnel have a long and positive working relationship.

The GE 1.5sle wind turbine is offered in North America with two hub heights (the center of the rotor), 65 meters and 80 meters above ground. Hub heights of 100 meters are available in Europe from GE and turbines with hub heights of greater than 100 meters are available in North America from manufactures other than GE.

Wind speed increases with height above ground. The rate of increase per meter of elevation is greatest near the ground and lessens with elevation above ground. A wind turbine therefore would appear to be most economical with the tallest structure possible. However, there is a substantial cost to reach the higher hub heights. Not only is there a greater investment in tower steel, but the foundation requirements multiply as well compared to shorter towers. Thus, there is an optimum height where the reach for higher wind resources is worth the added investment. Beyond this height, the increase of wind speed with height is insufficient to justify the investment.

There is a further consideration in areas where substantial trees occur, as in this Project area. Trees are a source of turbulence. Turbulence puts variable loads on the machinery and too much turbulence can significantly increase maintenance costs. Fortunately, turbulence decreases with height above ground. Much like wind speed, the rate of decrease of turbulence is greatest near the ground and lessens at higher elevations above ground. Again, this results in an optimization

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where added hub height reduces maintenance costs, but beyond a certain height, the reduction in maintenance costs does not justify the cost of a further increase in height. Noble has determined that the 80 meter hub height is the most economical GE model choice considering issues of energy productivity and maintenance costs versus capital cost.

1.4 Project Purpose, Needs, and Benefits

1.4.1 Project Purpose and Need

The Noble Ball Hill Windpark will use wind, a renewable resource, to generate electricity and avoid the use of any fuels or water and will produce zero emissions or waste discharge. This electricity will be provided to the New York Independent System Operator (NYISO) grid for distribution to meet consumer demand. The Project will have capacity sufficient to generate approximately 90 megawatts (MW) of power to the NYISO grid, contribute to the achievement of New York State's Renewable Portfolio Standard (RPS), and fill the need for a diverse national energy portfolio that includes a higher percentage of energy generated from renewable resources. Renewable energy projects reduce reliance on both domestic and foreign fossil fuel resources and diversify the range of resources used to produce the electricity necessary to meet state and national electrical needs. In addition, during operation renewable energy projects avoid air emissions from fossil fuel combustion commonly used for electrical generation. These emissions are detrimental to air quality and have been documented to adversely affect human health.

1.4.2 Effects on Use and Conservation of Energy Resources

The New York State Energy Plan sets a stated goal of increasing the share of renewable energy as a percentage of statewide primary use 50% by 2020 (up from 10% in 2000 to 15% in 2020). The State Energy Plan reports that at the end of 2005, the renewable energy share was at 10%. The State Energy Plan sets forth the following policy recommendations in achieving 15% use from renewable resources by 2020 (NYSERDA 2002):

- The state should competitively solicit 60 to 120 MW of renewable electricity generation to meet the requirement of Executive Order No. 111, which requires up to 10% of state facilities' electricity be provided from renewable resources by 2005 and 20% by 2010.
- The New York Power Authority (NYPA) should competitively solicit bids for long-term contracts for the purchase of 100 MW of electricity capacity from renewable energy sources. In addition, NYPA should increase its annual investment in energy efficiency by 25% and continue to cooperate with New York State Energy Research and Development Authority (NYSERDA) and the Long Island Power Authority in program offerings and delivery.

The Noble Ball Hill Windpark helps achieve the State Energy Plan's goal of increasing the share of renewable energy use in the New York. NYSEERDA reported in 2007 that the total renewable capacity supported by the RPS program

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since its inception could approach 1,162 MW by the fall of 2008. It is estimated that this renewable capacity could generate more than \$720 million of in-state economic benefits over a 20-year period, excluding the impact of any economic roll-over multipliers or energy price suppression effects (NYSERDA 2007). In addition to the economic benefits, this renewable capacity will provide added environmental benefits, by avoiding increases of nitrogen oxides, sulfur oxides, and carbon dioxide.

New York State's Energy Plan is considered to be among the most aggressive in the nation and is consistent with the National Energy Policy, which states that the United States has the technology needed to meet our principal energy challenges including:

- Promoting energy conservation;
- Repairing and modernizing our energy infrastructure; and
- Increasing our energy supplies in ways that protect and improve our environment.

Renewable and alternative energy supplies help diversify our energy portfolio and result in few adverse environmental impacts. The current contribution of renewable and alternative energy resources to the state and the national total electricity supply is relatively small; however, the renewable and alternative energy sectors are growing. Continued growth of renewable and alternative energy is vital to delivering clean energy to fuel our future economic growth. To stimulate investment in renewable energy production, the federal government provides tax incentives for the development and use of renewable energy technologies⁴.

1.4.3 Project Benefits

The construction and operation of the Project will result in positive environmental, economic, and energy benefits.

The Project would result in the addition of approximately 90 MW of clean, renewable electric energy to the power grid with no air emissions. Ninety MW is enough power to provide electricity to 30,000 homes (AWEA 2007). In comparison, the addition of 90 MW of electric generation by fossil fuel-fired facilities (i.e., natural gas or coal) presents serious consequences in the form of, among other things, air emissions (i.e., carbon dioxide, sulfur dioxide, nitrogen oxides, particulate matter, and mercury). The adverse environmental and health effects of air emissions from combustion of fossil fuels are well-documented and include global warming, acid rain, smog, respiratory health effects, and significant long-term impacts on wildlife.

⁴ The renewable Electricity Production Tax Credit provides a tax credit for each kWh of energy produced by eligible renewable generators including wind. The tax credit was originally established under the authority provided in 26 U.S.C §45 and was renewed in the Energy Policy Act of 2005, §1301. However, this credit is set to expire at the end of 2008 if it is not renewed.

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Local economic benefits of the Project will include:

- Temporary and permanent employment;
- Increased commerce in the Towns due to spending by project employees, suppliers, and local merchants;
- An increased flow of revenue to the county, Towns, and school districts through payment in lieu of taxes (PILOT) payments;
- An increased flow of revenue to landowners through easement agreements; and
- Increased economic diversification.

Construction of the Project will result in the direct employment of approximately 185 electrical workers, crane operators, equipment operators, carpenters, iron workers, riggers, laborers, and other construction workers (with a total estimated payroll and benefits of \$7.7 million) and create approximately 200 additional direct, indirect, and induced jobs countywide (with a total estimated payroll and benefits of \$5.2 million). A significant percentage of the construction workers employed during the construction period will be hired from within the local community to the extent that qualified workers are available. Personnel specially trained in specific procedures for wind turbine construction will be brought in and temporarily housed in the area during the construction phase of the Project.

During plant operations the Project will employ approximately eight workers: skilled operators (six), management (one), and administrative personnel (one), with a total estimated payroll and benefits of \$450,000. Operation of the project is estimated to create 16 more direct, indirect, and induced jobs countywide (with a total estimated payroll and benefits of \$439,000).

The Project will spend a total of about \$26.9 million countywide during construction. Total economic benefits during construction are estimated at \$42.7 million, including payrolls, supplies, materials, hotel stays, meals, and economic multiplier effects. During plant operation, the Project will spend an estimated \$1.7 million annually, exclusive of property taxes. Total annual economic benefits during operation are estimated at about \$3.1 million (including PILOTs), including payrolls, supplies, materials, windpark easement payments, and economic multiplier effects. Total countywide economic benefits, based upon regional multipliers applied to direct Project expenditures in original capital investment and ongoing operational expense, are estimated to be about \$128 million over 20 years.

The Project will extensively utilize and support providers of local services, suppliers, and area manufacturers during both construction and operation.

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Noble has proposed to provide payments to both Towns and other taxing authorities in the form of a PILOT program and host community agreements. These payments will result in a significant increase in local revenue for the taxing authorities. Significantly, the Project will not place additional demands for services upon the local municipalities or school districts.

The Project will assist in the revitalization of the local economy by providing steady income through easement payments to farmers and other landowners. Many of the landowners are farmers and the additional income from annual lease payments is expected to help stabilize their income and provide some relief from the cash-flow fluctuations inherent to the agricultural industry.

Additional value to the local economy will result from increased diversification of the county and state economic bases. Economic diversification ensures greater stability of the economy by minimizing financial high and low cycles associated with a specific industry. This effect is particularly important in rural areas, where more goods and services are imported and more dollars leave the region.

1.4.4 Growth Inducing Aspects of Action

While the Project will create temporary construction and new permanent jobs and provide a new revenue source for the county and Towns, as well as multiplier effects, it is not anticipated to lead to significant new growth (i.e., residential, commercial, or industrial) in the Towns of Villenova and Hanover or the surrounding areas. In the short-term, there will be some minor growth inducing aspects related to the Project. Temporary employment opportunities (approximately 185) will exist for area residents and other workers during the construction phase. Local commercial establishments may experience increased sales as a result of the Project and the presence of these workers for an extended period of time. In the long-term, employment opportunities will be available for approximately eight workers for the operation and maintenance of the turbines and associated facilities. Noble anticipates technicians would be hired locally to the greatest extent practicable, who will be trained to operate and maintain wind turbines. As a result, no new residential growth is expected from the Project.

The roadway network will not be significantly altered, with the exception of several intersections whose widths will be modified to accommodate large vehicle turning radii. These intersection improvements are not designed to increase traffic capacity or facilitate growth and will be returned to their original condition following construction. The Project does not include any new public utility infrastructure improvements, such as water or wastewater systems, which would enhance capacity or facilitate residential or industrial growth. Commercial growth will be limited to those businesses which supply site maintenance, vehicle maintenance, and general mechanical and office supplies to the Project operation and maintenance (O&M) facility.

Power generated by the Project will be supplied to the NYISO bulk transmission system (BTS) and not to individual retail customers. As mentioned previously,

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the presence of wind turbines may help maintain the agricultural character of the area by providing active farms a secondary source of income through easement payments. The additional income from annual lease payments is expected to help stabilize their income and provide some relief from the cash-flow fluctuations inherent to the agricultural industry.

1.4.5 Irreversible and Irretrievable Commitments of Resources

The proposed Project, like any land development project, will require the irreversible and irretrievable commitment of certain human, material, environmental, and financial resources. However, the commitment of these resources is expected to be offset by the benefits accruing from construction and operation of the Project.

Human and financial resources have been and will continue to be expended by Noble, various New York State agencies, Chautauqua County, and the Towns of Villenova and Hanover for the planning and review of the Project. Noble has entered into an escrow agreement with the Town of Villenova to cover third-party costs incurred by the Town in its capacity as Lead Agency in the SEQRA review process.

The Project requires the commitment of land for the life of the Project. Five thousand, five hundred sixty-nine acres (approximately 3,669 acres in Villenova and 1,900 acres in Hanover) within the 13,658-acre Project Area will be under agreement for development of the Project; however, a small percentage of that will be committed for the actual footprint. While the majority of the land under agreement can continue with existing land uses once the Project is operational, the actual locations of the turbines, access roads, substation, switchyard, and O&M facility would not be available for other purposes for the life of the Project. In accordance with the decommissioning plan described in Section 2.28 and Appendix Q, the turbines will be removed at the end of their useful life and the land may be reclaimed for other uses. The commitment of this land to the Project would be neither irreversible nor irretrievable. It is possible that after the end of the useful life (approximately 20 years or more), the turbines can be replaced with newer, technologically advanced, and more efficient turbines.

During the life of the Project, surface drainage patterns may be altered due to the addition of impervious surfaces, such as turbine pedestals, a substation, a switchyard, and an O&M facility. Noble will restore the ground surface to pre-existing grade to the extent practicable through the Project post-construction restoration plan. Temporary loss of habitat could result in a temporary displacement of plants and animals. Any impacts to wildlife will be minimized to the greatest extent practicable and will be monitored and mitigated as appropriate based on post-construction monitoring and agency requirements.

Construction materials and building supplies will be committed to the Project. The use of these materials, such as gravel, concrete, steel, etc., represents a long-term commitment of these resources which would not be available for other pro-

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jects. Some of these materials may be reusable and recycled after Project de-commissioning; however, many of the concrete foundations will not be recycled, but will be left in place below 3 feet.

Energy resources would 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 the various types of construction equipment and vehicles, and for the transportation of workers and materials to the construction sites. The primary energy source needed to operate the facility is abundant and renewable. The conventional energy resources used to construct and operate the Project would be minor compared to the clean, renewable energy generated by the Project.

1.5 Table of Required Permits and Consultations

Table 1.5-1 indicates each permit that Noble Ball Hill Windpark, LLC has or will apply for in order to construct and operate the Project. Copies of agency correspondence are included in Appendix C. Pertinent files from the New York State Environmental Quality Review Act (SEQRA) process are included in Appendix D.

Table 1.5-1 Required Permits and Consultations

Permit or Consultation Required	Agency
Zoning Amendment to Create a Wind Overlay District	Villanova Town Board
Special Use Permit	
Town Road Use Agreement	
Host Community Agreement	
Building Permits	Villanova Code Enforcement Officer or Town Designated Consultant
Zoning Permit	
Special Use Permit	Hanover Town Board
Town Road Use Agreement	
Host Community Agreement	
Building Permits	Hanover Code Enforcement Officer or Town Designated Consultant
GML §239-m Referral	Chautauqua County Planning Board
County Road Use Agreement	Chautauqua County Department of Public Facilities (DPF) Administrator
Payment in Lieu of Taxes (PILOT) Agreement Approval	Chautauqua County Industrial Development Agency (CCIDA)
Article 15 – Stream Disturbance Permit	New York State Department of Conservation
Article 24 – Freshwater Wetlands Permit	
Section 401: Water Quality Certification	

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Table 1.5-1 Required Permits and Consultations

Permit or Consultation Required	Agency
Article 17 – State Pollutant Discharge Elimination System – General Permit for Stormwater Discharges from Construction Activity	
Consultation	New York State Department of Agriculture and Markets
State Road Use Permits	New York State Department of Transportation
Consultation	New York State Office of Parks, Recreation and Historic Preservation
Section 68 Certificate of Public Convenience and Necessity	New York State Public Service Commission
Determination of No Hazard to Air Navigation with Approved Lighting Plan	Federal Aviation Administration
Section 404: Waters of the United States, Individual Wetland Certification	United States Army Corps of Engineers
Consultation	United States Fish and Wildlife Service