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Supplemental Draft Environmental Impact Statement for the Ball Hill Wind Project Chautauqua County, New York

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List of Abbreviations and Acronyms

AGL	above ground level
AM	amplitude modulation
APE	area of potential effect
ARI	Agricultural and Residential
ATV	all-terrain vehicle
AWEA	American Wind Energy Association
AWWI	American Wind Wildlife Institute
Ball Hill	Ball Hill Wind Energy, LLC
BBCS	Bird and Bat Conservation Strategy
BCI	Bat Conservation International
BCID	Bat Call Identification, Inc.
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
bp/dn	bat passes per detector night
CAA	Clean Air Act
CAG	Capitol Airspace Group
CBC	Christmas Bird Count
CO	carbon monoxide
CO_2	carbon dioxide
CT	Census Tract
dBA	decibels (A-weighted)
DEGS	Duke Energy Generation Services
DEIS	Draft Environmental Impact Statement
DHS	U.S. Department of Homeland Security
DOD	U.S. Department of Defense
E & E	Ecology and Environment, Inc.

List of Abbreviations and Acronyms (cont.)

ECL	Environmental Conservation Law
EDPR	EDP Renewables
EIS	Environmental Impact Statement
EMF	electric and magnetic fields
EMI	electromagnetic interference
EMP	Environmental Management Plan
Epsilon	Epsilon Associates
ERP	Emergency Response Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FM	frequency modulation
FTE	full-time equivalent
GE	General Electric
GHG	greenhouse gas
GIS	geographic information system
GSU	generation step-up
GWh	gigawatt hours
Hanover Law	Article XIV of Town of Hanover Zoning Laws: Wind Energy Conversion Systems
Hessler	Hessler Associates Inc.
Hg	mercury
Hz	Hertz
IEC	International Electrotechnical Commission
IP	Industrial Park "Floating"
IRAC	Interdepartment Radio Advisory Committee
ISMP	Invasive Species Management Plan
JD	jurisdictional determination
JEDI	Jobs and Economic Development Impact Model
KLW	KLW Group of Buffalo, New York
km	kilometer

List of Abbreviations and Acronyms (cont.)

kV	kilovolt
kW	kilowatt
L_{10}	day-night sound level
L_{max}	maximum sound level
LMR	land mobile radio
LSR	large scale renewables
LwA	A-weighted sound power level
MDS	map-documented structure
m/s	meters per second
MLA	mechanical load analysis
MLE	maximum likelihood estimation
mph	miles per hour
MSDS	material safety data sheet
MW	megawatt
MWh	megawatt hour
NAAQS	National Ambient Air Quality Standards
NEC	National Electrical Code
NESC	National Electrical Safety Code
NFPA	National Fire Protection Agency
NHP	Natural Heritage Program
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NRE	National Register Eligible
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NRL	National Register List
NTIA	National Telecommunications and Information Administration
NWI	National Wetland Inventory
NYCRR	New York Codes, Rules, and Regulations
NYISO	New York Independent System Operator
NYPA	New York Power Authority
NYS	New York State

List of Abbreviations and Acronyms (cont.)

NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDEC Visual Policy	Assessing and Mitigating Visual Impacts
NYSDOT	New York State Department of Transportation
NYSERDA	New York State Energy Research and Development Agency
O_3	ozone
O&M	operation and maintenance
OPGW	optical ground wire
OS/OW	oversize/overweight
OSHA	Occupational Safety and Health Administration
Panamerican	Panamerican Consultants, Inc.
PCS	personal communication system
PILOT	payments in lieu of taxes
PJD	Preliminary Jurisdictional Determination
$PM_{2.5}$	particulate matter of 2.5 microns or less
PM_{10}	particulate matter of 10 microns or less
Project	Ball Hill Wind Project
PSC	(New York) Public Service Commission
PSS	preliminary scoping statement
QMP	Quality Management Plan
RES	Renewable Energy Systems Americas, Inc.
REV	Reforming the Energy Vision
ROW	right-of-way
rpm	revolutions per minute
RPS	(New York State) Renewable Portfolio Standard
RSZ	rotor-swept zone
Saratoga	Saratoga Associates, P.C.
SCADA	supervisory control and data acquisition
SDEIS	Supplemental Draft Environmental Impact Statement
SEIS2	Second Supplemental Environmental Impact Statement
SEQRA	(New York) State Environmental Quality Review Act
SHPO	State Historic Preservation Office
SMP	Safety Management Plan

List of Abbreviations and Acronyms (cont.)

SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SPDES	(New York) State Pollutant Discharge Elimination System
SPF	Safety Program File
SSURGO	USDA Soil Survey Geographic
SWPPP	Storm Water Pollution Prevention Plan
T	Transitional
Town Laws	Local Law No. 1 of 2007: Wind Energy Facilities Law of the Town of Villenova and Article XIV of Town of Hanover Zoning Laws: Wind Energy Conversion Systems
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USDOI	U.S. Department of the Interior
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Villenova Town Law	Local Law No. 1 of 2007: Wind Energy Facilities Law of the Town of Villenova
VRA	visual resources assessment
W	watts
WECS	wind energy conversion system
WindPro	WindPRO 2.7 Basis Software
Wisconsin PSC	Wisconsin Public Service Commission
WNS	white nose syndrome
WTG	wind turbine generator
ZVI	zone of visual influence

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Definitions

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

- **Project.** "Project" refers to all activities involved in the construction, operation and decommissioning of the Ball Hill Wind Project described herein and all components thereof, including, but not limited to, wind turbines (including blades, nacelles, towers, pads, and foundations); electrical transmission and collection lines and poles; trenches; access roads; laydown areas, Operations and Maintenance (O&M) buildings and related structures.

- **Project Area.** The Project Area (see Figure 1.1-1) is denoted by the outer boundary of the geographic area that contains all wind energy facilities (as defined in the Villenova and Hanover wind laws) including, without limitation, turbine sites, access roads, transmission line and collection system components, O&M building, laydown areas, substation, and switchyard.

- **Wind Overlay District.** A Wind Overlay District is defined by the Town of Villenova Local Law 1 of 2007 and the Town of Hanover Local Law 1 of 2008 as a zoning district that encompasses part or parts of one or more underlying districts and that establishes requirements for wind energy facilities. Both laws require that all wind energy conversion systems must be within a Wind Overlay District. For this Project (as with the 2008 DEIS), the term "Wind Overlay District" is synonymous with "Project Area," and Ball Hill seeks the creation of such a wind overlay district.

- **Project Site.** The Project Site consists of land within the Project Area that has the potential to be permanently or temporarily disturbed as a result of the construction, operation, or decommissioning of Project facilities (including wind turbines, electrical collection and transmission lines, utility trenches, utility poles, access roads, staging areas, mitigation areas and other related structures). Ball Hill has obtained property interests or is in the process of finalizing negotiations for all parcels that would host Project components or for which a setback waiver within the Project Site is required.

- **Project Sponsor.** The Project sponsor is the Ball Hill Wind Energy, LLC. Throughout this document the project sponsor will be referred to as "Ball Hill."

Executive Summary

This Supplemental Draft Environmental Impact Statement (SDEIS) describes the potential environmental impacts and mitigation measures associated with the construction and operation of the proposed Ball Hill Wind Project (the Project) pursuant to the New York State Environmental Quality Review Act (SEQRA) (Environmental Conservation Law [ECL] Article 8 and its implementing regulations at 6 New York Codes, Rules, and Regulations [NYCRR] Part 617). The original Project layout was described and its impacts were evaluated in the Draft Environmental Impact Statement (DEIS), which was accepted by the Town of Villenova Town Board, the lead agency under SEQRA, in September 2008 (2008 DEIS).

Provided below is a brief description of the current Project layout, along with summaries of the regulatory process; the Project's purpose, need, and benefit; a summary of potential environmental impacts; and proposed mitigation measures and alternatives to the Project.

Project Description

Ball Hill Wind Energy, LLC (Ball Hill), a company owned by Renewable Energy Systems Americas, Inc. (RES), is continuing the development of the Ball Hill Wind Project (Project), which it proposes to construct and operate in the towns of Villenova and Hanover, Chautauqua County, located in western New York State (NYS). The Project would include up to 36 wind turbines with a maximum capacity between 79 and 100 megawatts (MW). As proposed, 28 turbines would be installed in the town of Villenova, and eight turbines would be installed in the town of Hanover.

Ball Hill proposes to install newer wind turbine technology than what was proposed and evaluated in the 2008 DEIS. Ball Hill proposes to install either the Vestas V110-2.2, General Electric (GE) 2.3-116 or similar turbine with a maximum height of just under 500 feet. Both the V110-2.2 and GE 2.3-116 turbines are three-bladed, upwind, horizontal axis wind turbines. The V110-2.2 has a rotor diameter of 360.9 feet (110 meters) and a hub height of 312 feet (95 meters). The blades of the turbines would be 131 feet (40 meters) off the ground, and the total height for this turbine would be 492 feet (150 meters) when a rotor blade is in the vertical position at the top of its rotation. The GE 2.3-116 has a rotor diameter of 380.6 feet (116 meters) and a hub height of 308.4 feet (94 meters). The blades of the turbines would be 118 feet (36 meters) off the ground, and the total height for this turbine would be 499 feet (152 meters) when a rotor blade is in the vertical position at the top of its rotation.

Although Ball Hill is analyzing the potential impacts for two separate manufacturers of wind turbines, ultimately only one type of turbine will be selected, and all turbines constructed will be from the same manufacturer, which will be described in the Final Environmental Impact Statement (FEIS).

In addition to the wind turbines, the Project will involve constructing a system of gravel access roads, electrical collection lines, an operation and maintenance (O&M) building, an on-site step-up substation, and an interconnection facility. Temporary construction laydown areas are also planned for the construction phase of the Project.

The Project Area is the same as presented in the 2008 DEIS, encompassing 13,659 acres in the towns of Villenova and Hanover. Under preliminary design, the proposed facilities will impact approximately 330.1 acres of land during construction and 228.3 acres of land during Project operations. Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to minimize and avoid the Project's environmental impacts identified in the SDEIS. The results of this micro-siting will be included in the FEIS. All Project facilities are shown in Figure 1.1-2. Figure 1.3-1 illustrates both the 2008 DEIS and SDEIS layouts. A summary of the primary Project facilities in the new SDEIS layout compared with the prior DEIS layout is provided in Table ES-1.

Table ES-1 Comparison of Project Layouts Proposed in the 2008 DEIS and the SDEIS

Project Component	2008 DEIS Layout	SDEIS Layout
Wind Turbines (number)	60	36
Access Roads (miles)	16.0	14.9
Buried Electrical Collection Lines (miles)	23.8	21.3
Overhead Electrical Collection and Transmission Lines (miles)	6	6
O&M Building Site (acres) [1]	5	2.8 (5 acres leased)
Substation (feet)	200 x 300	175 x 290
Switchyard (feet)	300 x 500	225 x 611
Temporary Construction Laydown Areas (acres)	28	26.1

Note:
1. The O&M building site is currently proposed to be located within the 10.4 acres for the laydown area following construction.

Construction of the Project would result in the direct employment of up to 64 full-time equivalent (FTE) employees (or 133,120 annual man-hours) of electrical workers, crane operators, equipment operators, and other construction workers and create up to approximately 320 additional indirect and induced FTE jobs region-wide. This means that more than 64 employees may be hired because not all positions would be full-time for an entire 12-month period. Once built, the wind turbines and associated components operate in almost a completely automated fashion. The Project will, however, permanently employ up to six on-site FTE technicians.

Regulatory Process

This SDEIS has been prepared by Ecology and Environment, Inc. (E & E) of Lancaster, New York. It was prepared in accordance with the requirements of SEQRA and is intended to facilitate the environmental review process and to provide a basis for informed public comment and decision-making.

Pursuant to the Town of Villenova Local Law 1 of 2007: Wind Energy Facilities Law (Villenova Town Law), an application seeking the creation of a Wind Overlay Zoning District and a Special Use Permit for the original Project layout was submitted, in 2008 to the Villenova Town Board. The Project, as originally proposed, was described and its impacts were evaluated in the 2008 DEIS, which was accepted by the Town of Villenova, the lead agency under SEQRA, in September 2008.

In 2011, DEGS Wind I, LLC, a direct subsidiary of Duke Energy Generation Services (DEGS), submitted an amended application to the Villenova Town Board, as the SEQRA lead agency, seeking the creation of a Wind Overlay Zoning District and a Special Use Permit and an amendment of the maximum height limitation in the Villenova Town Law to accommodate the new turbine technology. The amended application contained a revised layout and proposed new turbine technology within the same Project Area as previously proposed and studied in the 2008 DEIS. In 2012, a revised amended application using different turbine technology and a revised layout similarly within the same Project Area as the 2008 DEIS was submitted. In February 2012, the lead agency requested that an SDEIS be prepared, identifying differences from the 2008 DEIS and providing updated impact analyses in accordance with an approved scope of impacts for the SDEIS. In May 2012, the lead agency accepted the revised amended application as complete, made a positive declaration of significance, and ordered an SDEIS to be prepared for the revised amended application consistent with the scope of impacts approved in February 2012.

In 2015, Ball Hill continued the development of the Project. On October 29, 2015, the Villenova Town Board adopted a resolution recognizing Ball Hill as the applicant for the Project in the same location, assuming all rights and responsibilities of the prior developers as related to the Project, affirming its own status as the SEQRA lead agency, and directing that the SDEIS for the Project address the scope of impacts set forth in its February 8, 2012, resolution, as well as cumulative impacts and impacts associated with or resulting from the waiver of the maximum height restriction in the Villenova Town Law. As requested by the Town of Villenova Town Board, as lead agency under SEQRA, this SDEIS was prepared to describe the proposed action and analyze the impacts of and mitigation for the Project as currently proposed by Ball Hill.

While within the same Project Area, the Project proposes a revision to the layout presented in the 2008 DEIS; an updated impact analysis was conducted on all resource areas presented previously. Ball Hill updated the following impact assessment studies. These revised investigations now evaluate the Project layout presented in this current SDEIS:

- Visual impact assessment, including viewshed analysis and photo simulations;
- Wetland and waterbodies report;
- Turbine haul route study;
- Health and safety report;
- Communication surveys;
- Airspace reports;
- Architectural and archaeological cultural resource surveys;
- Shadow flicker impact analysis; and
- Sound-level assessment report.

Upon acceptance of this SDEIS, public and agency comments will be received on the SDEIS until the end of the comment period as specified in the Notice accompanying the SDEIS. After the public and agency comment period on the SDEIS, Ball Hill will prepare an FEIS and the lead agency will issue a Statement of Findings to complete the SEQRA process requirements.

Once findings are issued, the towns of Hanover and Villenova will complete the application process by determining whether to issue the permits and approvals required under their respective zoning laws. Additionally, agencies such as the New York State Department of Environmental Conservation (NYSDEC) and the NYS Public Service Commission (PSC), will complete their reviews of the applications before them and determine whether to issue the requested permits and approvals for the Project.

Purpose, Need, and Benefit

The purpose of the Project is to use wind, a renewable resource, to generate electricity, avoiding the use of any fossil fuels or water while producing no air or water emissions or waste discharge. The Project would have capacity sufficient to generate approximately 79 to 100 MW of power, contribute to the achievement of New York State's Reforming the Energy Vision (REV) initiative (2015), and promote the development of a diverse national energy portfolio with increased generation 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 the impacts from air emissions caused by the fossil fuel combustion commonly used for electrical generation. These fossil fuel emissions are detrimental to air quality and have been documented to adversely affect human health.

Renewable and alternative energy supplies help diversify New York State's energy portfolio and avoid production of emissions that contribute to greenhouse gases (GHGs). The current contribution of renewable and alternative energy resources to the state and 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. The Project was selected in the Tenth Main Tier Solicitation and the New York State Energy Research and Development Agency (NYSERDA) has awarded it a renewable energy credit (REC) contract. Governor Cuomo's support for the Project is expressed in the accompanying quote from a press release (see sidebar).

"Through these projects, we are developing a world-class technology infrastructure while using the renewable energy necessary to reduce our carbon footprint and create a greener New York."

New York Governor Andrew Cuomo

The construction and operation of the Project would result in positive environmental, economic, and energy benefits. The amount of energy to be generated by the Project (79 to 100 MW) is enough power to provide electricity to more than 20,000 homes.

Local economic benefits of the Project would include the following:

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

The Project would utilize and support providers of local services, suppliers, and area manufacturers during its construction and operation. Ball Hill will negotiate agreements to provide payments to both towns and other taxing authorities in the form of a PILOT program and Host Community Agreements. These payments would result in a significant increase in local revenue for the taxing authorities. Moreover, the Project would not place additional demands for services upon the local municipalities or school districts.

The Project would assist in the revitalization of the local economy by providing steady income through lease payments to landowners. Many of the landowners in the Project Area 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 in the agricultural industry.

Additional value to the local economy would 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.

Summary of Potential Impacts

In accordance with the requirements of SEQRA, potential environmental impacts arising from the proposed action were identified early in the application process and are evaluated in this SDEIS with respect to a range of environmental, economic, and cultural resources. Table ES-2 summarizes potential impacts that may occur in association with the construction and/or operation of the Project as currently designed. Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to minimize and avoid environmental impacts and to decrease identified Project impacts, the results of which will be analyzed in the FEIS. These impacts and associated mitigation measures are described in greater detail within Section 2 of the SDEIS.

Table ES-2 Summary of Evaluated Potential Project Impacts

Environmental Resource	Potential Impacts
Regional Geology, Topography, and Seismic Activity	■ Change to local topography
Soil Types and Descriptions, Agricultural Land, Steep Slopes, and Drainage Characteristics	■ Soil erosion and compaction ■ Potential damage to soil structure ■ Introduction of stones or rocks to topsoil ■ Conversion of prime farmland soils
Water Quality	■ Stream crossings ■ Siltation/sedimentation ■ Temporary disturbance ■ Permanent stream crossings with culverts
Wetlands	■ Temporary disturbance of forested and shrub wetlands ■ Forested and shrub wetland filling
Biological Resources	■ Vegetation clearing ■ Incidental wildlife injury and mortality ■ Wildlife displacement ■ Loss or alteration of habitat ■ Conversion of agricultural land ■ Preservation of land near turbines for agriculture

Table ES-2 Summary of Evaluated Potential Project Impacts

Environmental Resource	Potential Impacts
Bird and Bat Resources	■ Collisions resulting in mortality or injury ■ Loss or alteration of habitat ■ Influence on nesting locations
Visual Resources	■ Visual change to the landscape ■ Visual impact on sensitive sites/viewers ■ Shadow-flicker impact on adjacent residents
Sound	■ Construction noise ■ Operational impacts on adjacent residents
Climate and Air Quality	■ Construction vehicle emissions ■ Dust during construction ■ Reduced air pollutants and greenhouse gases
Communications	■ Potential interference with public, private, or government communication facilities ■ Telecommunication interference
Traffic and Transportation	■ Road wear ■ Traffic congestion/delays ■ Road system improvements/upgrades
Land Use	■ Adverse and beneficial impacts on farming ■ Changes in land use trends
Socioeconomics	■ Host community payment/PILOT ■ Revenue to compensated landowners ■ Expenditures on goods and services ■ Short and long-term employment ■ Direct and induced employment
Cultural Resources	■ Visual impacts on architectural resources ■ Disturbance to historic archaeological resources
Health and Safety	■ Stray voltage ■ Tower collapse/blade failure ■ Ice throw ■ Lightning strike ■ Fire ■ Demands on police and emergency services

The Project is expected to produce long-term positive socioeconomic effects within the Project Area and in the region and to provide additional energy without negatively affecting the region's air quality. The Project is anticipated to result in minor, generally short-term impacts on soils, vegetation, wetlands, wildlife habitat, and transportation facilities as a result of Project construction. The Project could have long-term effects on avian/bat resources, ambient sound levels, and some historic and visual resources during operation. However, with the inclusion of proper mitigation measures, operational impacts other than the Project's visibility (e.g., sound, bird and bat collisions, and shadow flicker) will be minimized and are expected to be minor.

Summary of Mitigation Measures

Various measures will be taken to avoid, minimize, and/or mitigate potential environmental impacts to the greatest extent practicable. General mitigation measures will include adhering to requirements of various local, state, and federal laws, ordinances, and regulations and entering into development agreements with adjacent landowners. Ball Hill will also employ an environmental supervisor during construction to ensure compliance with permit requirements and environmental protection commitments. The Project will bring significant environmental and economic benefits to the area. These benefits also serve to offset adverse impacts associated with Project construction and operation.

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

- Siting the Project away from population centers and areas of residential development;
- Locating access roads and turbines along field edges and in field corners, where practical, to avoid or minimize disturbance of agricultural land;
- Whenever practicable, voluntarily implementing setbacks of at least 500 meters (1,642 feet) from existing residences to ensure maximum screening benefit of existing woodland vegetation, where such exists, and minimizing sound impact and the potential for extended duration shadow flicker on nearby residences;
- Burying electrical collection lines between turbines;
- Using existing roads for turbine access whenever possible to minimize disturbances of agricultural land, wildlife habitat, wetlands, and streams;
- Co-locating electrical lines and roads within the same corridor, where possible;
- Utilizing construction techniques that minimize disturbance of vegetation, streams, and wetlands;
- Siting the interconnection substation facilities in an area partially screened by existing mature vegetation;
- Painting the turbines with a matte non-specular finish;
- Developing and implementing a sedimentation and erosion control plan;
- Developing and implementing an invasive species management plan;
- Implementing a compensatory stream/wetland mitigation program, if warranted, based on federal and state permitting requirements;
- Siting select turbines to avoid or minimize wetland, wildlife, or visual impacts;
- Voluntarily limiting the operations of wind turbines in low-wind speed conditions during the fall bat migration season to reduce risks to bats;

- Performing tree clearing for construction during late fall through early spring to the greatest extent possible to minimize potential impacts on birds and bats;
- Performing post-construction mortality monitoring to improve understanding of possible avian and bat impacts;
- Implementing agricultural protection measures to avoid, minimize, or mitigate impacts on agricultural land and farm operations;
- Developing a traffic- and dust-management plan during construction;
- Repairing and resurfacing public roads utilized during construction as needed;
- Preparing and adhering to a component delivery plan that avoids and/or minimizes impacts on residential areas;
- Developing and implementing a historic resource protection plan in concert with the New York State Historic Preservation Office (SHPO);
- Avoiding use of floodlights at any structures on-site or steady light sources near the turbines to minimize potential impacts on birds;
- Developing and implementing a Bird and Bat Conservation Strategy; and
- Performing post-construction restoration of resources to existing conditions (i.e., wetlands and soils).

Alternatives

Alternatives to the proposed Project that were considered and evaluated include: no action; alternative Project design/layout; alternative turbine technology; and alternative Project size/magnitude. Analysis of these alternatives revealed that the size, type, number, and the configuration of the turbines as currently proposed are necessary to produce a commercially viable project. The Project Area was selected through a systematic process that considered 1) the location of wind resources in New York State; 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 and 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 Ball Hill obtained property rights within a preferred project area sufficient to develop a wind energy facility.

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 wind project 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 fossil fuel-based power generation and, as described herein, the Project would bring substantial economic benefits to its host community. Therefore, the selection of the No-Build alternative would forego the energy, environmental, and economic benefits of the Project.

Alternative Project Location and Design

As described in this SDEIS, the potential Project Area was identified based on a set of physical, environmental, and public support criteria. Preliminary analysis of the Project Area was conducted in 2006 to identify any environmental and land use constraints in the Project Area that might prevent Project development (i.e., a 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 with the New York State Wind Resource Map and modeled to predict electrical production from each potential turbine location.

In 2015, Ball Hill continued development of the Project in its original location and continued to obtain 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.

As land rights acquisition is completed, internal "area constraints maps" are used to determine where turbines, access roads, substation, switchyard and collection system components, and other Project facilities could be located. Areas were eliminated as potential turbine locations if they were located on a NYSDEC- or National Wetland Inventory (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 setbacks or near communication or air transportation areas.

Meteorological data and computer modeling were used to create an efficient site design. Prospective turbine locations were then identified and field-verified to ensure that environmentally sensitive areas were avoided to the extent practicable, landowner concerns were addressed, and engineering constraints were minimized. Adjustments were made and computer modeling was repeated until preliminary turbine sites were optimized to balance potential environmental impacts and generation output. Once turbine locations were selected, access roads and collection lines were preliminarily sited to avoid and/or minimize impacts on wetlands and other sensitive environmental features, maximize use of existing road and transmission infrastructure, avoid engineering constraints, such as steep slopes, and to meet the approval of individual landowners. Access roads and other Project components must also meet the required geometrical and engineering specifications required by best engineering practices and by the turbine manufacturer for safe delivery and exit from the turbine sites.

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 and length of access road/interconnection systems needed. Each system was designed, where possible, to be co-located with other project facilities, use previously disturbed areas such as farmlands and roads, and avoid or minimizing stream and wetland crossings.

Final Project Design

Ball Hill is in the process of micro-siting and analyzing engineering options and controls to minimize and avoid environmental impacts and to decrease identified Project impacts, which will result in a final project design to be analyzed in the FEIS.

Care was taken to choose a project design that would minimize impact on the use of active agricultural lands. In consultation with New York State Department of Agriculture and Markets (NYSDAM) and NYSDAM's *Guidelines for Agricultural Mitigation for Windpower Projects* facilities continue to be carefully sited to minimize impacts on agricultural land. In addition, landowner concerns, current land use practices, and the towns' agricultural mitigation standards were considered and will continue to be reflected in the proposed layout of facilities. In accordance with NYSDAM guidance, turbines and access roads located on active farms would be 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 wooded areas. To the extent practical, roads and interconnects would be 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 to avoid or minimize adverse environmental impacts while improving Project efficiency by examining various turbine totals and layouts. The Project layout, as currently proposed, has been engineered to capture the area's high wind energy resources while minimizing wake effects on downwind turbines as well as adverse environmental impacts.

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

Although Ball Hill has completed preliminary review, it is possible that the fill design, surveying, wind turbine manufacturer design standards, and other outlying constraints could impact the current layout and design and require modification and design changes to the Project layouts, equipment, and system designs. The final project design will be described in the FEIS.

Alternative Turbine Selection

The commercial wind industry has developed turbines with generating capacities in the range of 1.5 MW to approximately 3 MW for land-based use. The proposed Project has been designed to use the Vestas V110-2.2 turbine or the GE 2.3-116 turbine. While larger than some available turbine models, these turbines are preferred because they are more cost-effective than smaller machines and also more efficient. Energy capture increases more rapidly with increased rotor diameter than do costs. Further, the rotor is centered at higher elevations aboveground where winds are stronger. Smaller turbines are available; however, substantially more turbines would be required to produce comparable amounts of power.

Either turbine option will allow Ball Hill to maintain the intended power output for the entire Project while using fewer turbines, thus decreasing the overall Project site size and footprint and minimizing environmental impacts. These efficient turbines use larger rotors that allow for greater output from lower wind speeds. These larger rotors along with longer blades would extend productivity, particularly in moderate wind conditions.

Ball Hill considered reducing the Project size by using either smaller or fewer turbines. Doing so, however, would not fully capture the available wind resource and would both hurt the state's objective of supplying domestic renewable energy as well as the Project's ability to offset fixed expenses associated with construction and connecting to the power grid. In summary, the alternatives analysis concluded that the Project, as proposed, offers the optimum use of resources with the fewest potential adverse impacts.

1 Introduction

1.1 Description of the Proposed Action

Ball Hill Wind Energy, LLC (Ball Hill), a company owned by Renewable Energy Systems Americas, Inc. (RES), is continuing the development of the Ball Hill Wind Project (Project), which it proposes to construct and operate in the towns of Villenova and Hanover, Chautauqua County, located in western New York State (NYS) (see Figure 1.1-1). The Project development utilizes the same Project Area as earlier project layouts (see Project History discussion below).

The Project will consist of generation and transmission components including up to 36 wind turbines with a capacity to produce approximately 79- to 100-megawatts (MW) of electricity. Ball Hill prepared this Supplemental Draft Environmental Impact Statement (SDEIS), as requested by the Town of Villenova Town Board, as Lead Agency under the New York State Environmental Quality Review Act (Environmental Conservation Law [ECL] Article 8 and its implementing regulations at 6 New York Codes, Rules, and Regulations [NYCRR] Part 617), hereinafter "SEQRA" to describe the proposed action and analyze the impacts of and mitigations for the Project as currently proposed by Ball Hill.

Project History

In May 2008, the Town of Villenova Town Board (Town Board) accepted an application for a Special Use Permit and Wind Overlay Zoning District under the Wind Energy Facilities Law of the Town of Villenova (Villenova Town Law) for the proposed Noble Ball Hill Windpark in the towns of Villenova and Hanover, Chautauqua County, New York. This wind energy proposal utilized the same Project Area as is currently proposed for the Project. In September 2008 the Town Board, as the Lead Agency under SEQRA accepted a Draft Environmental Impact Statement (2008 DEIS) (see Appendix A). As described in the 2008 DEIS, Noble Ball Hill Windpark, LLC, a direct subsidiary of Noble Environmental Power, proposed the construction and operation of 60 1.5-MW turbines (90.0 MW of power). Of the 60 proposed turbines, 49 were proposed for the town of Villenova and 11 for the town of Hanover within the same Project Area as studied in this SDEIS. The proposal also included associated access roads, buried electrical collection lines, and electrical transmission facilities. After acceptance of the 2008 DEIS, the Lead Agency opened a public comment period and held a public hearing under SEQRA and as required under the Town Laws. Written and oral comments were received from involved agencies and the public.

In 2010, DEGS Wind I, LLC, a direct subsidiary of Duke Energy Generation Services (DEGS), continued the development of wind energy facilities within the same Project Area as studied in this SDEIS. In 2011, DEGS submitted an amended application to the Town Board, for the necessary Town permits and approvals, and an amendment of the maximum height limitation in the Villenova Town Law. The amended application contained a revised layout and proposed new taller turbine technology within the same Project Area as previously proposed and studied in the 2008 DEIS. In 2012, a revised amended application using different turbine technology and a revised layout within the same Project Area as the 2008 DEIS was submitted. In February 2012, the Lead Agency requested that an SDEIS be prepared, identifying differences from the 2008 DEIS and providing updated impact analyses in accordance with an approved scope of impacts for the SDEIS. In May 2012, the Lead Agency accepted the revised amended application as complete, made a positive declaration of significance, and ordered an SDEIS to be prepared for the revised amended application consistent with the scope of impacts approved in February 2012.

In 2015, Ball Hill continued the development of the Project within the same Project Area studied in the 2008 DEIS. On October 29, 2015, the Town Board adopted a resolution recognizing Ball Hill Wind Energy, LLC as Applicant for the Project in the same location, confirming Ball Hill assumed all rights and responsibilities of the prior developers as related to the Project, affirming its own status as SEQRA Lead Agency, and directing that the SDEIS for the Project address the scope of impacts set forth in its February 8, 2012, resolution, as well as cumulative impacts and impacts associated with or resulting from the waiver of the maximum height restriction in the Villenova Town Law. As requested by the Lead Agency, this SDEIS was prepared to describe the proposed action and analyze the impacts of and mitigation for the Project as currently proposed by Ball Hill in accordance with the approved scope.

1.1.1 Project Overview

Ball Hill is proposing to construct and operate the Project in the towns of Villenova and Hanover, Chautauqua County, located in western NYS (see Figure 1.1-1). The Project utilizes the same Project Area as was studied in the 2008 DEIS. The Project consists of electrical generation and transmission components (see Figure 1.1-2).

More specifically, the Project would include the following:

- **Turbines:** Installation and operation of up to 36 wind turbines (28 in the town of Villenova and eight in the town of Hanover) within a 13,659-acre Project Area with a capacity between 79- and 100-MW (see Figure 1.1-2).

  Ball Hill proposes to install different wind turbine technology than was proposed and evaluated in the 2008 DEIS. Ball Hill proposes to install the Vestas V110-2.2, General Electric (GE) 2.3-116, or similar with a maximum height of 500 feet. Both the Vestas V110-2.2 turbine and GE 2.3-116 wind turbines are three-bladed, upwind, horizontal axis wind turbines. The Vestas V110-2.2

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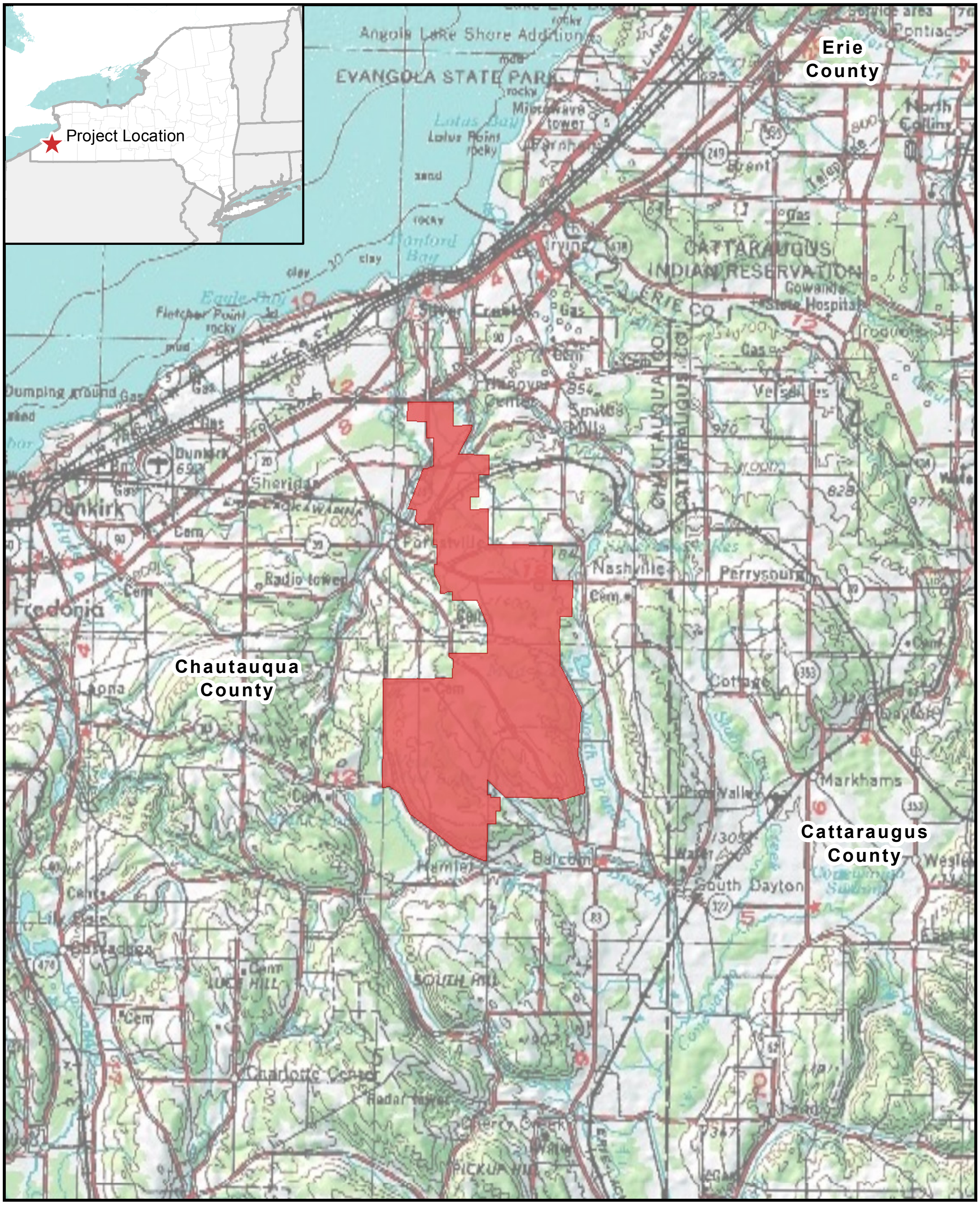


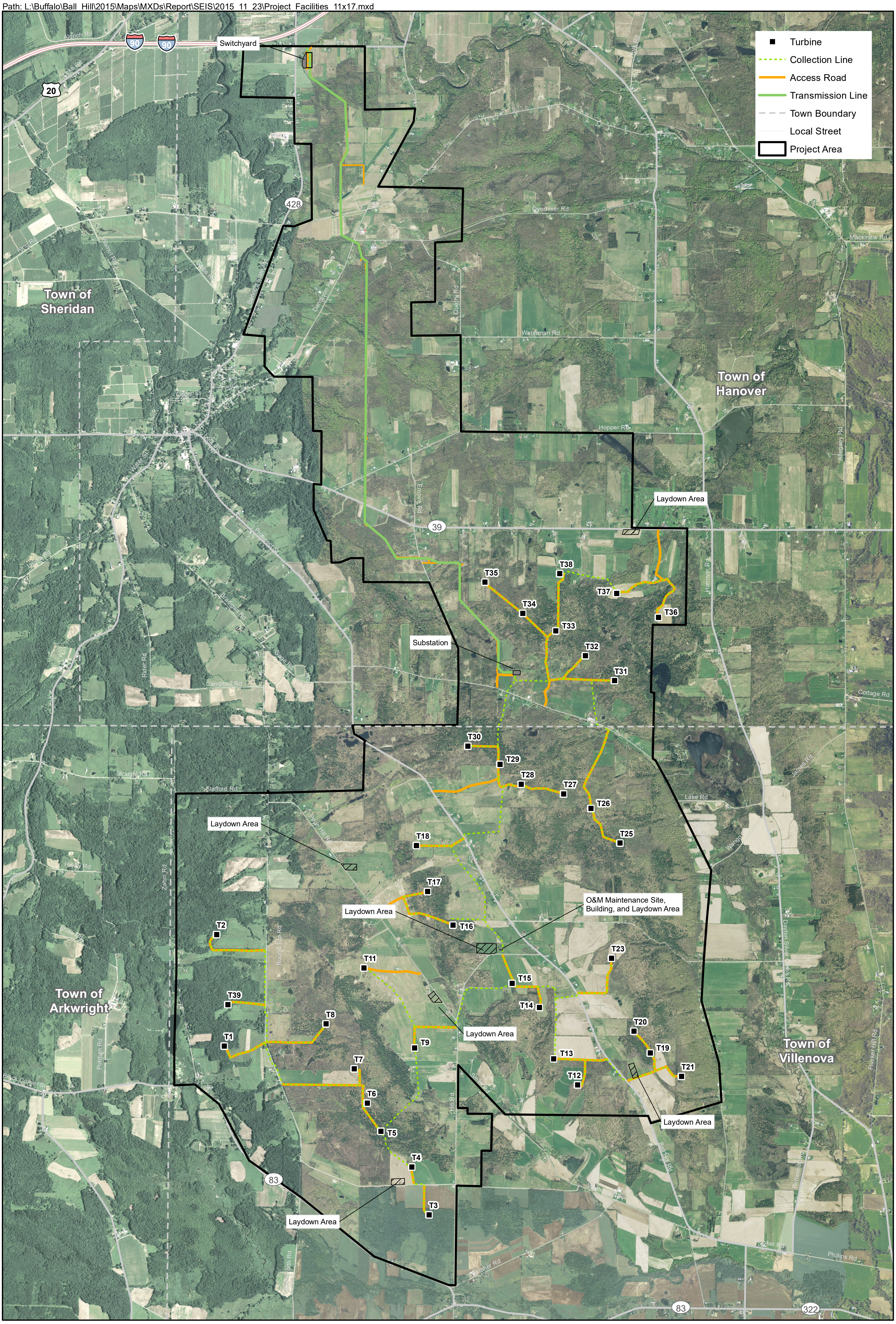
Service Layer Credits: Copyright: © 2013 National Geographic Society

- County Boundary
- Project Area

0 1 2 4 Miles

Figure 1.1-1
General Project Area
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

Path: L:\Buffalo\Ball_Hill\2015\Maps\MXDs\Report\SEIS\2015_11_23\Project_Facilities_11x17.mxd



Source: NAIP 2011.

Figure 1.1-2
Project Facilities
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

0 0.25 0.5 1 Miles

has a rotor diameter of 360.9 feet (110 meters) and a hub height of 312 feet (95 meters). 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. The blades of the turbines would be 131 feet (40 meters) off the ground. The total height for the turbine is 492 feet (150 meters) when a rotor blade is in the vertical position at the top of its rotation.

The GE 2.3-116 has a rotor diameter of 380.6 feet (116 meters) and a hub height of 308.4 feet (94 meters). The blades of the turbines would be 118 feet (36 meters) off the ground. The total height for the turbine is 499 feet (152 meters) when a rotor blade is in the vertical position at the top of its rotation.

Although Ball Hill is analyzing the potential impacts for two separate manufacturers of wind turbines, there will only be one type of turbine ultimately selected and all turbines constructed will be from the same manufacturer, which will be presented in the Final Environmental Impact Statement (FEIS).

- **Turbine Sites:** Every turbine will be constructed on a turbine site. A turbine site is a staging area (maximum of 230-foot radius from the turbine pedestal) used during construction of wind turbines and includes a foundation for that structure, a gravel crane pad, and the surrounding construction/maintenance area. Within the staging area, an approximately 270- by 240-foot area would be cleared and graded to a slope of 2% or less to facilitate the layout of turbine components. Disturbance outside of this 270-by 240-foot area would 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 would experience temporary impacts during construction, as described. Once the turbine at a particular site is installed, temporary impacts would be mitigated such that permanent impacts would include a 100- by 60-foot gravel crane pad, which would be left in place post-construction, and a round, slightly exposed base approximately 18 feet in diameter. No turbine will be constructed in a delineated wetland or stream.
- **Access Roads:** Construction and use of approximately 14.9 miles of access roads (10.9 miles in the town of Villenova and 4.0 miles in the town of Hanover) would connect each turbine site to a town or county roadway. The access roads would provide equipment and vehicle access for construction and subsequent maintenance of the facilities, as well as for emergency services, if needed. These 36-foot-wide temporary access roads would be restored and scaled back to a permanent width of 18 feet.

  Access to the transmission line is needed for construction and operation of the line (5.4 miles of new access roads). Access roads used for construction of the transmission line would be 20 feet wide. After construction these access roads would be scaled back to a permanent width of 12 feet and maintained for operation and maintenance (O&M).
- **Collection System:** Construction and use of an underground electrical collection system, which would allow delivery of electricity produced by the Project

to a new substation to be constructed in the town of Hanover. The underground electrical collection system as currently sited would be installed on private lands parallel to the right-of-way (ROW) corridors for the turbine access roads wherever feasible, or in separate ROW corridors where not feasible. A total of approximately 21.3 miles of collection lines (including underground collection lines collocated with access roads) would be installed (16.6 miles in the town of Villenova and 4.7 miles in the town of Hanover). Approximately 6.3 miles of collection lines would be installed within ROWs over private lands between turbines (4.8 miles in the town of Villenova and 1.5 miles in the town of Hanover). As currently designed all collection lines would be constructed underground. If overhead collection lines were to be required in future site design, they would be used to avoid wetland impacts or due to topography constraints.

- **Substation:** Construction and use of a new substation (Hanover substation) within the Project Area in the town of Hanover, which would tie the electrical collection system into a new 230-kilovolt (kV) overhead transmission line. The substation footprint would be approximately 175 feet by 290 feet. A short access road would be constructed from Hurlbert Road to the new substation.
- **Transmission Line:** Construction and use of an approximately 6-mile-long overhead 230-kV transmission line in the town of Hanover, which would transfer the energy produced by the Project from the new substation to the new switchyard. The transmission line would be located in a 120-foot-wide ROW. As part of construction of the transmission line, 5.4 miles of access roads would be constructed for access. These roads would be 20 feet wide during construction and maintained as 12-foot-wide rough roads after construction for maintenance. Wetland impacts associated with the transmission line will be avoided or minimized to the extent practicable. The majority of the transmission line access roads (4.0 miles) would be contained within an 80-foot-wide cleared portion of the proposed ROW and 1.4 miles would be new access road constructed on private land outside of the ROW. The overhead transmission line would be centered in an 80-foot cleared area with the remaining 20 feet on each side reserved for selective tree removal as needed to reduce tree conflicts with the line. In some places, to reduce impacts for forested habitat and wetlands, the clearing would be reduced to 40 feet with selective clearing with the remaining 40 feet on each side reserved for selective tree removal as needed to reduce tree conflicts with the line.
- **Switchyard:** Construction and use of a switchyard within the Project Area in the town of Hanover. The proposed switchyard would provide a connection to an existing 230-kV National Grid overhead transmission line, which would provide access to the grid. The switchyard footprint would be approximately 255 by 611 feet. A short access road would be constructed from Stebbins Road (County Route 86) to the new switchyard.

- **O&M Facility:** Construction and use of an O&M facility within the Project Area. During construction, the area surrounding the O&M building site would be used as a laydown area and would be 10.4 acres.

  Ball Hill may lease up to 5 acres for the O&M facility; however, construction and operation of the O&M building and laydown area would only permanently impact 2.8 of those 5 acres. Upon completion of construction, 7.6 acres of the surrounding laydown area would be restored to allow existing uses to resume and 2.8 acres would be maintained as an O&M laydown area as part of the O&M building site. The O&M building footprint may be approximately 140 feet by 50 feet, constructed as a single story with amenities including a maintenance shop, offices, and a conference room.

1.1.2 Project Area Description

The Project as proposed is located in Chautauqua County within an area of 13,659 acres in the towns of Villenova and Hanover, New York. This is the same Project Area as proposed and analyzed in the 2008 DEIS (see Appendix A). Land uses within the Project Area are predominantly a mixture of forested (7,630 acres) and agricultural (5,627 acres) land. Additional acreage within the Project Area consists of wetlands, roads and other paved surfaces, scattered residences, buildings, and open water features, such as farm ponds. (Delineated wetlands in the Project Area are described in Section 2.4, Wetlands, and Appendix C of this SDEIS.) The principal agricultural enterprise is dairy farming. Corn and hay are the main crops, but some other crops are 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 dominated by sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), black cherry (*Prunus serotina*), white ash (*Fraxinus* a*mericana*), and American beech (*Fagus grandifolia*). Current and historic silviculture is evident throughout the Project Area.

1.1.3 Project Site Description

The Project Site consists of 330.1 acres (124.0 acres in Villenova and 206.1 acres in Hanover) within the approximate 13,659-acre Project Area. The Project Site includes the assumed width for temporary and permanent construction ROWs (which will be further reduced for wetland and stream crossing areas in the FEIS as micro-siting is completed) for 14.9 miles of roads (67.7 acres); the turbine sites (137.1 acres); the collection system ROW (collection lines that run along access roads are included in the access road acreage) (31.4 acres); the transmission line (57.3 acres); 1.4 miles of access roads for the transmission line (outside of the transmission line ROW) (3.2 acres); and 26.1 acres for equipment laydown areas and the O&M building site. In addition to other Project facilities mentioned above, the Project Site also includes 1.9 acres for the substation and 5.4 acres for the switchyard in the town of Hanover. A summary of the acreages impacted in the Project Site by Project component is presented in Table 1.1-1.

Table 1.1-1 Summary of Project Impacts, Entire Project Site

Project Component	Construction Impacts (Permanent and Temporary Impacts) [acres]			Project Operational Impacts (Permanent Impacts) [acres]			Areas to be Restored to Existing Condition After Construction (Temporary Impacts)		
	Total	Town of Hanover	Town of Villenova	Total[a]	Town of Hanover	Town of Villenova	Total[a]	Town of Hanover	Town of Villenova
Turbines (including staging area)[1]	137.1	30.4	106.6	109.7	21.7	87.9	27.4	8.7	18.7
Laydown Areas/O&M Facility[2]	26.2	3.1	23.1	3.1	0.0	3.1	23.1	3.1	20.0
Access Roads[3]	67.8	17.1	50.5	46.1	14.2	31.9	21.6	3.0	18.6
Collection System[4]	33.3	7.4	25.9	7.2	2.8	4.4	26.1	4.6	21.5
Transmission Line System[5]	65.9	65.9	0.0	62.2	62.2	0.0	3.7	3.7	0.0
Total[6]	**330.1**	**124.0**	**206.1**	**228.3**	**101.0**	**127.3**	**101.8**	**22.9**	**78.8**

Notes

1 Turbines impacts include turbine pad and staging areas.

2 Laydown construction impacts include impacts from the construction laydown areas. Operational impacts include the O&M building site and O&M building which will be constructed on top of a construction laydown area.

3 Access road construction impacts are based on access road construction ROW (in some cases including collocated collection lines); operational impacts are based on 18-foot permanent access roads.

4 Collection system construction impacts include collection ROW along existing road, new collection ROW, and the substation; operational impacts include the substation footprint.

5 Construction impacts are based on the 80-foot wide cleared ROW needed for construction and installation of transmission line poles, the 20-foot wide ROW needed for access road associated with the transmission line, and the switchyard. Project operation impacts are associated with the switchyard footprint and the 12-foot wide permanent access roads. Impacts from pole placement are considered negligible.

6 Individual values may not add up to totals due to rounding.

1.2 Detailed Description of the Proposed Action

1.2.1 Project Description

Appendix B provides a map series identifying the Project facilities as depicted in this SDEIS as well as typical engineering drawings of sample roads. Site and engineering details for the Project specifying the locations of all wind energy facilities, including turbines, access roads, transmission line, and electrical components, are under development for this Project and will be included in the FEIS. Construction of the Project is expected to begin in 2017 and end in 2018; however, weather and other factors may delay the start of construction and/or increase construction duration to 18 months.

Selection of the various Project components was 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, Description of the Proposed Action, Ball Hill proposes to install up to 36 Vestas V110-2.2 (110-meter rotor diameter) turbines, GE 2.3-116 (116-meter rotor diameter) turbines, or similar turbines with a maximum height of 500 feet. Twenty-eight of the turbines are expected to be constructed in the town of Villenova, and eight in the town of Hanover. The Vestas V110-2.2 turbine consists of a three-blade rotor 110 meters in diameter and centered 95 meters above ground, as described above whereas the GE 2.3-116 turbine consists of a three-blade rotor 116 meters in diameter and centered 94 meters above ground. The maximum height of each wind turbine would be 500 feet when the rotor blade is at the top of its rotation. Each turbine would be installed upon an approximate 18-foot diameter, slightly exposed concrete foundation. Each turbine has a nameplate capacity of 2.2 MW (Vestas) or 2.3 MW (GE).

The wind turbines would require lighting in accordance with Federal Aviation Administration (FAA) standards to avoid hazards to aviation. Aviation warning lights would be limited to the minimum required by the FAA (e.g., if allowed by the FAA, lights would be installed on turbines around the Project perimeter, and those within the perimeter would be spaced a half mile apart, rather than on all structures). There would be no lights on during the day. There would be red flashing lights during the night designed at a minimum intensity and duration of time with an illumination pattern that would primarily be directed upward, as suggested by the FAA (see Section 2.7, Visual Resources).

Collection System Description

Power generated by the wind turbines is fed through a breaker panel at the turbine base inside the tower and is interconnected to a nacelle-mounted or pad-mounted step-up transformer that steps the voltage from 690 volts, as generated by the turbine, to 34,500 volts (34.5 kV). The transformers are interconnected on the high voltage side to underground cables that connect the turbines together electrically.

The Project requires approximately 21.3 miles of underground electric collection lines (16.6 miles in Villenova and 4.7 miles in Hanover) installed in trenches. As currently designed, all collection lines would be constructed underground. Additional details, including micro-siting, of the final collection system design will be provided in the FEIS.

The underground collection system would be installed in a trench that is typically 48 inches (4 feet) deep. After the cables are placed in the trench, there would be 42 inches from the top of cables to the top of the trench. Cables would generally run parallel to the Project's access roads in order to avoid disturbances to additional ground. In locations where two or more sets of underground lines converge, pad-mounted junction terminals would be utilized to tie the lines together into one or more sets of larger feeder conductors.

The overall electrical system would 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 (NESC), 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 construction of a new 230-kV electrical transmission line (approximately 6 miles long) to transfer the power from a new electrical substation in the town of Hanover to a new step-up transformer station and switchyard to the north in the town of Hanover adjacent to the existing 230-kV National Grid Dunkirk-Gardenville Line. The transmission line would be located in a 120-foot ROW located on private lands. The line would be centered in an 80-foot cleared area with the remaining 20 feet on each side being reserved for selective tree removal as needed to reduce tree conflicts with the line. In some places, to reduce impacts, the clearing would be reduced to 40 feet with selective clearing with the remaining 40 feet on each side reserved for selective tree removal as needed to reduce tree conflicts with the line.

The new transmission line would be placed on single-pole wood or wood look-alike structures within the 80-foot-wide cleared ROW. The poles will be sited as a result of alignment, topography, or sensitive area (i.e., streams or wetlands) avoidance. All poles would be placed outside of delineated wetland areas throughout the transmission line cleared ROW. The transmission facility has sufficient capacity to transfer the electricity generated by the Project. The New York Independent System Operator (NYISO) is currently studying the interconnection feasibility of Ball Hill to support construction start in 2017. As part of construction of the transmission line, 5.4 miles of access roads would be constructed for access. These roads would be 20 feet wide during construction and maintained as 12-foot-wide rough roads after construction for O&M.

Access Road and Component Delivery Description

The Project requires construction and use of 14.9 miles of access roads (10.9 miles in the town of Villenova and 4.0 miles in the town of Hanover) that would connect each turbine site to a town or county roadway. These roads would be gravel-based and designed to meet the specific load-bearing requirements of trucks transporting concrete, aggregate, and turbine components to the turbine sites. Construction of the 36-foot temporary access roads may require grading of varying widths as micro-siting for the Project occurs and will be presented in the FEIS. Appendix B identifies an example of construction drawings for an access road. After construction, the 36-foot temporary access road disturbed area would be restored and reduced to an 18-foot permanent access road to allow its use by Ball Hill for maintenance and operational purposes, as well as access by emergency services, if needed.

The 2008 Transportation Haul Route Study (see Appendix N of the 2008 DEIS attached hereto as Appendix A of the SDEIS) evaluates the potential routing for the delivery of turbine components and identifies where temporary public 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. After the Project has been constructed, the intersections would be restored to their original condition including traffic sign replacement and roadway resurfacing, if necessary, in accordance with the Road Use Agreements to be entered into between Ball Hill and each Town and Chautauqua County. Specific intersection drawings can be found in Appendix A of the 2008 Transportation Haul Route Study (see Appendix N of the 2008 DEIS attached hereto as Appendix A).

A preliminary transportation route survey was conducted for the Project in December 2015. This preliminary study, included as Appendix D to this SDEIS, was to evaluate the transport of wind turbine components to the Project Site in Chautauqua County, New York. Wind turbine components include tower sections, blades, and the nacelle of the wind turbine. According to the preliminary study, no major obstacles would prevent delivery of Project components to the Project Area, and specific items for the drivers to be aware of are noted, such as overhead tree branches and traffic lights. Any intersection improvements on state, county, or town roads that are necessary for the Project would require approval of the state, or Chautauqua County, or the Towns, respectively. Typically, the proposed intersection improvements include traffic sign removal, compacted gravel widening, drainage ditch filling and/or drainage pipe culvert extensions. Once the gravel widening has been constructed, traffic signs are reset to their original location on portable or removable posts so they can be easily moved when oversize loads pass through the intersection. When Project construction is complete, the intersections will be restored to their original condition and the disturbed areas will be reseeded as required. Specific travel routes within the Project Area to turbine sites and laydown areas will be addressed in a final transportation plan in the FEIS.

Substation and Switchyard Description

A new substation and switchyard would be constructed as part of the Project and would both be located in the town of Hanover (see Figure 1.1-2).

The main function of the substation is to step up the voltage of the electricity transported through the collection lines from 34.5 kV to 230 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 would transmit the power generated by the Project to the new switchyard to be built by Ball Hill in the town of Hanover and would then deliver 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, and an underground grounding grid.

All of the main outdoor electrical equipment and control houses would be installed on concrete foundations that are designed for the soil conditions at the substation and switchyard sites. In addition, each site would have fencing and gates to limit unauthorized access to the sites. Both the substation and switchyard will be constructed in accordance with all current and applicable electrical and building codes.

1.2.2 Construction Overview

Turbine Installation

Generally, each component type would be installed in the same manner at each turbine site of the Project. A turbine site is a staging area (maximum of 230-foot radius from the turbine pedestal) used during construction for laying out equipment, turbine rotor assembly, and stockpiling topsoil. Within the staging area, an approximately 270-by 240-foot area would be cleared and graded to a slope of 2% or less to facilitate the layout of turbine components. Disturbance outside of this 270-by 240-foot area would 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 will be designed so as to avoid or minimize impacts to wetlands, streams, and other sensitive resources.

Within the maximum 230-foot radius from the turbine pedestal, a gravel crane pad – typically 100- by 60-foot with a slope of 1% or less in all directions – would be installed. The crane pad is used to support the crane used to lift turbine components to their upright and installed positions. After turbine installation is completed, the crane pad would remain in place for future turbine maintenance or decommissioning. Pad-mounted transformers may need to be situated at each turbine site depending on the final turbine model selection so that there are at least

6 feet of clearance between the transformer and any other component. The transformers would be installed in accordance with industry standards.

Each wind turbine would permanently occupy a round, slightly exposed foundation base approximately 18 feet in diameter. Preparation of each turbine site for installation of spread footer foundations would involve excavation of surface materials to a depth of approximately 10 feet. After excavation is complete, concrete would be spread on the bottom of the excavation to level it in preparation of the rebar installation. After the rebar, steel and a turbine bolt cage would be installed and the concrete placed for the foundation and turbine pedestal. Each foundation will be approximately 65 feet in diameter utilizing approximately 520 cubic yards of concrete and 60 tons of rebar steel. The final design of each foundation will be submitted with the building permit application for each turbine site.

Best management practices (BMPs) would be used to ensure that topsoil and subgrade materials are kept separated and stockpiled so that the disturbed land is returned to its pre-construction condition and use. Dewatering will be used when necessary to maintain the strength of the subsurface load-bearing materials. If bedrock is encountered during excavation activities, an excavator with a large rock bucket would 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.

Ball Hill does not expect that blasting would be necessary for the excavation of the foundations. In the event that blasting becomes necessary, a detailed blasting plan would be prepared and submitted to the Towns of Villenova and Hanover, the Chautauqua County Emergency Services Coordinator, and the Chautauqua County Department of Health for their review.

During the Project construction phase, the turbine components (i.e., tower sections, nacelle, and rotor blades) would be transported from the vendor's ports of import and delivered directly to site. A 3.1-acre equipment staging area may be located along Route 39 near the intersection with Empire Road in the town of Hanover (see Section 2.11, Traffic and Transportation). This area could be used as short-term staging for verification of match marking, a quality receipt inspection, washing,[1] and any necessary rigging adjustments prior to site delivery. Materials, such as cable reels, pad mount transformers, and 34.5-kV junction boxes, would be delivered directly to specific turbine sites or to general laydown areas identified on Figure 1.1-2 to support specific scheduled construction activities. Other specific equipment and materials would be delivered to designated turbine sites. Each turbine site would serve as the heavy lift staging area for the erection of that specific turbine.

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

During construction, a total of 26.1 acres of temporary laydown areas within the Project Area would also provide storage for materials, such as overhead poles, rods, ring forms, and other construction materials. The proposed locations of the temporary laydown areas are depicted on Figure 1.1-2 and were chosen because they require minimal clearing and avoid permanent impacts on these locations. Six laydown areas are currently being proposed for the Project and range in size from 2 to 10 acres each. Construction of each laydown area would include stripping and stockpiling of the topsoil, reinforcing the site with geotextile fabric, and installing gravel. The laydown areas would also provide space for Ball Hill and its contractors' construction trailers and parking for construction crews who would be transported to the work sites. Others, including dedicated support staff, quality inspectors, and field engineers, would park off the public roads with landowner permission in designated areas, such as access roads and turbine sites, as needed. Construction trailers will be utilized during the construction phase of this Project and are anticipated to be placed within the O&M building site/laydown area. This would be a centralized location for work trailers and project coordination. Laydown areas will be restored upon completion of construction.

Underground Electrical Collection System Installation

Underground electrical collection lines would be used as the main electrical collection system to gather electricity generated at all the wind turbine sites. Underground collection lines would be installed, to the extent possible, alongside areas of temporary road disturbance. In areas where underground collection lines could not be installed adjacent to an access road, they would be installed within a varying width ROW, depending on the number of circuits. Underground collection lines would be installed via direct burial using either a trenching machine or a track hoe. The cables would generally be buried in a 48-inch-deep trench, with a final depth to the top of the cable of 42 inches. Where multiple circuits are installed parallel to each other, a separation of approximately 12 feet is required between parallel runs. In the unlikely event that bedrock is encountered within the trench depth during installation, alternatives, such as ripping or blasting, would be evaluated. Blasting would not proceed until a blasting plan has been prepared and approved by the appropriate town in which the blasting would occur and Chautauqua County.

Construction of underground collection lines within wetlands would be done either by trenching or using a directional bore during construction. These narrow trenches in wetlands would not create an impervious boundary; therefore, would not cause any alteration in the subsurface hydrology of wetlands. However, where necessary, trench plugs would be used to prevent migration of water out of the wetland. Pre-existing contours would be restored after the trench is backfilled and the area is revegetated. No permanent loss of wetlands would occur in association with the installation of underground collection lines. This is discussed in greater detail in this SDEIS in Section 2.4, Wetlands, and Appendix C.

Underground collection lines would be installed via trenching or using a directional bore at stream crossings. Streams that are not naturally dry at the time of crossing would be temporarily dammed, and water would be pumped around the construction area to allow collection lines to be installed in dry conditions. The equipment that would 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. If directional bore is used, a horizontal boring machine will install a bore sufficiently below the bed, and cables will be pulled back in the bore. The bore will start and finish well clear of the stream banks. Aboveground junction boxes will be located at various locations to join multiple reels of cables for long runs and at one end of each directional bore location.

Overhead Electrical Transmission Line Installation

The electrical transmission portion of the Project will require a new overhead transmission line. A new 120-foot ROW would be required; all forested areas within a central 80-foot ROW would be cleared to avoid interference with transmission lines. The additional 20 feet of ROW on either side of the clearing would be utilized for selective tree removal. During construction, equipment travel would generally be limited to a 20-foot travel corridor, where practicable, and temporary 80-foot by 80-foot workspaces at pole locations. If wetland areas and streams are encountered along the transmission ROW, wetland mats would be used within a 12-foot corridor immediately adjacent to the transmission line to accommodate equipment travel.

Construction of the proposed transmission line would occur in four general phases: 1) ROW clearing and preparation; 2) installation of single-pole structures; 3) stringing of the conductors; and 4) cleanup and restoration.

The entire cleared ROW width (typically 80 feet) would be cleared of trees during construction and maintained in an herbaceous or scrub-shrub state during operation to provide appropriate transmission system clearance and maintain reliability of the transmission line. In areas where woody vegetation needs to be removed from wetlands within the 80-foot ROW, it would be cut by hand and equipment used for removal would be positioned outside of the wetland boundary or on mats located within a construction corridor immediately adjacent to the transmission line. Tree stumps would be left intact except where removal is necessary for pole installation or where they pose a safety related construction constraint (such as within travel paths). In these areas, stumps would be removed and disposed of in approved upland, non-active agricultural locations.

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

Within the ROW, 4.0 miles of 12-foot-wide access roads would be constructed for maintenance of the transmission line within the cleared portion of the ROW. An additional 1.4 miles of access roads will need to be constructed outside of the 80-foot ROW to connect to existing roads. No access roads will be constructed within wetland areas.

Access Road Construction

Access roads would have a temporary width of 36 feet during construction. Access roads would be installed within a disturbed area of varying widths (further reduced in wetlands) that would 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, underground collection lines would be installed parallel to the construction ROW (for an example drawing see Appendix B). When turbine and collection system construction is complete, the disturbed areas and construction ROW will be restored (as described below) leaving a narrower permanent access road for each turbine site. Such access roads would be maintained at a width of 18 feet for O&M of the turbines.

Except for the 18-foot permanent access road, the remainder of the construction ROW would 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 and mulch would be used to temporarily stabilize the soil. If necessary, supplemental seeding/mulching would take place on an as-needed basis. In areas adjacent to agricultural fields, plans for revegetation or seeding/mulching would be discussed with individual farmers so that the re-establishment of vegetation complements each farmer's operation. The New York State Department of Agriculture and Markets (NYSDAM) *Guidelines for Agricultural Mitigation for Windpower Projects* will be followed to minimize loss of agricultural land and impacts on farming operations. Periodic removal of woody vegetation may be required to maintain an herbaceous or successional shrub state composed of native species along access road edges.

The proposed access roads for the Project are gravel roads designed to bear the weight of construction vehicle and truck traffic transporting concrete, gravel, and turbine components to the wind turbines over the life of the Project. These access roads would also support any emergency or fire service equipment that may need access to and egress from to the Project Site. The required gravel road base section would be constructed using site-specific geotechnical information considering the load-bearing requirements of construction traffic and equipment delivery. The gravel roads would then be constructed accordingly for the soil conditions and base section, including stripping of topsoil in most areas. Geotextile fabric, or a comparable product, may be used to separate the native soil/fill from the gravel base material to prevent fine soil particles from migrating into the gravel base material and to preserve road base integrity. Cement stabilization may be used in place of geotextiles in some areas as well.

Roads would be constructed with stream culverts as needed to prevent washout of the base material during storm events and to ensure roadbed stability. Roadside ditches would be constructed as dictated by the terrain to convey stormwater run-off away from the roadways. To prevent access by the general public, construction/access roads may be gated where they intersect public roads.

Substation and Switchyard Construction

The switchyard facility will include a three-breaker-ring bus arrangement. 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 the U.S. Department of Homeland Security (DHS). The substation will be designed in accordance with Institute of Electrical and Electronics Engineers and NESC standards. Both the switchyard and the substation will be steel fenced areas with appropriate warning signs.

The collection system delivers generated power via four to eight collector system circuits that are connected to the substation. The substation transformer steps up the voltage to 230 kV for interconnection with the National Grid transmission system through the new switchyard.

The substation includes circuit breakers in combination with open-air type isolation switches to connect the collection system feeders to the main 34.5-kV substation bus, a 34.5-kV main bus open-air isolation/grounding switch, a 34.5- to 230-kV, wye-delta-wye generation step-up (GSU). An automatic transfer switch is to be included if a back-up station service power source from the local distribution utility or a back-up diesel generator is included in the final design of the substations.

The construction of these facilities involves grading, construction of a foundation for the transformer, 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. The GSU transformer will be equipped with mineral oil and adequate oil containment will be provided. All excavation, trenching, and electrical system construction work would be done in accordance with the Project Storm Water Pollution Prevention Plan (SWPPP). Prior to construction, site-specific SWPPPs would be submitted to the New York State Department of Environmental Conservation (NYSDEC), as required. A draft, non-site specific SWPPP is included as Appendix E. Construction work would require the use of bulldozers, a drill rig and concrete trucks, a trencher, a backhoe, front end loaders, dump trucks, transportation trucks for the materials, boom trucks and cranes, and man-lift bucket trucks.

The footprint for the substation would be up to 175 by 290 feet (1.2 acres of disturbance) and the footprint for the switchyard would be 225 by 611 feet (3.1 acres of disturbance). During construction of the substation an additional 0.7 acres would be temporarily impacted and 3.1 additional acres would be temporarily impacted during construction of the switchyard.

Environmental Monitoring

Construction activities would be monitored by Ball Hill to ensure compliance with applicable permit conditions, the SWPPP, and BMPs. To facilitate this, Ball Hill would create a project-specific Environmental Management Plan (see Appendix F for a draft plan). The plan will reference all permits, permit conditions and other commitments made during the SEQRA process, including those associated with wetland and stream disturbance, vegetation removal, invasive species control, stormwater management, erosion control, and agricultural impacts. Ball Hill would retain an environmental supervisor(s) whose duties would 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 supervisor would have full stop-work authority and be a point of contact for the Towns and other agencies during construction. In addition, for the benefit of the Towns of Hanover and Villenova, Ball Hill agrees to provide reasonable funding for an independent environmental monitor for the Towns whose focus will be compliance with permit conditions, including but not limited to road construction and use.

Safety

Prior to the start of construction and pursuant to applicable laws and regulations, a risk analysis would be completed to address any identified construction risks. Risk management protocol from this analysis will be incorporated into the site-specific Safety Management Plan (SMP) and Quality Management Plan (QMP). These plans will identify all required actions and resources required, and would confirm availability and proper training for construction phase risks. This plan will detail 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. Draft Health and Safety Plan components are included in Appendix G. A summary of these documents is presented in Section 2.15, Health and Safety, of this SDEIS. Specific accident/incident prevention policies will be developed for these plans to maintain the health and safety of workers and protect private and public property. Both of these plans will be continuously updated with the most current information prior to construction.

Complaint Resolution Process

In accordance with the 2008 DEIS, Ball Hill will establish a complaint resolution process to receive and address complaints raised during construction and operation of the Project. Complaints will be directed to the environmental supervisor by email or by calling a dedicated project hotline, and the contact information will be made available in Project communications. The complaint resolution process will be developed in cooperation with the Towns and presented in a Complaint Resolution Plan to be included in the FEIS.

1.2.3 Operation and Maintenance

Ball Hill plans to operate the Project with a staff of up to six full-time employees who would perform routine, preventive maintenance and unplanned work on the wind turbines under an O&M contract. A facility manager and an administrative assistant would be responsible for all O&M 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. If needed, large repair tasks would be accomplished using both Project employees and third-party contractors.

Ball Hill would construct an O&M facility on 2.8 acres within the Project Area, which would house these activities. The O&M building footprint would be approximately 140 feet by 50 feet constructed as a single story with amenities including a maintenance shop, offices, and a conference room.

The operational staff would maintain the wind turbines, including routine maintenance, long-term maintenance, and emergency work. Routine maintenance for the turbines would 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.

Emergency work 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 utilization of cranes at each turbine site to complete the work.

It is not expected that the Project will use herbicides to control vegetation along access roads, turbine maintenance areas, or electrical collection ROWs. Access roads 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 would be performed by a certified contractor and in accordance with all applicable regulations. The natural vegetative conditions would be restored after construction and preserved to the maximum extent practicable throughout the Project Area, and no sites would remain devoid of vegetation. Maintenance of all cleared areas and periodic removal of vegetation would 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 would 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.

All materials used during the inspection and maintenance of Project equipment would follow a strict material safety data sheet (MSDS) program and, when required, would 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. Typical MSDSs will be included in the FEIS as Appendix H.

1.3 Project Alternatives

This section discusses Project alternatives and describes the process used to select 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 the following: 1) the location of wind resources in 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 and 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 Ball Hill 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 wind project 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 fossil fuel based resources. Therefore, the selection of the no-build alternative would forego any reduction in the continued reliance in the Northeast on fuel-based energy resources (e.g., fossil fuels and nuclear power). 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 79 to 100 MW of clean, renewable electric energy to the power grid would be lost. Electric generation by fossil fuel-fired facilities produces adverse impacts from 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 climate change have been cited as serious concerns for bird populations in North America (Price and Glick 2004; National Audubon Society 2013, 2015).

Beyond air emissions, fossil fuel-fired facilities are known to produce other significant adverse environmental impacts. These include, among others, 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), the visual and quality of life impacts resulting from the facilities' structure and vapor/steam plume, and significant adverse impacts on fuel extraction and transport. 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. Even with modern pollution control devices, significant adverse impacts remain, such as fuel collection processing and transportation. The cumulative adverse effects from the construction and operation of additional fossil fuel power plants needed to meet the ever-increasing demand for energy would increase without the use of renewable energy.

Beyond environmental impacts, fossil fuel power plant facilities may 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 significant adverse impacts when compared to wind energy, 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 can result in significant price swings and increased costs to consumers due to supply and demand forces. In extreme instances, supply disruptions may force use of other fuels, such as fuel oil. Thus, fossil fuel-fired facilities, which depend on non-renewable resources, may have environmental and social costs that wind energy does not.

Nuclear facilities, while adding to the diversity of the nation's energy generation, 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, natural disaster, or act of terrorism. Moreover, the negative public perception of nuclear facilities (both the power plants themselves and radioactive waste disposal sites) renders the siting of any new facilities extremely difficult.

In marked contrast, according to the National Renewable Energy Laboratory, wind energy is: 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 (U.S. Department of Energy [USDOE] 2005). Wind projects do, however, require adequate 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, a lease may be signed and the land remains the property of the rural landowner. Thus, revenues are paid to the landowner, and these monies help sustain economic vitality in the rural area. In addition to lease payments to private landowners, the Project is expected to make significant payments in lieu of taxes (PILOT) and other payments to it host communities, 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 USDOE developed a plan for wind energy to provide 20% of United States electricity by 2030. NYS's 2015 Reforming the Energy Vison (REV) initiative calls for a 40% reduction in greenhouse gas (GHG) emissions from 1990 levels and 50% generation of electricity from renewable energy sources by 2030 (New York State Energy Planning Board 2015a). Thus, they encourage development of renewable sources and support renewable sources as a vital part of the local and national long-term energy (see Section 1.4, Project Purpose, Needs, and Benefits).

NYS continues to support wind energy. In May 2015 the Ball Hill Wind Project was selected in the 10th Main Tier Solicitation and the New York State Energy Research and Development Agency (NYSERDA) has awarded it a renewable energy credit contract. Governor Cuomo's support for the Project was expressed in the accompanying press release.

This Project utilizes a renewable resource, avoids adverse environmental impacts associated with fossil fuel-fired and nuclear-powered facilities, and is environmentally and socioeconomically 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 increasingly competitive with prices of 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 NYS.

Under the No-Build alternative, the economic benefits of the Project would not be realized, including revenues to local taxing jurisdictions, lease revenues for participating landowners, income from O&M jobs, payments to Project neighbors, and income from construction jobs. The Project, as proposed, would add up to 100 MW of electric generating capacity from a renewable resource to the NYS Energy Portfolio. If the No-Build alternative were selected, the state's energy portfolio would not include this additional capacity from a renewable resource — wind.

If the No-Build alternative were selected, the temporary and permanent environmental impacts from Project construction and operation would not occur. This includes the potential impacts on the natural environment, such as soils, water quality, wetlands, wildlife habitat, and birds and bats. Overall, the Project would result in the disturbance of 330.1 acres of land during construction including the permanent conversion of 228.3 acres (127.3 acres in the town of Villenova and 101.0 acres in the town of Hanover) of land for Project facilities, such as turbine pedestals, access roads, turbine crane pads and the substation, switchyard and transmission line ROW. This temporary disturbance and permanent alteration would be avoided under the No Build alternative.

If the No-Build alternative were selected, 29.1 acres of wetlands would not be disturbed during construction. As currently designed, this includes 4.6 acres of wetland to be permanently filled (which will be minimized and reduced through the micro-siting process, to be presented in the FEIS). Approximately 4.3 acres of forested wetland would not be permanently converted to scrub-shrub 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, scrub-shrub, 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 on 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 those to visual resources, noise, communication signals, traffic and transportation, land use, and cultural resources. However, for the Project these impacts are offset by the benefits described above. Environmental impacts are discussed in detail in Section 2, Environmental Impacts and Mitigation Measures, and its subsections.

Finalizing Project Location and Design

As described in detail in the 2008 DEIS (see Appendix A), beginning in 2004, the Project sponsor 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; proximity to existing roads and transmission lines; and availability of contiguous land.

The proposed Project Area in the towns of Villenova and Hanover was identified for many reasons. The National Grid 230-kV Dunkirk-Gardenville transmission line that runs through the town of Hanover makes electrical transmission possible in this area. 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."

Transportation in and through Chautauqua County and the towns of Villenova and Hanover is provided by a well-developed system of local, county, and state roads. The defined Project Area is accessible via NYS Route 39, NYS Route 60, NYS Route 72, NYS Route 83, NYS Route 85, NYS Route 93, NYS Route 394, Waterboro Rd., County Route 87, Danker Road, and Ball Hill Road. 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 would 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 and have a low population density, making them attractive for wind energy development. Large, sparsely settled parcels require fewer leases and less encroachment on residential uses. As stated previously, agricultural land use is highly compatible with wind energy projects.

Once the proposed Project Area was identified, discussions with landowners and residents of the community in 2006 and 2007 were undertaken to determine whether there would be sufficient participation of landowners to develop a viable project. Voluntary agreements with landowners for development on their respective property were secured. The Project Site is limited to those locations where voluntary landowner agreements are obtained and some public ROW usage where improvements are needed.

After the potential Project Area was identified 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. As discussed in the 2008 DEIS, no fatal flaws were identified during this analysis (see Appendix A).

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.

In 2015 Ball Hill continued development of the Project in its original location. Ball Hill continued to obtain 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.

Figure 1.3-1 and Table 1.3-1 depict a Project comparison map between the Noble Ball Hill Windpark layout presented in the 2008 DEIS and Ball Hill's layout as presented in this SDEIS.

Table 1.3-1 Comparison of Project Layouts Proposed in the 2008 DEIS and the SDEIS

Project Component	2008 DEIS Layout	SDEIS Layout
Wind Turbines (number)	60	36
Access Roads (miles)	16.0	14.9
Buried Electrical Collection Lines (miles)	23.8	21.3
Transmission Lines (miles)	6	6
O&M Building Site (acres)[1]	5	2.8 (5 acres leased)
Substation (feet by feet)	200 x 300	175 x 290
Switchyard (feet by feet)	300 x 500	225 x 611
Temporary Construction Laydown Areas (acres)	28	26.1

Note:
1 The O&M building site is currently proposed to be located within the 10.4 acres for the laydown area following construction.

As land rights acquisition activities are 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 all the constraints to develop an exclusion boundary to properly site potential turbine locations. Areas were eliminated from consideration for turbine locations if located on a NYSDEC or National Wetland Inventory (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, or within the additional setback distances established by Ball Hill (i.e., 1,642 feet from a residence);
- 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 FAA and other applicable requirements; or
- Within a microwave or other radiowave pathway.

Constraint data were collected and mapped using geographic information system (GIS) software. An exclusion boundary was developed to show the possible siting locations based on hard setback requirements. Hard setbacks included, but were not limited to, public roads, non-participating property lines, residential structures, and FAA-restricted airspace. Next meteorological data and noise calculations were evaluated by consultants to create efficient arrays. Potential turbine locations were then identified and field verified to ensure that:

- Impacts on wetlands and other environmentally sensitive areas were avoided to the maximum 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, balancing the avoidance of potential environmental impacts and maximizing generation output.

Once turbine locations were selected, access roads and collection lines were sited to avoid and/or minimize impacts on wetlands and other sensitive environmental features and wildlife, maximize use of existing road and transmission infrastructure, avoid engineering constraints, such as steep slopes, and meet the approval of individual landowners. Fundamentally, the access roads and other project components must also meet the required geometrical and engineering specifications required by the turbine manufacturer for safe delivery and exit from the turbine sites.

Ball Hill utilized specific criteria for the preliminary siting of electrical collection lines. "First order" criteria for collection line routing were: 1) shortening the length of circuits to minimize electrical losses, cost and environmental impacts; 2) availability of property rights; and 3) absence of environmental constraints. Once preliminary electrical collection 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. Such impacts can be minimized by using

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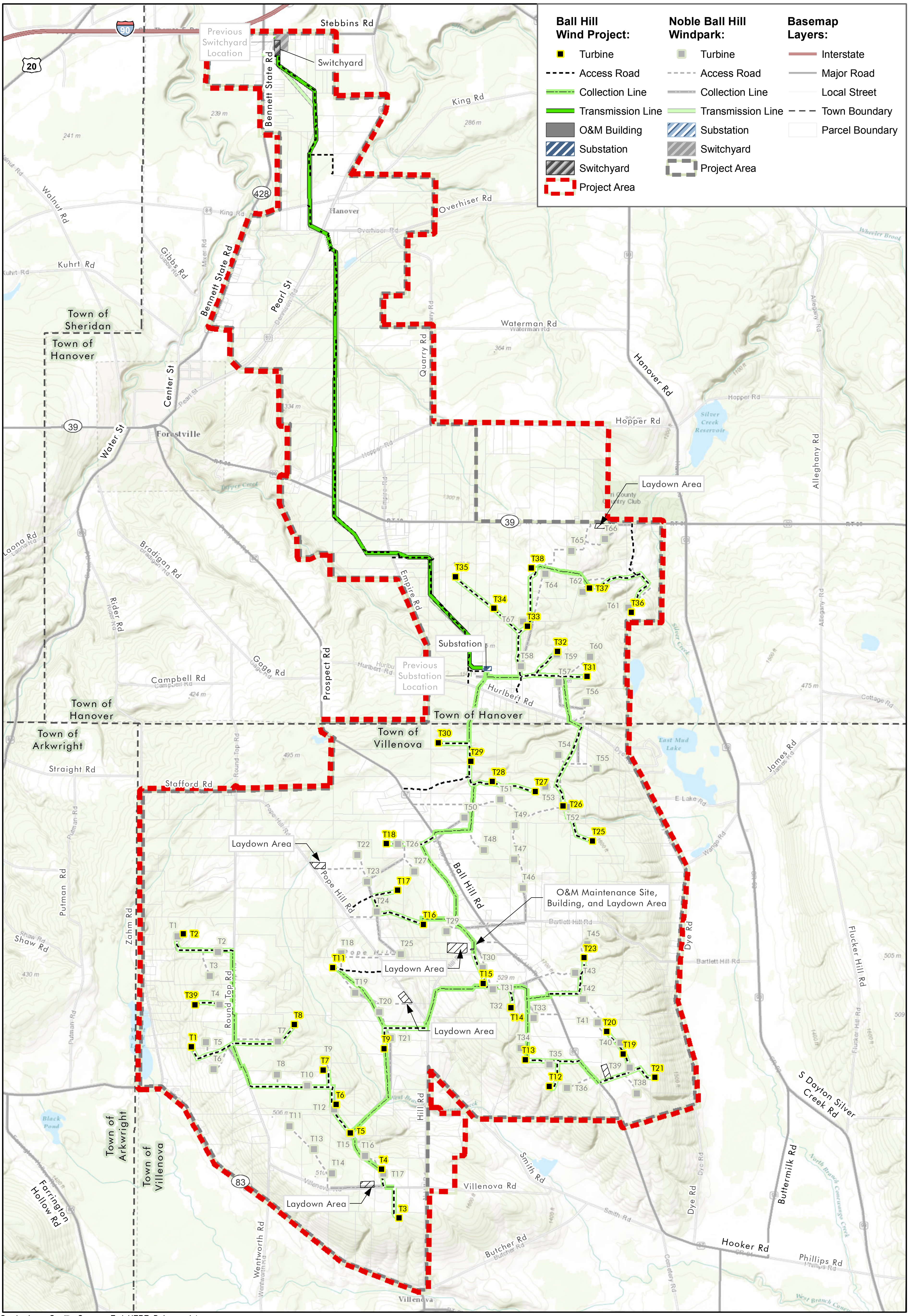


Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the

Figure 1.3-1
Project Comparison
Ball Hill Wind Project (2015) and Noble Ball Hill Windpark (2008)
Chautauqua County, New York
Ball Hill Wind Energy, LLC

0 0.25 0.5 1 Miles

various construction techniques, some of which are directional drilling, maintaining buried cable depths in agricultural areas coordinated with landowner operations, and strategic pole placement. As required under the Towns' wind energy facility laws and after careful analysis, a primarily underground approach was selected in order to minimize visual impacts to the greatest extent possible.

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/collection 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 wetland and stream crossings.

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 order to minimize agricultural impacts. Access roads have been sited in accordance with NYSDAM *Guidelines for Agricultural Mitigation for Windpower Projects* wherever practicable to minimize loss of agricultural land and impacts on farming operations.

Project Design

Care was taken to choose a project design that would minimize impact on the use of active agricultural lands. Facilities were carefully sited to minimize impacts on agricultural land in conformance with NYSDAM's guidelines. 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 guidelines, 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 impacts on drain tiles. The Project has also been designed so as to avoid any potential impacts on archaeological resources.

The design and layout of the Project components has been continuously evaluated and optimized to avoid or minimize adverse environmental impacts while improving Project efficiency. The proposed Project layout has been engineered to capture the area's high wind energy resource while minimizing wake effects on downwind turbines and adverse environmental impacts. Ball Hill is in the process of micro-siting and analyzing engineering options and controls to minimize and avoid impacts to these areas, the result of which will be included in the FEIS.

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 36-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 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 impacts may occur including increased cost, loss of potential turbines and generating capacity, and other adverse environmental impacts.

Examples of increased impacts include the additional lengths of roads and collection lines that would be required to avoid all wetlands. For every linear foot increase of road, there would be an increase of up to 75 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 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 traffic impacts in the areas and general inconveniences for the people living in the area. The proposed design has multiple turbines along one access road with a single entrance from a public road. During the siting process, proposed roadways were modified to minimize impacts on wetlands, use existing access routes in order to minimize forest fragmentation, complement existing land uses, and avoid cultural resources.

Although Ball Hill has completed extensive preliminary review, there exists the possibility that the fill design, surveying, wind turbine manufacturer design standards, and other constraints could impact the current layout and design and require modification and design changes to the Project layouts, equipment, and system designs. 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.

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

Alternative Turbine Selection

For the proposed Project, Ball Hill will select a 2.2- or 2.3-MW turbine or something similar. While larger than some available turbine models, the 2.3-MW turbine was selected because it is more cost-effective than smaller machines and also more efficient. Energy capture increases more rapidly than do costs with increased rotor diameter. Further, the rotor is centered at higher elevations aboveground where winds are stronger. Smaller turbines are available; however, more turbines would be required to produce comparable amounts of power. In 2015, Ball Hill chose the Vestas V110-2.2 or GE 2.3-116, the two main options for the Project. These options are larger than the GE 1.5-MW model identified in the 2008 DEIS. These turbines have been selected because they allow Ball Hill to maximize power output for the entire Project while utilizing fewer turbines and, thus, decreasing the overall Project Site size and footprint, and, thus, generally minimizing environmental impacts. These turbines are efficient and utilize a larger rotor and allow for greater output from lower wind speeds. The larger rotor along with the longer blades (110 to 116 meters) would extend productivity particularly in moderate wind conditions. Ball Hill analyzes the environmental impacts of both of these turbines throughout this SDEIS. The GE turbine has a larger footprint for the turbine site and is therefore used for all impact calculations, and was assumed for visual impacts assessment.

Further advancements in turbine technology with higher capacities and similar dimensions may allow an update which would be studied as part of the FEIS. Any candidate higher capacity turbines would be expected to have a larger generator but not have any significantly different visual or noise impacts.

Smaller Project Size

Ball Hill reduced the Project size by utilizing larger and higher capacity turbines than those proposed in 2008. The 2008 Project layout included 60 turbines and their associated access roads and collection lines. The 2008 Project site comprised 386 acres. As currently designed, the current Project has a 330.1-acre Project Site encompassing up to 36 turbines yet will produce more energy than the proposed 2008 layout. In summary, the alternatives analysis concluded that the Project size and technology as proposed offers the optimum use of resources with the least potential adverse impacts.

1.4 Project Purpose, Needs, and Benefits

1.4.1 Project Purpose and Need

The purpose of the Project is to use wind, a renewable resource, to generate electricity while avoiding the use of any fossil fuels or water yet producing no air or water emissions or waste discharge. This electricity would be provided to the NYISO grid for distribution to meet consumer demand. The Project would have capacity sufficient to generate approximately 79 to 100 MW of power, contribute to the achievement of NYS's Renewable Portfolio Standard (RPS), 2015 State Energy Plan, and promote the development of a diverse national energy portfolio with increased generation 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.

1.4.2 Effects on Use and Conservation of Energy Resources

In 2004 the New York Public Service Commission (PSC) adopted an RPS, which called for an increase in the proportion of renewable energy to 25% by 2013 (PSC 2015a). In 2010, the RPS target was revised to 30% by 2015. The PSC established an RPS program goal of 10.4 million megawatt hours (MWh) by 2015 through a combination of Main Tier (for Large Scale Renewables [LSR]) and Customer-Sited Tier Distributed Energy Resources renewable sources. As of December 31, 2014, NYSERDA had achieved 56% of this goal (NYSERDA 2015a).

The 2015 New York State Energy Plan introduced the new energy initiative REV. The REV Initiative established the following goals by 2030 (New York State Energy Planning Board 2015a):

- 40% reduction in GHG emissions from 1990 levels, from sources including power generation, industry, buildings, and transportation. This goal supports the long-term goal of decreasing carbon emissions 80% by 2050.
- 50% generation of electricity from renewable energy sources.
- 23% decrease in energy consumption in buildings from 2012 levels.

With the expiration of the RPS in 2015, the REV Initiative will expand on the renewable energy goals of the RPS while taking on additional challenges related to environmental impacts, climate change, system resiliency, technical innovations, market competition, consumer choice, and affordability (PSC 2015b). The PSC has instituted an LSR track for the REV Initiative and instructed NYSERDA to continue with LSR solicitations through 2016 (PSC 2015c), siting the importance of LSR in achieving New York's GHG reduction and renewable energy goals.

The Project would help achieve NYS goals to increase clean energy economy in NYS, to bring low-carbon choices to New Yorkers, while at the same time benefiting economic development, jobs, technological innovation, and energy security. In addition to the economic benefits, this renewable capacity would provide added environmental benefits by avoiding the production of nitrogen oxides, sulfur oxides, and carbon dioxide from electricity generation.

NYS's climate action program 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 avoid production of emissions that contribute to GHGs. The current contribution of renewable and alternative energy resources to the state and 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 technologies.

1.4.3 Project Benefits

The construction and operation of the Project would result in positive environmental, economic, and energy benefits. The Project would add approximately 79 to 100 MW of clean, renewable electric generating capacity to the power grid with no air emissions. This amount of energy is enough power to provide electricity, on average to approximately 23,700 to 30,000 homes. (Each MW of wind energy generates about as much electricity as 225 to 300 households use.) In comparison, the addition of 79 to100 MW of electric generation by fossil fuel-fired facilities (i.e., natural gas or coal) presents serious adverse environmental and health consequences in the form of, among other things, pollution 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. In contrast, the Project would produce this amount of power without any significant adverse impacts on air or water quality or climate change.

Local economic benefits of the Project would include:

- Temporary and permanent employment;
- Increased commerce in the towns due to spending by Project employees, suppliers, and local merchants;
- Increased flow of revenue to the county, towns, and school districts through PILOT payments;
- Increased flow of revenue to landowners under lease agreements; and
- Increased economic diversification.

Ball Hill 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 would result in a significant increase in local revenue for the taxing authorities. Significantly, the Project would not increase demands for services upon the local municipalities or school districts.

Construction of the Project would result in the direct employment of up to 64 full-time equivalent (FTE) employees (or 133,120 annual man-hours) of electrical workers, crane operators, equipment operators, carpenters, iron workers, riggers, laborers, and other construction workers (with a total estimated payroll of up to $5.2 million) and create up to approximately 320 additional indirect, and induced FTE jobs countywide (with a total estimated payroll of up to $24.1 million). Total direct, indirect, and induced employment from construction of the Project would be up to approximately 384 FTE employees. More employees may be hired since not all positions would be full time for an entire 12-month period. A significant percentage of the construction workers employed during the construction period would 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 would be brought in and temporarily housed in the area during the construction phase of the Project.

During operations the Project would employ up to six on-site FTE employees (with a total estimated payroll of up to $0.5 million). Operation of the Project is estimated to create up to 10 more indirect and induced FTE jobs countywide (with a total estimated payroll of up to $0.8 million). Total employment during operation of the Project would be up to approximately 16 FTE jobs (with a total estimated payroll of up to $1.3 million.

The Project would spend a total of about up to $44.3 million region-wide during construction. The increase in construction spending will directly impact the regional economy by increasing employment, earnings, and economic activity in the construction industry. In addition, these construction expenditures will also have a positive indirect and induced impact on the local economy. Regional economic output, a measure of economic activity in an area, is expected to directly increase by $5.2 million to $5.6 million as a direct result of construction of the Project. An additional $46.1 million to $58.0 million of economic output is expected to be generated as these funds are "multiplied" or cycle through the local economy.

During operation, the Project would inject an estimated $1.1 million to $1.5 million annually into the regional economy from O&M expenditures at the Project Site. Regional economic activity would be further increased by $2.4 million to $3.0 million as the indirect and induced impacts associated with the operation of the Project are included. The indirect impacts would include the effects on regional economic activity associated with any materials or services purchased by the Project from the regional economy. The induced economic impacts would include those effects that would be generated as the additional expenditure of funds cycled through the regional economy. In total the direct, indirect, and induced impacts associated with the operation phase of the Project would increase regional economic activity by $2.8 million to $3.5 million per year.

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

The Project would 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 would 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 would create construction jobs and several new permanent positions, provide new revenue to Chautauqua County and Towns and additional indirect economic benefits through multiplier effects, it is not anticipated to lead to significant new economic growth (i.e., residential, commercial, or industrial) in the towns of Villenova and Hanover or the surrounding areas. In the short-term, there would be some minor increased growth from the Project. Temporary employment opportunities (up to 64 FTE jobs) would 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 construction related workers for an extended period of time. In the long-term, employment opportunities would be available for up to six workers for the O&M of the turbines and associated facilities. Ball Hill anticipates technicians would be hired locally to the extent practicable and would be trained to operate and maintain wind turbines. As a result, no new significant long-term residential, commercial, or industrial growth is expected from the Project.

The area roadway network would not be significantly altered, with the exception of particular road improvements to accommodate the traffic generated by the Project. For example, the width of several intersections would be modified to accommodate large vehicle turning radii or road services and culverts may be improved or repaired to accommodate turbine deliveries as well as concrete and gravel truck traffic. These intersection and road surface/structure improvements are not designed to increase traffic capacity or facilitate growth and would 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. Commercial growth would occur but would likely be limited to those businesses which supply site maintenance, vehicle maintenance, and general mechanical and office supplies to the Project O&M facility.

Power generated by the Project would be supplied to the NYISO bulk transmission system and not to individual retail customers. As mentioned previously, the presence of wind turbines may help maintain the agricultural character of the area by providing active farms a secondary source of income through lease payments. The additional income from such payments may supplement and 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, would 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 would continue to be expended by Ball Hill, various NYS agencies, Chautauqua County, and the towns of Villenova and Hanover for the planning and review of the Project. Ball Hill 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 New York SEQRA review process. Similar arrangements with the Town of Hanover would also be made to avoid significant expenditures for review of Project impacts.

The Project requires the commitment of land for the life of the Project. 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 for the Project, the turbines would be removed at the end of their useful life and the land may be reclaimed for other uses (see Appendix N). 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. Ball Hill would 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 on wildlife would be avoided or minimized to the greatest extent practicable and would be monitored and mitigated as appropriate based on post-construction monitoring and agency requirements.

Construction materials and building supplies would be used for the Project. The use of these materials, such as gravel, concrete, and steel, represents a long-term commitment of these resources that would not be available for other projects. Some of these materials may be reusable and recycled after Project decommissioning; however, many of the concrete foundations would not be recycled, but would be left in place at least 3 feet below ground surface.

Energy resources would be consumed in building and operating the Project. Fuel, lubricants, and electricity would 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, wind, is unlimited. The amount of conventional energy resources used to construct and operate the Project would be minor compared to the clean, renewable energy generated by the Project over the life of the Project.

1.5 Table of Required Permits and Consultations

Table 1.5-1 indicates each permit that Ball Hill has or would apply for in order to construct and operate the Project.

Table 1.5-1 Required Permits and Consultations

Required Permits/Agreements	Agency
Local Law to Create a Wind Overlay District and amendment of height limitation for Wind Energy Conversion Systems	Villenova Town Board
Special Use Permit	Villenova Town Board
Town Road Use Agreement	Villenova Town Board
Host Community Agreement	Villenova Town Board
Building Permits	Villenova Code Enforcement Officer or Town Designated Consultant
Zoning Permit	
Special Use Permit	Hanover Town Board
Town Road Use Agreement	Hanover Town Board
Host Community Agreement	Hanover Town Board
Subdivision Approval and Referral	Hanover Planning Board
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) and associated Agreements and Approvals	Chautauqua County Industrial Development Agency (CCIDA)
Article 15 – Stream Disturbance Permit	New York State Department of Conservation (NYSDEC)
Article 24 – Freshwater Wetlands Permit	NYSDEC
Section 401: Water Quality Certification	NYSDEC
Article 17 – State Pollutant Discharge Elimination System – General Permit for Stormwater Discharges from Construction Activity	NYSDEC
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

Table 1.5-1 Required Permits and Consultations

Required Permits/Agreements	Agency
Article VII Certificate of Environmental Compatibility and Public Need	New York State Public Service Commission
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: Wetlands Disturbance Permit, or as determined by the United States Army Corps of Engineers when wetland delineations are completed	United States Army Corps of Engineers
Consultation	United States Fish and Wildlife Service

2 Environmental Impacts and Mitigation Measures

2.1 Geology

This section provides updated information on the potential impacts of the Project and mitigation related to geologic resources in the Project Area. Information on the existing surficial geology, bedrock geology, topography, mineral resources, and seismic activity within the Project Area is included in Section 2.1 of the 2008 DEIS, attached hereto as Appendix A. This information remains accurate and relevant to the Project and, for the sake of efficiency, is incorporated herein by reference. This section evaluates potential impacts on geology and topography from construction operations and potential Project-related risks from seismic activity in the region.

2.1.1 Construction Impacts

Construction of the Project is not expected to affect regional geology and topography because the spatial scale of the Project is much smaller than the regional geologic and topographic scales. Construction of the Project will affect portions of the Project site geology and topography in the following situations:

- Local topography around the turbine sites and some other Project facilities may be changed (i.e., cut and filled) to accommodate the requirements to construct and operate the turbines and roads. Minor alterations of the turbine sites to level off the area would be required; however, these alterations would not change the overall topography of the Project Area; and
- If shallow bedrock is encountered during construction, it would be excavated and returned to the excavation or trenches. Blasting during construction is not anticipated. However, if blasting becomes necessary, it would not proceed until approval has been obtained from the proper jurisdictions. Significant changes will not be made to the overall level of bedrock in the Project Area. For additional discussion of blasting, see Section 3.1, Description of the Proposed Construction Plan.

Geology and topography impacts related to steep slopes and the presence of shallow bedrock, as inferred from the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database soil characteristics, are included in Table 2.2-3.

2.1.2 Operational Impacts

Operation of the Project would not entail any additional impacts on local geology and topography beyond those required for the installation and maintenance of the facilities. The minor changes made in the course of construction are likely to be permanent. However, following decommissioning there would be a return to pre-construction conditions, and the land may be reclaimed for other uses. Additional details about decommissioning are presented in Section 3.2, Decommissioning, of this SDEIS.

2.1.3 Seismic Activity

The U.S. Geological Survey (USGS) Earthquake Hazards Program, which estimates the level of probable seismic activity probable for any area within the continental United States. The Project Site location (latitude and longitude) was entered into the USGS Earthquake Hazards Program, and the results indicated the area has an extremely low potential for significant seismic activity (USGS 2008).

2.1.4 Mitigation

The Towns of Villenova and Hanover regulate wind turbine development to protect the public health, safety, and welfare of the towns' residents. These regulations, described in Section 2.12, Land Use, establish turbine setback requirements to protect the public from a tower collapse regardless of its cause, seismic or otherwise. In compliance with applicable Town laws, proposed tower locations would be set back from off-site residences at a distance greater than 1,000 feet and over 500 feet from roads and site boundary lines to ensure that, in the unlikely event of significant seismic activity causing structure failure, damage to other structures would not occur. In addition, Ball Hill will adhere to the policy of RES, which is to locate wind turbine towers 1,642 feet (500 meters) from an off-site residence, further mitigating any impacts, where feasible. In addition, the potential earthquake hazards for the region would be accounted for in the design of the anchoring system for the towers as required by the New York State Building Code.

2.2 Soils

This section provides an updated general description of soil characteristics found in the Project Area based on Natural Resource Conservation Service (USDA 2015) soil type descriptions and is intended to supplement the 2008 DEIS (see Appendix A) with regard to soils within in the Project Area. This section also addresses the impacts on soils and proposed mitigation for soils for the Project.

Soils

The existing conditions of soil units in the Project Area are similar to those described in the 2008 DEIS (see Appendix A); however, due to the revised Project layout, the soil series and specific component types likely to be impacted by the Project have changed slightly.

Table 2.2-1 provides updated data to reflect the properties and parameters for all soil units located within the Project Area; and Tables 2.2-2 and 2.2-3 show impacts on soils and soil types within the Project Site.

Agricultural Lands

Current agricultural land uses within the Project Area include pasture land, hay, row crops, and vineyards. Based on land use cover types, the 13,659-acre Project Area includes 5,627 acres of agricultural land use, which represents 41% of the Project Area.

A majority of the Project Area lies within two Chautauqua County agricultural districts: Agricultural District 5 (CHAT005) and Agricultural District 10 (CHAT010), which together encompass 9,702.1 acres in the towns of Hanover and Villenova (NYSDAM 2015). Agricultural District 5 covers 2,017.8 acres in the town of Hanover, and Agricultural District 10 covers 7,684.3 acres in the town of Villenova.

Agricultural districts are often created based on the presence of “prime farmland” and “soils of statewide importance” (NYSDAM 2015). It is important to clarify that the designation of a soil under any of these classes does not mean that the land is currently or was formerly used for agricultural purposes; rather, it simply indicates that the soil type possesses the necessary physical and chemical criteria to satisfy the designation defined by the USDA or pertinent state agencies, such as NYSDAM (USDA 2015; NYSDAM 2015). Soils identified as prime farmland or soils of statewide importance are recognized as having the greatest potential productivity for crop growth. Prime farmlands and soils of statewide importance are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Approximately 2,277 acres (17%) of soils in the Project Area are considered prime farmland soils (1,527 acres in the town of Villenova and 750 acres in the town of Hanover).

Table 2.2-1 Major Characteristics of Soils Found in the Project Area[1]

Soil Series	Farmland Class	Percent Slope	Drainage	Water Table Depth (cm) - Annual Minimum	Hydric	Acres[2]
Alden mucky silt loam	Not prime farmland	3	Very poorly drained	0	All hydric	140.15
Ashville silt loam	Farmland of statewide importance	3	Poorly drained	15	All hydric	285.71
Barcelona silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	138.41
Barcelona silt loam, 3 to 8% slopes	Prime farmland if drained	8	Somewhat poorly drained	31	Not hydric	53.90
Busti silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	286.04
Busti silt loam, 3 to 8% slopes	Prime farmland if drained	8	Somewhat poorly drained	31	Not hydric	1,756.48
Busti silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Somewhat poorly drained	31	Not hydric	28.06
Canandaigua silt loam, loamy substratum	Farmland of statewide importance	3	Poorly drained	0	All hydric	117.43
Carlisle muck	Not prime farmland	2	Very poorly drained	0	All hydric	2.94
Chadakoin silt loam, 3 to 8% slopes	All areas are prime farmland	8	Well drained	0	Not hydric	12.73
Chadakoin silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Well drained	0	Not hydric	26.25
Chadakoin silt loam, 15 to 25% slopes	Not prime farmland	25	Well drained	0	Not hydric	61.69
Chadakoin silt loam, 25 to 35% slopes	Not prime farmland	35	Well drained	0	Not hydric	50.64
Chadakoin silt loam, 35 to 50% slopes	Not prime farmland	50	Well drained	0	Not hydric	30.10
Chautauqua silt loam, 3 to 8% slopes	All areas are prime farmland	8	Moderately well drained	54	Not hydric	1,398.53
Chautauqua silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Moderately well drained	54	Not hydric	1,114.57
Chautauqua silt loam, 15 to 25% slopes	Not prime farmland	25	Moderately well drained	54	Not hydric	39.50
Chenango channery loam, fan, 0 to 3% slopes	All areas are prime farmland	3	Well drained	137	Not hydric	19.41

Table 2.2-1 Major Characteristics of Soils Found in the Project Area[1]

Soil Series	Farmland Class	Percent Slope	Drainage	Water Table Depth (cm) - Annual Minimum	Hydric	Acres[2]
Chenango channery loam, fan, 3 to 8% slopes	All areas are prime farmland	8	Well drained	137	Not hydric	123.37
Chenango gravelly loam, 0 to 3% slopes	All areas are prime farmland	3	Well drained	0	Not hydric	185.14
Chenango gravelly loam, 3 to 8% slopes	All areas are prime farmland	8	Well drained	0	Not hydric	110.03
Chenango gravelly loam, 8 to 15% slopes	Farmland of statewide importance	15	Well drained	0	Not hydric	47.66
Churchville silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	9.52
Collamer silt loam, 3 to 8% slopes	All areas are prime farmland	8	Moderately well drained	54	Not hydric	16.13
Collamer silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Moderately well drained	54	Not hydric	14.05
Dalton silt loam, 0 to 3% slopes	Farmland of statewide importance	3	Somewhat poorly drained	31	Not hydric	55.49
Dalton silt loam, 3 to 8% slopes	Farmland of statewide importance	8	Somewhat poorly drained	31	Not hydric	10.14
Darien silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	23	Not hydric	38.41
Darien silt loam, 3 to 8% slopes	Prime farmland if drained	8	Somewhat poorly drained	23	Not hydric	24.48
Elnora fine sandy loam, 0 to 3% slopes	All areas are prime farmland	3	Moderately well drained	54	Not hydric	3.07
Elnora fine sandy loam, 3 to 8% slopes	All areas are prime farmland	8	Moderately well drained	54	Not hydric	6.49
Erie silt loam, 0 to 3% slopes	Farmland of statewide importance	3	Somewhat poorly drained	31	Not hydric	102.05
Erie silt loam, 3 to 8% slopes	Farmland of statewide importance	8	Somewhat poorly drained	31	Not hydric	722.55
Fluvaquents-Udifluvents complex, frequently flooded	Not prime farmland	3	Poorly drained	0	All hydric	221.69
Fremont silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	680.87

Table 2.2-1 Major Characteristics of Soils Found in the Project Area[1]

Soil Series	Farmland Class	Percent Slope	Drainage	Water Table Depth (cm) - Annual Minimum	Hydric	Acres[2]
Fremont silt loam, 3 to 8% slopes	Farmland of statewide importance	8	Somewhat poorly drained	31	Not hydric	1,444.14
Fremont silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Somewhat poorly drained	31	Not hydric	181.78
Fremont silt loam, 15 to 25% slopes	Not prime farmland	25	Somewhat poorly drained	31	Not hydric	32.10
Halsey mucky silt loam	Not prime farmland	8	Very poorly drained	8	All hydric	2.38
Hornell silt loam, 0 to 3% slopes	Prime farmland if drained	0	Somewhat poorly drained	31	Not hydric	15.03
Hornell silt loam, 3 to 8% slopes	Farmland of statewide importance	8	Somewhat poorly drained	31	Not hydric	307.54
Hornell silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Somewhat poorly drained	31	Not hydric	32.85
Hornell silt loam, 15 to 25% slopes	Not prime farmland	25	Somewhat poorly drained	31	Not hydric	149.39
Langford silt loam, 3 to 8% slopes	Farmland of statewide importance	8	Well drained	54	Not hydric	471.30
Langford silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Well drained	54	Not hydric	265.62
Middlebury silt loam	All areas are prime farmland	3	Moderately well drained	38	Not hydric	14.60
Minoa fine sandy loam	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	0.10
Niagara silt loam, 0 to 3% slopes, loamy substratum	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	398.61
Niagara silt loam, 3 to 8% slopes, loamy substratum	Prime farmland if drained	8	Somewhat poorly drained	31	Not hydric	50.40
Orpark silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	140.62
Orpark silt loam, 3 to 8% slopes	Prime farmland if drained	8	Somewhat poorly drained	31	Not hydric	173.04

Table 2.2-1 Major Characteristics of Soils Found in the Project Area[1]

Soil Series	Farmland Class	Percent Slope	Drainage	Water Table Depth (cm) - Annual Minimum	Hydric	Acres[2]
Orpark silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Somewhat poorly drained	31	Not hydric	17.45
Palms muck	Not prime farmland	3	Very poorly drained	0	All hydric	8.34
Pompton silt loam	All areas are prime farmland	3	Moderately well drained	46	Not hydric	24.73
Raynham silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	38	Not hydric	9.85
Red Hook silt loam	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	63.48
Rhinebeck silt loam, 0 to 3% slopes	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	1.67
Rock outcrop-Manlius complex, 35 to 70% slopes	Not prime farmland	70	Not Applicable	0	Unranked	39.60
Saprists and Aquents, ponded	Not prime farmland	1	Very poorly drained	0	All hydric	32.39
Schuyler silt loam, 3 to 8% slopes	All areas are prime farmland	8	Moderately well drained	54	Not hydric	84.92
Schuyler silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Moderately well drained	54	Not hydric	160.08
Schuyler silt loam, 15 to 25% slopes	Not prime farmland	25	Moderately well drained	54	Not hydric	408.90
Schuyler silt loam, 25 to 35% slopes	Not prime farmland	35	Moderately well drained	54	Not hydric	2.08
Schuyler silt loam, 35 to 50% slopes	Not prime farmland	50	Moderately well drained	54	Not hydric	15.83
Swormville silt loam	Prime farmland if drained	3	Somewhat poorly drained	31	Not hydric	53.90
Towerville silt loam, 3 to 8% slopes	All areas are prime farmland	8	Moderately well drained	54	Not hydric	9.93
Towerville silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Moderately well drained	54	Not hydric	5.51

Table 2.2-1 Major Characteristics of Soils Found in the Project Area[1]

Soil Series	Farmland Class	Percent Slope	Drainage	Water Table Depth (cm) - Annual Minimum	Hydric	Acres[2]
Towerville silt loam, 25 to 35% slopes	Not prime farmland	35	Moderately well drained	54	Not hydric	44.53
Towerville silt loam, 35 to 50% slopes	Not prime farmland	50	Moderately well drained	54	Not hydric	85.75
Unadilla silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Well drained	0	Not hydric	7.92
Valois gravelly silt loam, 3 to 8% slopes	All areas are prime farmland	8	Well drained	0	Not hydric	268.15
Valois gravelly silt loam, 8 to 15% slopes	Farmland of statewide importance	15	Well drained	0	Not hydric	60.67
Valois gravelly silt loam, 15 to 25% slopes	Not prime farmland	25	Well drained	0	Not hydric	70.24
Valois gravelly silt loam, 25 to 35% slopes	Not prime farmland	35	Well drained	0	Not hydric	32.41
Valois gravelly silt loam, 35 to 50% slopes	Not prime farmland	50	Well drained	0	Not hydric	38.49
Valois gravelly silt loam, rolling	Farmland of statewide importance	15	Well drained	0	Not hydric	432.81
Water	Not prime farmland	0	Not Applicable	0	Unranked	50.92
Wayland silt loam	Not prime farmland	3	Poorly drained	0	All hydric	15.52

Notes:
[1] Soils data taken from SSURGO Database (USDA 2015).
[2] Acreages listed in the table are based on individual parcel data that has been combined for purposes of calculation.

Approximately 5,912 acres (43%) of soils in the Project Area are considered soils of statewide importance (3,898 acres in the town of Villenova and 2,014 acres in the town of Hanover).

To estimate areas of potential impact from Project construction, the Chautauqua County Soil Survey and the USDA SSURGO database were reviewed to identify the soil series within the Project Area and to provide more detailed information on potential soil and agricultural productivity-related impacts at each turbine, access road, and associated collection system. Table 2.2-2 presents updated estimates of the temporary and permanent impacts on these types of farmland soils from Project construction.

Table 2.2-2 Impacts on Farmland Soils[1, 2, 3]

Soil Type	Acres Temporary Impact	Acres Permanent Impact
Prime Farmland Soils		
Chautauqua silt loam, 3 to 8% slopes	53.9	19.6
Chenango channery loam, fan, 3 to 8% slopes	0.5	0.1
Chenango gravelly loam, 0 to 3% slopes	4.4	2.8
Chenango gravelly loam, 3 to 8% slopes	5.9	2.5
Collamer silt loam, 3 to 8% slopes	0.3	0.2
Elnora fine sandy loam, 3 to 8% slopes	0.3	0.1
Pompton silt loam	0.0	0.0
Schuyler silt loam, 3 to 8% slopes	0.1	<0.1
Valois gravelly silt loam, 3 to 8% slopes	8.7	2.9
Subtotal Prime Farmland Soils	**74.0**	**28.3**
Prime Farmland if Drained		
Barcelona silt loam, 3 to 8% slopes	0.3	0.2
Busti silt loam, 0 to 3% slopes	7.2	3.2
Busti silt loam, 3 to 8% slopes	42.9	13.8
Darien silt loam, 0 to 3% slopes	0.2	0.1
Fremont silt loam, 0 to 3% slopes	8.7	3.8
Hornell silt loam, 0 to 3% slopes	0.1	0.1
Niagara silt loam, 0 to 3% slopes, loamy substratum	2.7	1.2
Orpark silt loam, 0 to 3% slopes	0.4	0.2
Orpark silt loam, 3 to 8% slopes	1.8	0.7
Raynham silt loam, 0 to 3% slopes	<0.1	0.0
Swormville silt loam	1.1	<0.1
Subtotal Prime Farmland if Drained	**65.5**	**23.1**
Farmland of Statewide Importance		
Ashville silt loam	6.6	2.8
Busti silt loam, 8 to 15% slopes	0.7	0.1
Canandaigua silt loam, loamy substratum	0.8	0.5
Chautauqua silt loam, 8 to 15% slopes	15.3	4.9

Table 2.2-2 Impacts on Farmland Soils[1, 2, 3]

Soil Type	Acres Temporary Impact	Acres Permanent Impact
Chenango gravelly loam, 8 to 15% slopes	0.7	0.3
Collamer silt loam, 8 to 15% slopes	0.4	0.2
Dalton silt loam, 0 to 3% slopes	2.3	0.1
Erie silt loam, 0 to 3% slopes	1.6	0.3
Erie silt loam, 3 to 8% slopes	24.6	8.3
Fremont silt loam, 3 to 8% slopes	29.4	11.3
Fremont silt loam, 8 to 15% slopes	4.4	1.7
Hornell silt loam, 3 to 8% slopes	0.8	0.5
Langford silt loam, 3 to 8% slopes	15.8	2.4
Langford silt loam, 8 to 15% slopes	16.3	4.5
Orpark silt loam, 8 to 15% slopes	0.3	0.2
Schuyler silt loam, 8 to 15% slopes	1.4	0.4
Towerville silt loam, 8 to 15 percent slopes	1.1	0.3
Unadilla silt loam, 8 to 15% slopes	0.9	0.4
Valois gravelly silt loam, 8 to 15% slopes	0.5	0.2
Valois gravelly silt loam, rolling	9.1	3.7
Subtotal Farmland of Statewide Importance	**132.9**	**43.0**
Total Impact on Farmland Soils	**272.4**	**94.4**

Notes:
1 Soils data taken from SSURGO Database (USDA 2015).
2 Impacts to soils considers all Project facilities that would require grading. Clearing of the Transmission Line ROW would not require grading and, therefore, would not impact soils and are not included in this table.
3 Individual acreages may not add up to totals due to rounding.

Steep Slopes and Drainage Characteristics

Approximately 1,101 acres (8%) of the soils in the Project Area have steep slopes, defined as slopes greater than 15% (861 acres in the town of Villenova and 240 acres in the town of Hanover). Areas with steep slopes may be of concern if they are cleared of vegetation during construction activities, as they may be subject to severe erosion during storm events. The presence of steep slopes may affect Project activities by limiting the delivery and use of heavy equipment. Furthermore, construction activities at these locations may be more involved since topography may need to be altered (e.g., by cutting and filling). Where practicable, Project components have been sited to avoid steep slopes that can potentially cause problems during construction.

Approximately 826 acres (6%) of the soils in the Project Area are characterized as poorly or very poorly drained soils (520 acres in the town of Villenova and 306 acres in the town of Hanover). Soil drainage characteristics may also be a concern, since soils with poor drainage can result in areas of ponding or significant water buildup during storm events. This can cause problems during construction with equipment access and increased rutting potential in soils that are saturated.

2.2.1 Construction Impacts

The Project would involve both temporary and permanent impacts on soil resources and agricultural productivity in the Project Area. Table 2.2-3 summarizes the anticipated construction impacts by Project component and soil characteristics.

Overall, the Project would result in the disturbance of soils on 282.6 acres of land, including the permanent conversion of 98.1 acres out of the 13,659 acres of the entire Project Area for Project facilities, such as turbine pedestals, access roads, O&M buildings, and the power substation and switchyard (see Table 2.2-3). The remaining 184.5 acres of land would incur temporary construction-related impacts.

Construction activities, including clearing and grading, trenching and excavation, movement of heavy equipment, and cleanup, may affect soils and agricultural productivity. Potential soil impacts from construction include erosion, compaction, damage to soil structure resulting from construction equipment traffic, and the introduction of stones or rocks from shallow bedrock areas into the topsoil.

Rutting and compaction of agricultural soils may result from the passage of heavy equipment and construction vehicle traffic in the proposed construction areas. These impacts are of particular concern in cultivated fields and may be more likely to occur where soils are poorly drained. Soils with the potential for compaction or rutting resulting from heavy equipment passage were identified through published County Soil Survey information as well as the USDA SSURGO database, where engineering/construction limitations for a given soil type are provided (USDA 2015). As shown in Table 2.2-3, 85.5 acres of soils proposed for disturbance within the Project Area are prone to compaction or rutting.

Agricultural production may also be hampered by the introduction of stones or rocks greater than 4 inches in diameter into the soil surface layer. Subsurface rock fragments and stones may be encountered during grading, trenching, and excavation operations. Excavation of shallow bedrock during construction could also introduce rock fragments and stones into an agricultural field's topsoil layer. As indicated in Table 2.2-3, 65.8 acres of the Project Area may encounter soils with shallow bedrock.

Blasting of shallow bedrock for construction purposes could also impact soil integrity. Blasting during construction is not anticipated; however, if blasting becomes necessary, it will not proceed until full approvals have been obtained from the authority having jurisdiction. See Section 3.1.4, Installation of Turbines, of this SDEIS for additional information regarding blasting.

Soil may also be contaminated by accidental minor spills or leaks of lubricants and fuels used in the construction process.

Table 2.2-3 Potential Soil Impacts Based on Soil Attributes and Project Component[7]

Project Component	Total Impact (Acres)[1]	High Erosion Potential[2]	High Compaction Potential	Poor Drainage[3]	Shallow Bedrock[4]	Slope >15%	Prime Farmland[5]	Statewide Importance
Construction Impacts								
Turbines (including staging area)	137.1	37.3	38.8	3.3	19.4	6.2	69.9	60.6
Collection System[6]	33.3	6.2	8.3	0.9	11.8	0.9	16.8	15.0
Access Roads[7]	67.7	11.0	20.1	2.3	18.3	1.4	32.4	33.6
Transmission[8]	18.4	0.7	10.4	1.1	2.6	0.3	14.0	4.0
Laydown Areas/O&M Facility	26.1	4.0	7.9	1.1	13.7	0.0	6.3	19.8
Total Acres of All Construction Impacts[12]	**282.6**	**59.2**	**85.5**	**8.7**	**65.8**	**17.6**	**139.4**	**133.0**
Operational (Permanent) Impacts								
Turbines[9]	53.6	14.2	15.1	0.8	7.0	2.6	28.0	22.9
Collection System[6]	1.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0
Access Roads[7]	30.5	5.4	8.9	1.0	7.6	0.6	14.9	14.9
Transmission[8]	10.0	0.4	5.2	0.7	1.6	0.2	7.4	2.4
Laydown Areas/O&M Facility[11]	2.9	0.0	2.9	0.0	1.7	0.0	0.0	2.9
Total Acres for Operational Impacts[12]	**98.1**	**20.0**	**32.1**	**2.5**	**17.9**	**3.4**	**51.5**	**43.1**
Total Acres with Temporary Soil Impact[10,12]	**184.5**	**39.2**	**53.4**	**6.2**	**47.9**	**14.2**	**87.9**	**89.9**

Notes:
[1] Total impact is the total soils impacted by each Project component and does not represent a sum of the types of soils presented in this table.
[2] Includes severe and very severe.
[3] Includes poorly drained and very poorly drained.
[4] Includes all bedrock less than 6 feet from the surface.
[5] Includes prime farmland and prime farmland if drained.
[6] Construction impacts include collection right of way (ROW) along existing road, new collection ROW, and the substation; operational impacts include the substation footprint.
[7] Construction impacts are based on access road construction ROW (in some cases including collocated collection lines); operational impacts are based on 18-foot permanent access roads.
[8] Construction and operational impacts based on a 20-foot (construction) and 12-foot (operational) access road ROW and impacts associated with the switchyard. Impacts from poles are considered negligible and are not included. There will be no impact on soils from the clearing of the 80-foot ROW.
[9] Operational impacts are based on the turbine site footprint (270 feet by 240 feet).
[10] Temporary impact on soils equals the construction impact minus the operational impacts. The construction impact includes all soil impacted during construction, which is inclusive of temporary and operational impacts.
[11] Construction impacts include impacts from the construction laydown areas. Operational impacts include the O&M building site and O&M building, which will be constructed on top of a construction laydown area.
[12] Individual values may not add up to totals due to rounding.

Key:
O&M = operation and maintenance

2.2.2 Operational Impacts

The Project requires the acquisition of land rights within two state-certified agricultural districts: Chautauqua County Districts 5 and 10. The agricultural districts in this region encompass almost the entire Project Area, including forested areas and other areas not suitable for farming. Regardless, many soils in these districts are designated as prime farmland or soils of statewide importance and the removal of significant portions of these areas from use may impact the farming community in a given area. Even though the majority of the Project is proposed within existing agricultural districts, only a very small percentage of the soils designated as prime farmland or soils of statewide importance within the Project Site will be impacted by the Project.

Potential permanent impacts from Project facilities were calculated based on the design and layout of the final components. Following construction, the proposed Project would permanently impact 98.1 acres, or 0.7%, of the Project Area. Table 2.2-3 provides a complete acreage impact summary, listed by soil attribute, associated with the installed Project.

As shown in Table 2.2-3, Project facilities would permanently impact 53.6 acres, or 0.4%, of soils at turbine locations; 30.5 acres, or 0.2%, of soils along access roads; 1.2 acres, or less than 0.1%, of soils at the substation for collection systems; 10.0 acres or less than 0.1% at the switchyard and access roads associated with the transmission line; and 2.9 acres, or less than 0.1% for the O&M facility and permanent laydown areas within the Project Area. Negligible permanent impacts on soils are associated with pole placement for the overhead collection system. Installation of underground collection lines would result in no permanent impacts on soils.

Potential permanent impacts associated with Project-related facilities on agricultural lands include production losses associated with conversion of prime farmland soils, soils of statewide importance, or land within agricultural districts to non-agricultural uses. Other impacts, such as subsoil/topsoil mixing, erosion and sedimentation, introduction of stones and rocks into surface soils, and compaction, also can affect the long-term productivity of agricultural lands in the Project Area.

Prime farmland soils and soils of statewide importance that may be permanently impacted by the Project are identified in Table 2.2-3. The Project would permanently impact 51.5 acres of prime farmland (2.3% of prime farmland soils in the Project Area) and 43.1 acres of soils of statewide importance (0.7% of soils of statewide importance in the Project Area).

In the town of Villenova, the Project would permanently impact 19.7 acres of prime farmland and 11.0 acres of soils of statewide importance. The Project would impact 31.7 acres of prime farmland and 32.1 acres of soils of statewide importance in the town of Hanover. The total acreage of prime farmland and soils of statewide importance that would be permanently impacted by conversion to non-agricultural uses is, therefore, minimal and would not significantly affect these soil resources in the towns and Chautauqua County.

2.2.3 Mitigation and Restoration

Construction impacts will be confined to the Project Site and, upon completion, restoration will be performed to avoid any long-term effects. Approximately 65% of soils disturbed during construction within the Project Area will be restored to pre-existing conditions.

Agricultural Lands

Ball Hill undertook an extensive multi-phased siting process to minimize impacts on agricultural lands and other sensitive environmental resources. In addition, Ball Hill proposes mitigation measures explained below to address the concerns expressed in the 2008 letter from NYSDAM related to the proposed locations of wind turbines, access roads, and electrical collection and transmission systems for the project in 2008. Restoration and mitigation of agricultural lands will be conducted in accordance with NYSDAM guidelines for agricultural mitigation for wind power projects to the extent practicable. Appendix B of the 2008 DEIS (attached hereto as Appendix A) contains a copy of the most current guidelines, revised by NYSDAM in 2008.

Proposed turbine locations on active farms were sited, to the extent practicable, to be consistent with NYSDAM guidelines for agricultural mitigation for wind power projects (see Appendix B of the 2008 DEIS attached hereto as Appendix A). To the extent practicable, roads and interconnects were sited on the edge of agricultural land to minimize impacts on agricultural operations. Underground collection lines located away from access roadways would be buried at a depth of at least 42 inches to the top of the conduit in agricultural lands to further minimize post-construction impacts on farming practices.

Ball Hill has and will continue to coordinate with NYSDAM to develop an appropriate post-construction monitoring plan to ensure that NYSDAM guidelines are met. The Villenova Town Law (see Appendix O from the 2008 DEIS attached hereto as Appendix A) governing wind energy facilities requires that "any construction or ground disturbance involving agricultural land shall be done in according to the NYSDAM's publication titled *Guidelines for Agricultural Mitigation for Wind Power Projects*" (see Appendix B from the 2008 DEIS attached hereto as Appendix A). Consistent with NYSDAM guidelines, active agricultural areas that are temporarily or permanently disturbed by construction will be monitored for two years following the completion of initial restoration. General conditions to be monitored include compaction testing, crop productivity, and condition and function of drainage features. During the monitoring period, an environmental supervisor versed in agricultural operations will be retained by Ball Hill to identify and make recommendations regarding unforeseen Project-related impacts on active agricultural lands that are found to need of additional mitigation measures.

Soil compaction and mixing of subsoils with the topsoil layer can affect long-term farmland productivity. To minimize these impacts on active agricultural fields during construction, the construction contractor will strip topsoil from the Project workspace and stockpile all topsoil separately from excavated subsoil material in windrows adjacent to the workspace to minimize topsoil handling. Measures that will be implemented to reduce soil compaction within active agricultural lands will also include restrictions on traffic and load placements when conditions of extreme wetness are encountered and until suitable soil moisture conditions have been restored. In addition, impacts on agricultural lands will be minimized by restricting construction equipment and vehicles to the approved construction ROWs.

Following the completion of construction operations, all temporarily disturbed areas located within active agricultural lands will be decompacted to a minimum depth of 18 inches using a deep ripper, subsoiler, or heavy-duty chisel plow, in accordance with NYSDAM guidelines. Due to the potential for adverse impacts on turbine grounding wires, underground collection cables, and the compacted structural fill on top of the foundations, no subsoil decompaction will be performed within a 35-foot radius of the outside edge of each turbine base. Instead, non-compacted topsoil will be placed on top of the subsoil. If long-term crop loss occurs despite these mitigation measures, Ball Hill will compensate the landowner according to existing agreements.

Decompaction of the Project Site will be performed under the direction of the environmental supervisor and verified by use of a soil penetrometer. Ball Hill will avoid decompaction during or after periods of heavy precipitation. Ball Hill will address soil elasticity conditions on a case-by-case basis as part of Ball Hill's Environmental Management Plan (EMP) (see Appendix I of the 2008 DEIS [within Appendix A of this SDEIS] and Appendix F of this SDEIS) and in accordance with landowner and NYSDAM recommendations in order to ensure effective soil decompaction. Any decompaction activities conducted after October 1 will be coordinated with NYSDAM.

On agricultural land, blasted or excavated bedrock, boulders, and concentrations of excavated stone or rock materials will not be returned to the excavation or trenches any closer than 24 inches from the exposed work surface of the stripped portion of the ROW. The remainder of the backfill will be limited to suitable subsoil material, backfilled up to the top of the exposed work surface. Excess waste rock/stone materials will be removed from active agricultural areas and properly disposed of.

Restoration of all agricultural land and pasture will be coordinated with the affected landowners and will be in accordance with NYSDAM guidelines, including those in the *Seeding, Fertilizing, and Lime Recommendations for Gas Pipeline Right-of-Way Restoration in Farmlands* (NYSDAM 2005). Although these recommendations were originally developed or intended for natural gas pipeline

ROW projects, the same agronomic principles apply to farmland restoration for wind power projects. Ball Hill will continue to coordinate with NYSDAM throughout the construction and operation phases of the Project. Landowners will be consulted before using any seed mixes or soil amendments in disturbed areas. In addition, Ball Hill will ensure that only endophyte-free varieties are used. Additional temporary fencing, as required for coordinating livestock exclusions, will be placed in accordance with landowner requirements. If necessary, alternative grazing plans will be coordinated between Ball Hill, the individual landowner, and the appropriate town(s). Ball Hill will ensure that the integrity of any fencing or watering systems within or adjacent to the Project ROW is maintained. The environmental supervisor will check the fence integrity on a weekly basis at minimum. Additionally, if necessary, alternative grazing plans will be coordinated between Ball Hill and the individual landowner.

Erosion Control

Soil erosion and off-site sedimentation will be minimized through the implementation of erosion control measures to reduce unnecessary impacts and to comply with the appropriate regulations. BMPs will be implemented in conjunction with applicable guidelines (e.g., NYSDAM guidelines and SWPPP requirements). These BMPs will be managed in the site-specific SWPPP for the Project and will be included and submitted in a Notice of Intent for Construction Activities prior to construction, as required by the New York State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities. As a general practice, temporary erosion controls, including interceptor diversions and sediment filter devices (e.g., hay bales and silt fences), will be installed prior to initial ground disturbance. As required, temporary trench plugs will be installed immediately following trench excavation for cabling and mulch or erosion control fabrics (e.g., jute netting) may be used on critical slopes or areas to control erosion. The SWPPP will be filed with the Towns and NYSDEC a minimum of five days prior to the commencement of construction. Typical stormwater pollution prevention measures are included as Appendix E.

During construction, Ball Hill will monitor the effectiveness of temporary erosion control devices in accordance with the SWPPP and Ball Hill's EMP. To ensure proper functioning, temporary erosion control devices will be monitored on a weekly basis, at a minimum, and after rain events to ensure proper functioning, as required in the New York State Standards and Specifications for Sediment and Erosion Control, and in accordance with the SPDES General Permit for Stormwater Discharges from Construction Activities and the SWPPP. Temporary erosion control structures will be maintained until the affected areas are successfully stabilized. Following successful revegetation of construction areas, temporary erosion control devices will be removed.

Mitigation measures will be applied to all disturbed areas and maintained as necessary to prevent soil erosion and sedimentation during the life of the Project. In areas in or adjacent to agricultural fields, the SWPPP will require revegetation or seeding/mulching, which will be coordinated with individual farmers so that the re-establishment of vegetation complements each farmer's operation. Restoration activities in these areas will be conducted in accordance with NYSDAM guidelines. Prior to construction, Ball Hill will document areas within the Project Site that currently have erosion and sedimentation issues so that the adequacy of restoration efforts and site drainage design can be evaluated.

Topsoil and Subsoil

Soil impacts, such as loss of organic matter, topsoil-subsoil mixing, deterioration of soil structure, and soil settling or slumping, will be minimized and/or avoided to the maximum extent practicable by use of protective measures. These measures are intended to ensure that topsoil-subsoil mixing does not occur and that compaction and other construction-related impacts are avoided or mitigated. These protective measures are described below.

Upland and agricultural topsoil will not be stockpiled adjacent to the Project workspace within 50 feet from any wetland or waterbody boundary. Silt fencing will be properly installed around the perimeter of the toe-of-slope of all upland and agricultural topsoil stockpiles to prevent movement of sediment off site. When topsoil stockpiles are left to "over winter" (prior to final restoration operations), each stockpile will be hydroseeded with an annual rye-grass and a suitable hydromulch prior to the onset of winter weather.

In areas where wetland soils are encountered, all wetland topsoil will be stockpiled separate from upland/agricultural topsoil and placed adjacent to the wetland from which it was removed. These stockpiles will not be placed within 50 feet from any wetland or waterbody boundary. Silt fencing will be placed around the toe-of-slope perimeter of all wetland topsoil stockpiles, and the stockpiles will be clearly identified as "Wetland Topsoil." Wetland topsoil will be re-placed into the wetland from which it was removed as soon as practicable after the completion of major construction operations (e.g., turbine placement, trenching).

All excavated subsoil material will be stockpiled separately from all topsoils and adjacent to the Project workspace, no less than 50 feet from any wetland/waterbody. Topsoil would be removed from all areas where subsoil will be stockpiled.

Topsoil will be replaced to original depth, and the original contours will be reestablished to the maximum extent practicable. In active agricultural lands where the topsoil has been stripped, soil decompaction will be conducted prior to topsoil replacement as per NYSDAM guidelines to minimize trench settling. Ball Hill will backfill the trench with select material followed by the native soil. Subsoil decompaction and topsoil replacement will be avoided during and after periods of heavy precipitation. Following decompaction, rocks 4 inches in diameter and larger will be removed from the surface of the subsoil prior to replacement of the topsoil. If the excavated materials are not suitable for use as backfill around turbine pads and roadway areas, soil of similar texture may be imported. The unsuitable soils will then be removed from the Project Area and disposed of in accordance with all applicable permit requirements. For active agricultural lands, any imported topsoil will be selected in consultation with the affected landowner and in accordance with NYSDAM guidelines. If rutting occurs in agricultural fields during construction, either topsoil stripping or heavy timber matting will be employed to prevent the mixing of subsoil and topsoil.

Ball Hill will dewater all excavations and trenches prior to backfilling. The SWPPP will provide the necessary measures for dewatering of trenches and excavations when groundwater is encountered.

Drainage

Prior to and throughout construction, Ball Hill has and will continue to coordinate with individual landowners to determine the locations of all known drain tiles within the areas disturbed by the Project. This information will be provided to the installation contractors prior to the commencement of construction. Additionally, Ball Hill will coordinate with the Chautauqua County Soil and Water Conservation District to determine whether there are any records for the affected properties. If subsurface drainage tiles are encountered during construction, they will be restored in accordance with the drain tile repair specifications provided in Appendix I. Other potential drainage impacts that may occur include changes to the natural drainage ways of agricultural lands. Ball Hill will mitigate these potential impacts by implementing subsurface intercept drain lines and ditch plugs and, where necessary, culverts and ford crossings to maintain natural drainage patterns. In addition, where Project access roads are constructed or existing roads are improved, design of these roadways will include drainage systems. New subsurface drain lines will meet or exceed the condition of existing installed structures and will be installed in coordination with the affected landowner. Prior to replacement, the condition, size, and integrity of the drain tile will be noted to ensure appropriate replacement occurs.

Other Mitigation

Requirements and procedures to prevent and respond to spills during construction are a component of the SWPPP (see Appendix E). Ball Hill will require contractors to use BMPs for handling materials to help prevent spills. If a fuel or lubricating oil spill occurs, it will be cleaned up immediately by removing and properly disposing of any contaminated soils pursuant to applicable regulatory requirements.

For the duration of the Project, a complaint hotline will be established to address and resolve landowner complaints from Project construction or operation, which will be addressed according to the Complaint Resolution Plan described in Section 1.2.2. Ball Hill will work with an agriculture/soil conservation specialist, as required, to address and remediate any complaints received involving soils in agricultural areas. Response procedures in the event of a spill will also be described in the Emergency Response Plan (ERP) that will be developed for the Project (see Appendix G).

The implementation of the identified mitigation measures will avoid and/or minimize the potential adverse impacts to soils, including agricultural soils, to the maximum extent practicable.

2.3 Water Quality

This section provides a description of additional stream delineation that supplemented the previous delineation efforts as set forth in the 2008 DEIS. In addition, this section provides a detailed discussion of the overall stream impacts and proposed water quality mitigation activities for any impacts from construction and operation of the Project.

This SDEIS supplements the 2008 DEIS (see Appendix A), and the impact calculations herein are based on a combination of the 2015 stream delineation surveys and historical data. While these data present valuable information about the potential location, extent, and quality of streams throughout the Project Site, streams are dynamic and can change over time. Updated field delineations will be completed to support the FEIS and federal and state permits. The general stream types and conditions in the Project Site remain the same as those described in the 2008 DEIS, though the extent of bed and banks of some individual streams may have changed. Updated stream delineations for the current Project layout began in 2015 but are incomplete at this time. Additional delineations will be conducted in 2016; all streams will be revisited and delineated for preparation of a revised comprehensive wetland and stream delineation report to be included in the FEIS and to support both federal and state wetland permit applications. Once delineations have been completed for the Project, an agency review will be conducted and a jurisdictional determination (JD) will be sought. Once stream delineations are complete, the updated information will be used to support micro-siting to avoid and/or minimize impacts on streams. More detailed information regarding the data used for this stream evaluation and the current status of stream delineations conducted in 2015 is included in Appendix C of this SDEIS.

Table 2.3-1 contains the updated existing conditions and stream characteristics for the Project.

This section addresses possible impacts on groundwater and surface water resulting from construction and operation of the Project. Construction activities, including building access roads, installing turbines, and placing electrical collection and transmission lines, may impact the condition of groundwater and surface water resources and, ultimately, water quality. Ball Hill will minimize any potential construction impacts on surface or groundwater quality through the implementation of BMPs as described herein.

Long-term impacts on surface water quality are expected to be minimal because Project components were sited to avoid impacts on groundwater and surface water resources by locating them in previously disturbed areas to the extent practicable.

2.3.1 Construction Impacts

The siting of some Project components remains preliminary and will be adjusted for the FEIS. It is anticipated that the impact numbers shown here are higher than the final impacts that will be calculated after micro-siting has been completed.

These final impact calculations will be included in the FEIS and demonstrate Ball Hill's commitment to continue to avoid and minimize impacts on water resources through refined layout design.

Groundwater

Construction of the Project is not expected to cause any significant adverse impact on groundwater. It is possible that shallow groundwater may be encountered during excavation of Project facilities or that other localized groundwater flow disruptions may take place downgradient of the turbine foundations, access roads, collection lines, substation, and transmission pole foundations. However, should this occur, it is anticipated that preconstruction groundwater conditions would restore themselves as groundwater fills in behind the subsurface Project facilities. Any soil compaction that takes place during construction is not expected to extend to the water table; therefore, groundwater movement would not be disrupted by compaction. Compaction could potentially result in less groundwater infiltration in affected areas. However, the total area where compaction could potentially take place (85.5 acres [see Table 2.2-3]), in comparison with the amount of pervious surface that readily allows infiltration to groundwater in the Project Area, is minor and is not expected to cause any changes in regional groundwater levels or quality. These areas would also be temporarily compacted during the construction process. Construction of the Project may increase the potential for introduction of pollutants into groundwater as a result of possible spills of petroleum or other chemicals. To avoid or mitigate any such potential impact, Ball Hill will implement a site-specific SWPPP in accordance with NYSDEC regulations. The SWPPP will contain a spill prevention and control (SPCC) plan. A typical SWPPP, including spill prevention measures, is included in this SDEIS as Appendix E. In addition, under federal environmental regulations in 40 CFR Part 112, Ball Hill will implement an SPCC plan for the site because oil in excess of stated thresholds (i.e., 1,320 gallons for the site) would be on the site. Sources of oil could include the main power transformer, wind turbine pad mount transformers, gear oils, and hydraulic fluids located in the turbines, and any oil or fuel storage as part of construction. Ball Hill general policies for the implementation of the SPCC are included in the ERP in Appendix G. As the Project develops, a site-specific SPCC will be established and included as an appendix to Ball Hill's Safety Plans.

Construction of the Project is not expected to impact private or public drinking sources. Typically, drinking water wells, such as those used by residents in the Project Area, are designed to withdraw water from deep aquifers, which would utilize a deeper source of groundwater that would not be encountered during construction. If areas of shallow groundwater exist in the vicinity of Project facilities, they would be identified during site-specific, detailed foundation engineering investigations performed in conjunction with the road and foundation design processes and addressed in the design plans.

Blasting may be necessary if areas with shallow bedrock are encountered during construction. First, mechanical methods will be attempted to remove the bedrock, including ripping or conventional excavation. If blasting is necessary, it will be performed in a manner designed to control energy release. In general, blasting activities can cause adverse effects to groundwater flow due to ground dislocation from the force of the blast. Alteration of groundwater flow can potentially reduce or eliminate the amount of groundwater supplied to nearby wells. Temporary increases in turbidity and changes in water level may occur in wells located in proximity to the Project facilities during construction activities involving blasting. Potential blasting activities are not anticipated to impact private or public drinking sources due to the typical depth of drinking water wells in the Project Area. Additionally, Ball Hill will limit blasting operations to the minimum quantity and force required to fracture and loosen the rock to the necessary depth. Site-specific blasting plans will take into consideration potential effects on nearby water supply wells, as applicable.

Surface Water

Figure 2.3-1 shows that the entire Project Area is located outside the 500-year floodplain, but a portion of the Project Area does lie within the 100-year floodplain (Zone A).

Locations of streams surveyed within the survey corridor are described in the Draft Progress Wetland Delineation Report (see Appendix C). The potential sources of impacts on these streams are summarized on Table 2.3-1 and shown on Figure 2.3-2. Measures were taken during the Project's siting process to avoid stream crossings to the extent practicable. Due to the location and number of streams in the Project Area and the linear nature of Project facilities, it will be necessary to cross streams to install access roads, collection lines, and/or transmission lines. Because specific crossings are regulated by the U.S. Army Corps of Engineers (USACE) and NYSDEC, Ball Hill will refine its stream crossing methods, as appropriate, with these agencies as part of the required permitting process. Final crossing designs will be provided to the Towns upon permit issuance.

Within the generation portions of the Project, reduced construction ROWs for temporary access roads located within sensitive resources may be installed to avoid or minimize impacts. Culverts of an appropriate type and size to maintain sufficient flow would be used where access roads cross streams. Collection lines would be installed within a varying width ROW, depending on the number of circuits and the method used for crossing. Underground collection lines would be installed via trenching of the streams; however, impacts would be minimal since trenching would take place under dry conditions. Streams that are not naturally dry at the time of crossing would be temporarily dammed, with the water pumped around the construction area to allow collection lines to be installed in dry conditions. The equipment that would be used to install the collection lines would cut a trench, place the cable, and backfill the trench in a single pass, which would reduce the duration of stream disturbance.

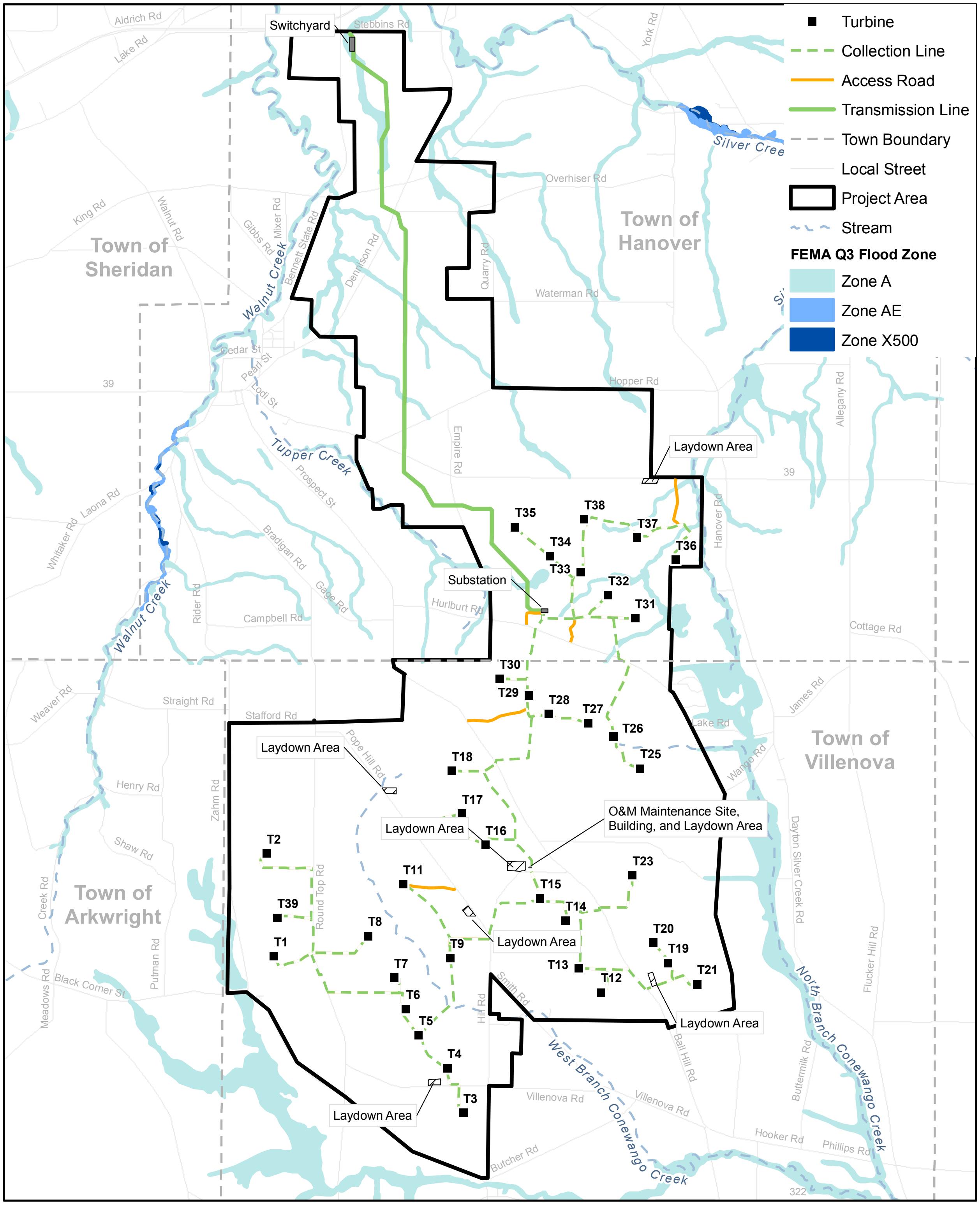
For the transmission portion of the Project, stream crossings not associated with access roads would be avoided during construction to the maximum extent practicable. Construction of the transmission line requires the clearing of woody vegetation from an 80-foot-wide cleared ROW to allow installation of the transmission poles and lines and avoid interference with vegetation once the lines are installed. All transmission lines will have overhead crossings of streams within the transmission line ROW. Due to the location and potential number of streams along the transmission line, it would be necessary to cross streams during construction. Stream crossings would be limited to a 12-foot temporary construction corridor. Temporary construction impacts would be minimized by using temporary crossings or wetland mats for equipment crossings; however, some minor impacts may occur within the 12-foot travel corridor. Any vegetation impeding equipment access would be hand-cleared in the vicinity of streams. Clearing vegetation along crossed streams may disturb streams, in addition to slight water temperature changes due to loss of shade; however, where practicable, stumps would be left in place to minimize erosion and sedimentation and to facilitate natural revegetation once construction is complete. Permanent culverts may be used for equipment access at nine stream crossings. Upon completion of construction of the overhead electrical transmission lines, operations and maintenance (O&M) vehicles would be via all-terrain vehicles (ATVs) or comparable vehicles.

Access to the transmission line during construction may be achieved through a 20-foot construction access road ROW. After construction these access roads would be scaled back to a permanent width of 12 feet and maintained for O&M. Culverts of an appropriate type and size to maintain sufficient flow will be used as needed where access roads cross streams.

Protected Streams

Generation. Twenty-one of the streams crossed by the Project have been classified as protected streams by NYSDEC and are associated with turbine staging areas, access roads, underground collection lines, and the transmission line. Fifteen of the 21 NYSDEC-protected streams would be impacted by generation components, all of which are Class A streams, which are defined as sources of drinking water. Any crossings that are necessary for Project construction would be designed in ways that do not cause any further degradation of Class A or Class C(t) streams. There will be nine protected streams crossed by generation access roads. Culverts of an appropriate type and size to maintain sufficient flow would be installed at stream crossings. After construction is complete, temporary access roads associated with the turbines and laydown areas would be reduced to 18-foot permanent access roads.

Path: L:\Buffalo\Ball_Hill\2015\Maps\MXDs\Report\SEIS\2015_11_23\Floodplains.mxd



Source: Federal Emergency Management Agency Q3 Data, 1996.

0 0.25 0.5 1 Miles

Figure 2.3-1
FEMA Flood Zones
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

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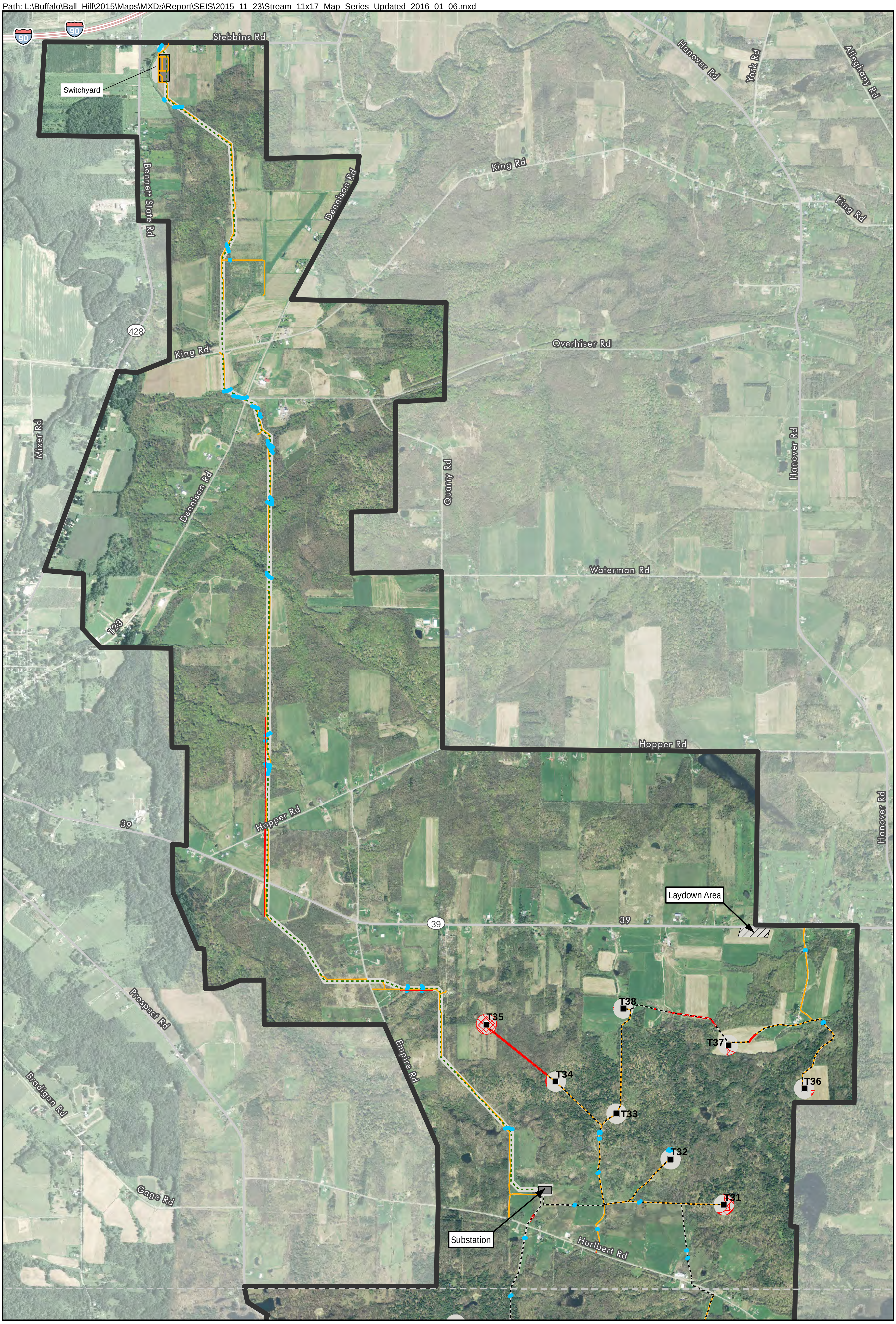
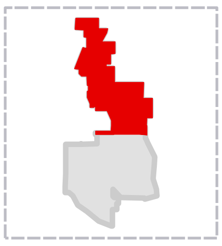


Source: Fisher, 2015; Ecology and Environment, 2008, 2011, 2013; NAIP 2011.



- Turbine
- Collection Line
- Access Road
- Transmission Line
- Town Boundary
- Local Street
- Project Area
- Delineated Streams
- Mapped Stream Line
- Workspace

Figure 2.3-2
Project Streams Surveyed: Page 1 of 2
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

0 0.125 0.25 0.5 Miles

This figure presents and overview of the wetland surveys and locations to date for the Project. More detailed mapping of the wetlands delineated to date are presented in Appendix G of the 2008 DEIS, attached hereto as Appendix A and Appendix C of this SDEIS.

Previous wetland delineation data for the Project Area is only used in this SDEIS where the re-survey of all Project components is incomplete. In areas surveyed in multiple years, only the most recent data has been used. Data presented in the FEIS will be from field surveys conducted in 2015 and 2016.

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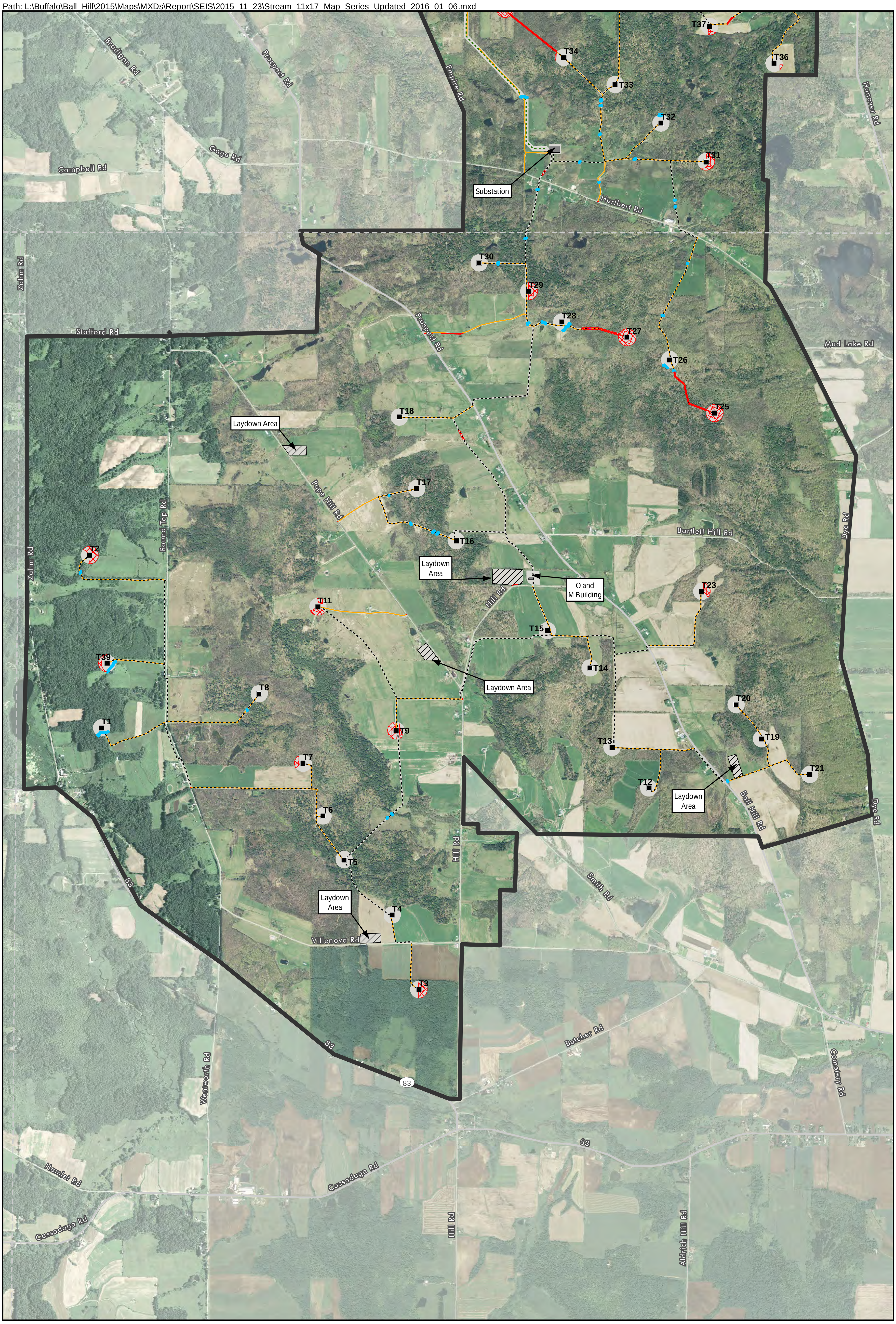
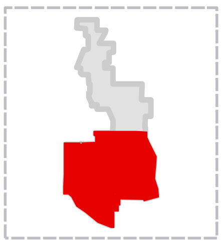


Source: Fisher, 2015; Ecology and Environment, 2008, 2011, 2013; NAIP 2011.



- Turbine
- Collection Line
- Access Road
- Transmission Line
- Town Boundary
- Local Street
- Project Area
- Delineated Streams
- Mapped Stream Line
- Workspace

Figure 2.3-2
Project Streams Surveyed: Page 2 of 2
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

0 0.125 0.25 0.5 Miles

This figure presents and overview of the wetland surveys and locations to date for the Project. More detailed mapping of the wetlands delineated to date are presented in Appendix G of the 2008 DEIS, attached hereto as Appendix A and Appendix C of this SDEIS.

Previous wetland delineation data for the Project Area is only used in this SDEIS where the re-survey of all Project components is incomplete. In areas surveyed in multiple years, only the most recent data has been used. Data presented in the FEIS will be from field surveys conducted in 2015 and 2016.

Transmission. Six NYSDEC-protected streams could be impacted by transmission components. These streams are classified as Class C(t) streams, which are defined as supporting fisheries and suitable for non-contact activities, specifically trout. All of these streams would be crossed by the overhead transmission line, and three of these streams may be additionally crossed by the transmission line access road.

Access roads that cross these streams would be installed within a narrowed 20-foot-wide construction ROW, and their permanent width would be reduced to 12 feet. Culverts of an appropriate type and size to maintain sufficient flow would be used as needed where access roads cross streams during construction. Permanent culverts may be used for equipment stream crossings at some locations. Upon completion of construction, O&M vehicles would be ATVs or comparable vehicles.

Stormwater

Construction of the Project could impact the quality of stormwater runoff. Indirect impacts on surface waters that could potentially result from construction activities include increases in sedimentation and turbidity caused by increased surface runoff from disturbed areas and the possible release of pollutants or hazardous materials in the event of a spill during construction. These impacts are expected to be minor, short-term, and reversible, with the exception of a minor permanent increase in impervious surface area, which will be mitigated through compliance with the site-specific SWPPP (see "Stormwater" in Section 2.3.2). See Section 2.3.4 for a full discussion of mitigation of potential impacts on stormwater from construction.

2.3.2 Operational Impacts

The siting of some Project components remains preliminary and will be adjusted for the FEIS. It is anticipated that the impact numbers shown here are higher than final impacts that will be calculated after micro-siting has been completed. These final impact calculations will be included in the FEIS and demonstrate Ball Hill's commitment to continue to avoid and minimize impacts on water resource through refined layout design.

Groundwater

The operation of the Project is not expected to have any permanent impacts on groundwater within the Project Site. The Project would add only small areas of impervious surface (tower pedestals [0.2 acre]; crane pads [4.9 acres], permanent access roads [37.40 acres], and the O&M facility [0.14 acre]) to the Project Area. The effect on groundwater recharge would, therefore, be negligible. The potential for pollutants to enter the groundwater from spills of petroleum and other chemicals during operation of the Project would be minimized through the continued implementation of BMPs and spill prevention measures set forth in the SPCC (see Appendix E for typical stormwater pollution prevention measures). Implementation of these measures is expected to result in the avoidance of impacts on groundwater and residential drinking water wells within or outside the Project Site.

Surface Water

No significant adverse impacts on streams in the Project Area are expected from operation of the Project. Upon completion of construction, temporary access roads would be reduced to 18-foot permanent access roads for turbines. Permanent culverts would be installed in access roads at stream crossings and maintained as necessary, a total of 31 streams crossed by permanent access roads. No permanent fill would be placed in the stream channel; however, alteration of the vegetative communities on the banks may have minor impacts on stream ecology or function due to loss of shade. While impacts on riparian vegetation to maintain the collection ROW may be necessary during operation, stream banks would remain vegetated in an herbaceous or scrub-shrub state.

For the 12-foot permanent access roads to the transmission line, permanent culverts may be used for equipment stream crossings at some locations. During operation of the Project, O&M vehicles would be ATVs or comparable vehicles.

Protected Streams

Operation of the Project is not expected to result in any significant adverse impacts on protected streams. Permanent culverts will be inspected, maintained, and repaired as necessary to ensure no blockage, washouts, or other adverse impacts result. The presence of the transmission line and underground electrical collection lines would have no impact on stream ecology or function; impacts on riparian vegetation to maintain the collection ROW may be necessary during operation; however, stream banks would remain vegetated in an herbaceous or scrub-shrub state.

The 12-foot permanent access roads to the transmission line may incorporate permanent culverts at three locations to be used for equipment stream crossings. Upon completion of construction, O&M vehicles would be ATVs or comparable vehicles.

Stormwater

No significant increase in impervious surface would result from the operation of the Project. A total of 42.6 acres of impervious surface will be added to the 13,659-acre Project Area from tower pedestals (0.2 acre); crane pads (4.9 acres); permanent access roads (37.40 acres); and the O&M facility (0.1 acre). These Project facilities will be designed for proper surface water flow and stormwater management, in compliance with the site-specific SWPPP. Therefore, no significant adverse impacts on stormwater runoff volumes or water quality are anticipated.

2.3.3 Summary of Impacts

Based on the layout of Project components, a total of 43 perennial streams and six intermittent streams would be crossed by Project facilities (see Table 2.3-1 and

Figure 2.3-2). No ephemeral streams would be crossed by Project facilities. Twenty-one NYSDEC-protected streams would be crossed by the Project facilities. These streams are discussed under the Protected Streams heading within this section. A total of 30 perennial streams and three intermittent streams would be crossed by the generation components of the Project. Twenty streams are crossed by access roads associated with the generation portion of the Project, seven are crossed by collection lines, and up to six by turbine staging areas (see Table 2.3-1 and Figure 2.3-2). In the transmission portion of the Project, a total of 13 perennial streams and three intermittent streams would be crossed by the overhead transmission portion of the Project. Nine of these would be crossed by both the transmission line and a potential access road associated with the transmission portion of the Project, and seven would be crossed only by the transmission line (see Table 2.3-1).

As described above, construction of the Project may result in minor, short-term impacts on the streams crossed. These impacts could occur as a result of in-stream construction activities or construction on slopes adjacent to stream channels. If permanent culverts are necessary, culverts will be designed and installed in a manner maintaining natural stream flow and water velocity. Clearing and grading stream banks, culvert installation, in-stream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat, increased water temperature, increased sedimentation, turbidity, decreased dissolved oxygen concentrations, releases of chemical and nutrient pollutants contained in stream sediments, and introduction of chemical contaminants, such as fuel and lubricants from possible spills. In general, these impacts would be temporary, short-term, and reversible as they are limited only to the period of in-stream construction.

Construction of the Project could result in indirect impacts on the quality of stormwater runoff as a result of increased surface runoff from disturbed areas and the possible release of pollutants or hazardous materials in the event of a spill during construction. These impacts are expected to be minor, short-term, and reversible, with the exception of a minor permanent increase in impervious surface area, which will be mitigated through compliance with the site-specific SWPPP.

No additional impacts are anticipated as a result of the Project.

2.3.4 Mitigation

Several measures will be implemented to ensure surface water quality protection, including implementation of BMPs as set forth in the site-specific SWPPP to be developed for this Project (see Appendix E for typical stormwater pollution prevention measures) and the use of environmental monitoring to ensure these measures are implemented during construction (see Appendix F). The SWPPP will require using sediment and erosion control measures and other BMPs during construction. Typical stormwater pollution prevention measures will be implemented as set forth in the SWPPP. Some examples include utilizing straw bale

Table 2.3-1 Total Stream Impacts, Entire Project

	Count of Total Streams Impacted[1]	Count of Perennial Streams Impacted	Count of Intermittent Streams Impacted	Count of NYSDEC-Protected Streams Impacted	Length of Stream within the Construction ROW[2]	Length of Stream within the Permanent Disturbance Corridor[3]	Temporary Impacts (Areas to be Restored to Preconstruction Contours following Construction)
Turbine Staging Areas	6	6	0	1	1,328.18	160.33	1,167.85
Access Roads	Generation: 20 Transmission: 9	Generation: 18 Transmission: 7	Generation: 2 Transmission: 2	Generation: 9 Transmission: 3	993.90 303.06	446.67 165.39	547.23 137.67
Collection Line[4]	7	6	1	5	258.84	NA	258.84
Transmission Line	16	13	3	6	1,900.89	NA	1,900.89
Total[5, 6]	**49**	**49**	**49**	**21**	**5,391.85**	**772.39**	**5,391.85**

Notes:

1 Each unique stream identification number is assumed to be associated with a single stream crossing. In some instances, linear impacts to a stream may occur within different construction corridors (i.e., an access road and a collection line). Impacts on specific stream identification numbers will be summarized in the FEIS.

2 Construction disturbance includes all areas to be disturbed during construction activities. As such, they include all impact related to clearing and grading of stream banks, in-stream trenching, trench dewatering, and backfilling. For the generation portion of the Project, this includes the linear feet of all streams that fall within the construction ROW. For the transmission portion of the Project, this includes the linear feet of all streams that fall within the 80-foot-wide cleared ROW or access roads to the transmission line. Linear impacts for the transmission portion of the Project are counted for both the 80-foot-wide cleared ROW and the access roads inside and outside of this ROW.

3 Stream impacts within the permanent disturbance corridor refer to in-stream trenching, trench dewatering, and backfilling and culvert installation. Upon completion of construction, temporary access roads will be reduced to 18-foot permanent access roads for turbines and laydown areas. Permanent culverts will be installed in access roads at stream crossings and maintained as necessary. No permanent fill would be placed in the stream channel; however, alteration of the vegetative communities on the banks may have minor impacts on stream ecology or function due to loss of shade.

4 Due to co-location of facilities, some collection line impacts are inseparable from access road impacts. In these instances, linear impacts are reported as access road impacts.

5 Due to rounding, totals may not reflect the sum of numbers.

6 Surveys of some portions of the project area were not completed during the 2015 field season. Impacts reported in these areas are based on delineations completed in 2008, 2012, and 2013. Surveys will be conducted as soon as possible to update the wetland boundaries in these areas. These data will be presented in the FEIS.

dikes, perimeter dikes/swales, silt fencing, stabilizing the construction entrance, stone/rock outlet sediment traps, stone check dams, level spreading, pipe slope drains, and dust control. For more details on these measures see Appendix E.

A site-specific SWPPP will be prepared and filed prior to the issuance of building permits and initiating construction. Environmental monitoring of the site will occur throughout construction and site restoration in accordance with Ball Hill's construction plan and the SWPPP.

The SWPPP will encompass all requirements set forth by the SPDES General Permit for Stormwater Discharges from Construction Activities and will include an erosion and sediment control plan, measures for post-construction runoff control as required, and a spill prevention plan. Furthermore, during construction, sediment and erosion control devices will be monitored weekly, at a minimum, and twice weekly if more than 5 acres are disturbed at one time, and after precipitation events as per SPDES regulations and the NYSDEC Standards and Specification for Sediment and Erosion Control. In addition, the Town of Hanover local law requires that the SWPPP include pre-construction and post-construction drainage calculations that show a zero increase in runoff. The SWPPP will be submitted to the Towns and NYSDEC prior to construction, as required.

Typical BMPs that would be used during construction to prevent excess stormwater runoff from the construction areas include straw bale dikes, perimeter dikes/swales, silt fencing, stabilizing the construction entrance, stone/rock outlet sediment traps, stone check dams, level spreading, pipe slope drains, and dust control. For more details on these measures see Appendix E. Site-specific BMPs will be implemented prior to construction and will be described in more detail in the SWPPP, when developed. The SWPPP will address BMPs that will take place on site to prevent spills and, in the event of a spill, response procedures that will be used to avoid and/or minimize potential adverse groundwater and surface water impacts. Any spillage of fuels, waste oils, other petroleum products, or hazardous materials in proximity to waterbodies shall be reported to NYSDEC's Spill Hotline (1-800-457-7362) within two hours. Any increase in stormwater discharges resulting directly from the construction of the Project will be documented in the SWPPP and, if needed, permitted through an SPDES General Permit for Stormwater Discharges from Construction Activities. Furthermore, maintenance and BMPs will be used for post-construction runoff control, as required. This will ensure that temporarily impacted features do not create more stormwater runoff than preconstruction conditions.

Groundwater

Potential significant adverse groundwater impacts will be avoided and/or minimized through SWPPP implementation of the mitigation measures and BMPs set forth in the SWPPP. All surface soils that are temporarily compacted will be decompacted and/or mitigated as described in (see Section 2.2.1.3). Subsoil within approximately 35 feet of the turbine base will remain compacted, as this provides additional structural stability over the foundation. However, the topsoil will be placed over the compacted soil within this 35-foot radius. Instances of soil compaction outside the 35-foot radius will be minimized through the SWPPPs and BMPs, including the segregation of subsoil and topsoil, use of geotextiles to prevent compaction, and soil compaction mitigation where appropriate. Similar activities in wetlands, if encountered, will be governed by NYSDEC and USACE permits.

If shallow groundwater enters the excavation areas during turbine foundation placement, it may be pumped out during installation of the foundation. Any groundwater that is pumped out of a foundation excavation will be discharged to an area that will either direct the flow toward existing waterbodies or temporarily retain the water until it can filter back into the ground. Specific details relating to pumping groundwater will be included in the SWPPP. Temporary sediment traps or the controlled release of water over vegetated areas will be utilized during construction to intercept and manage sediment-laden runoff from dewatering of turbine foundations. Based on engineering designs, the control practices will retain the runoff and allow sediment to settle prior to discharge. For dewatering practices, the sediment traps shall be placed adjacent to the turbine foundations, with the outlet discharging to a swale, a ditch, or vegetated area.

Surface Water

Potential significant adverse surface water impacts will be avoided and/or minimized by siting Project components away from surface water resources to the extent practicable. However, it will be necessary to cross streams to install access roads and collection lines. During construction, appropriate erosion/sediment control measures (e.g., silt fences or straw bale dikes or other stormwater control measures) will be used to limit the area of impact on surface waters in accordance with USACE and NYSDEC permit requirements. Any sediment runoff or increased turbidity in surface waters resulting from construction will be minimal. Any construction activities occurring within 50 feet of protected stream banks will be conducted in accordance with NYSDEC permit requirements. Other measures that will be implemented to minimize impacts on streams during construction include the following:

- All in-stream work in trout streams, as well as any work that may result in the suspension of sediment, shall not occur during the trout spawning and incubation period commencing October 1 and ending April 30, unless prior approval is obtained by NYSDEC.
- Clearing of existing vegetation will be limited to the material that poses a hazard or hindrance to construction. Snags that provide shelter in streams for fish will not be disturbed unless they cause serious obstructions, scouring, or erosion. Trees will not be felled into any stream or onto the immediate stream bank.
- Where necessary, appropriately sized culverts will be installed to meet hydraulic capacity and structural integrity criteria.

- There will be no widening or constriction of the stream channel bed through the road crossing, and no berms will be constructed on the stream banks.
- If culverts with bottoms are to be used and will be permanent, including round culverts, they will be installed so that at least 20% of the culvert's height is embedded below the existing stream bed at the outlet end of the culvert. The streambed material that is excavated to accommodate culvert placement will then be spread evenly on the bottom of the new culvert. If it is not practical to spread streambed material throughout the entire bottom of the new culvert, material will be spread in the culvert at the inlet and outlet ends gradually up to streambed elevation to promote natural deposition. Culverts with bottoms, including round culverts, will not be used if the streambed is bedrock.
- Access road shoulders within 50 feet of the culvert will be adequately protected with riprap or seeded and mulched within seven days of completion of the temporary and permanent culvert crossing. Mitigation of stream disturbances within 50 feet of protected streams will be coordinated with the applicable agencies (i.e., NYSDEC and the USACE).
- During periods of work activity, flow immediately downstream of the work site will approximate flow immediately upstream of the work site.
- Where streams with flow at the time of construction will be crossed, dam-and-pump procedures will be followed to control water adjacent to the work area.
- Any additional recommendations identified by NYSDEC or USACE during the permitting process.

Access roads and collection lines will be co-located with existing stream crossings whenever possible to avoid creating new disturbances of these resources. Project facilities will be co-located with existing disturbed areas where possible (including existing farming and logging roads and ATV trails), in an effort to minimize impacts and improve these areas. In most cases, only minor improvements, such as replacing culverts, will be required.

Overhead and underground collection lines and overhead transmission lines will be installed across streams. To minimize impacts, wetland mats will be used during construction to bridge streams to prevent impacts associated with equipment crossing. Any in-stream disturbance, such as trenching, will take place during dry conditions to minimize downstream impacts. If water is present at the time of crossing, Ball Hill will dewater the area using a dam-and-pump crossing to minimize stream impacts. To further minimize impacts on streams, the trench will be opened, installation accomplished, and backfilled in one continuous operation, thus limiting the duration of in-stream work. As currently designed, the collection lines are entirely underground. If overhead collection lines are required for the Project as micro-siting continues, any poles would be placed as far away from riparian areas as possible to avoid or minimize any disturbance to streams. Woody vegetation along the stream bank will be cut in some places, but to the maximum extent practicable, stumps will be left in place to protect against erosion. Stream crossings will be engineered, designed, and installed to maintain sufficient flow during construction in accordance with applicable regulations. These methods will be provided to the Towns upon submittal of the Joint Wetland Permit Application to NYSDEC and the USACE and included in the FEIS.

2.4 Wetlands

This section provides a description of additional wetland delineations that have occurred, supplementing the previous delineation efforts as set forth in the 2008 DEIS. In addition, this section provides a detailed discussion of the overall wetland impacts and proposed mitigation activities for wetlands from construction and operation of the Project as currently proposed.

Federal and State-Regulated Wetlands

Section 404 of the Clean Water Act authorizes the USACE to issue permits regulating the discharge of dredged or fill materials into the waters of the United States, including wetlands. There is no minimum size for wetlands to be regulated under federal jurisdiction; however, wetlands that do not have a hydrological connection to waters of the United States (isolated wetlands) may not be subject to federal jurisdiction. There are no regulatory maps identifying federally jurisdictional wetlands. The USACE makes a JD over wetlands as part of their permitting review.

Under Article 24 of the NYS ECL, NYSDEC regulates wetlands that exceed 12.4 acres (5 hectares) in size or have unusual local importance. NYS also regulates a 100-foot upland buffer area surrounding each regulated wetland. Work within state-regulated wetlands and the regulated adjacent area requires a permit from NYSDEC.

Activities associated with construction and operation of the Project components within most of the delineated wetlands are anticipated to be subject to federal and/or state regulations. Ball Hill will file appropriate permit applications with the USACE and NYSDEC and provide copies to the Town of Villenova, SEQRA Lead Agency.

Delineated Wetlands

For the purposes of this SDEIS, a combination of 2015 wetland delineation survey data and historical data has been used to evaluate impacts and proposed mitigation. While historical data present valuable information about the potential location, extent and quality of wetlands throughout the Project Site, wetlands are dynamic habitats that change over time and updated field delineations (which began in 2015) will be completed to support the FEIS and federal and state permits. The general wetland types and conditions in the Project Area remain the same as those described in the 2008 DEIS, though the limits of individual wetlands have changed in some instances. Updated wetland delineations for the current Project layout began in 2015 but are incomplete at this time (see Figure 2.4-1). The Project Site is 330.10 acres, 178.38 acres of the Project Site were delineated in 2015, 118.62 acres were delineated in 2011/2012, and 33.10 acres have not been delineated. Additional delineations will be conducted in 2016. When completed, all wetlands will have been delineated for preparation of a revised comprehensive wetland delineation report to be included in the FEIS and to support both federal and state wetland permit applications. Once delineations have been completed for the Project, an agency review will be conducted and JDs will be sought. This updated information will be used to support micro-siting to avoid and minimize impacts on wetland resources. More detailed information regarding the data used for this wetland evaluation and the current status of wetland delineations conducted in 2015 is included in Appendix C of this SDEIS.

For the purposes of the wetland analysis in the SDEIS, federal jurisdiction is assumed for all wetlands, following the USACE protocols for Preliminary JDs (PJDs). During the permitting process, Ball Hill may choose to request an Approved JD or a PJD from the USACE, depending on how many wetlands appear to be isolated and how that could affect wetland impact totals. State jurisdiction in this SDEIS has been assumed only for current NYSDEC-mapped wetlands. Final jurisdictional determinations and approval of all identified impacts thereto will be made by the USACE and NYSDEC subsequent to field verification.

Based on review of the current and historic wetland data, 149 wetlands totaling approximately 29.12 acres were identified within the Project Site. It is important to note that the design of some Project components remains preliminary and micro-siting will be performed to avoid and minimize impacts on wetland resources.

Of the 29.12 acres of wetlands within the Project Site, 8.37 acres are palustrine forested wetlands or have a forested component, 3.84 acres are palustrine scrub-shrub wetlands or have a shrub component, and 16.91 acres are palustrine emergent wetlands. Wetlands generally receive hydrologic input from precipitation and retained surface water perched on poorly drained soils, and in lower elevations from ground and surface water connections with streams. Soils within the wetlands generally consist of silt loam texture mineral soils with low chroma and redox depletions and/or concentrations.

Types of Wetland Impacts

The wetland impact discussion provided in this section is broken down by (1) impacts during construction; and (2) impacts resulting from operation of the Project.

(1) Impacts during construction include all areas to be disturbed during construction activities (i.e., areas within the Project Site, including construction workspace for wind turbines, electrical collection and transmission lines, utility trenches, utility poles, access roads, staging areas, mitigation areas, and other related structures). Construction impacts are broken down further by temporary and permanent impacts. Some wetlands are temporarily impacted by ground disturbance or placement of fill and the contours are restored following construction to allow wetlands conditions to become reestablished, but permanently impacted by forest conversion. This forest conversion is reported to clarify that where wetland contours are restored, there are some permanent impacts to wetland functions associated with the permanent loss of trees.

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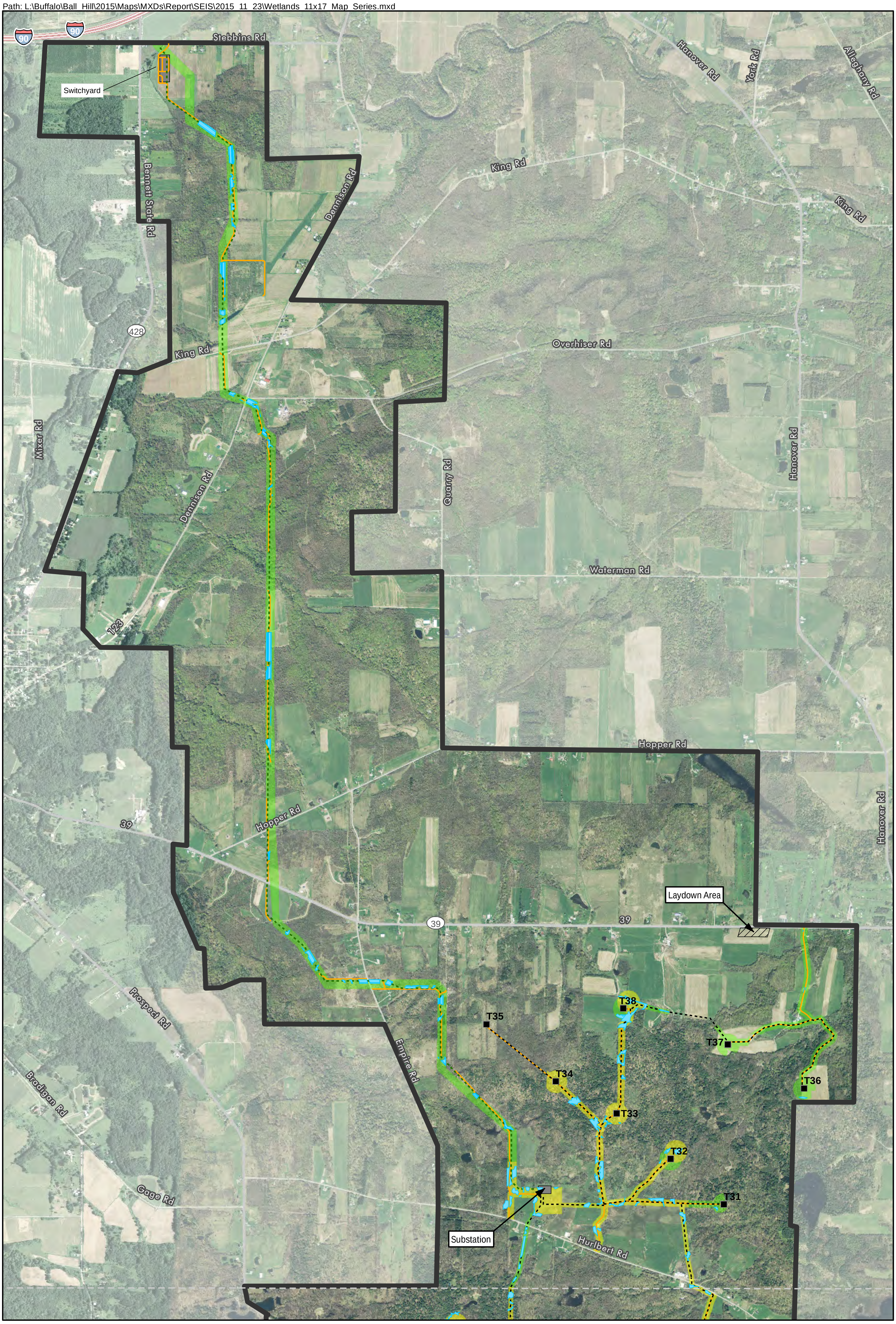
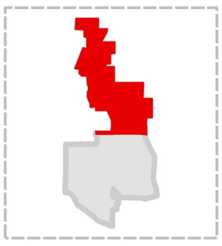


Source: Fisher, 2015; Ecology and Environment, 2008, 2011, 2013; NAIP 2011.



- Turbine
- Collection Line
- Access Road
- Transmission Line
- Town Boundary
- Local Street
- Project Area
- Delineated Wetlands
- Current Study Area Limits (Fisher, 2015)
- Previous Survey Study Area Limits

Figure 2.4-1
Project Wetlands Surveyed: Page 1 of 2
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

0 0.125 0.25 0.5 Miles

This figure presents and overview of the wetland surveys and locations to date for the Project. More detailed mapping of the wetlands delineated to date are presented in Appendix G of the 2008 DEIS, attached hereto as Appendix A and Appendix C of this SDEIS.

Previous wetland delineation data for the Project Area is only used in this SDEIS where the re-survey of all Project components is incomplete. In areas surveyed in multiple years, only the most recent data has been used. Data presented in the FEIS will be from field surveys conducted in 2015 and 2016.

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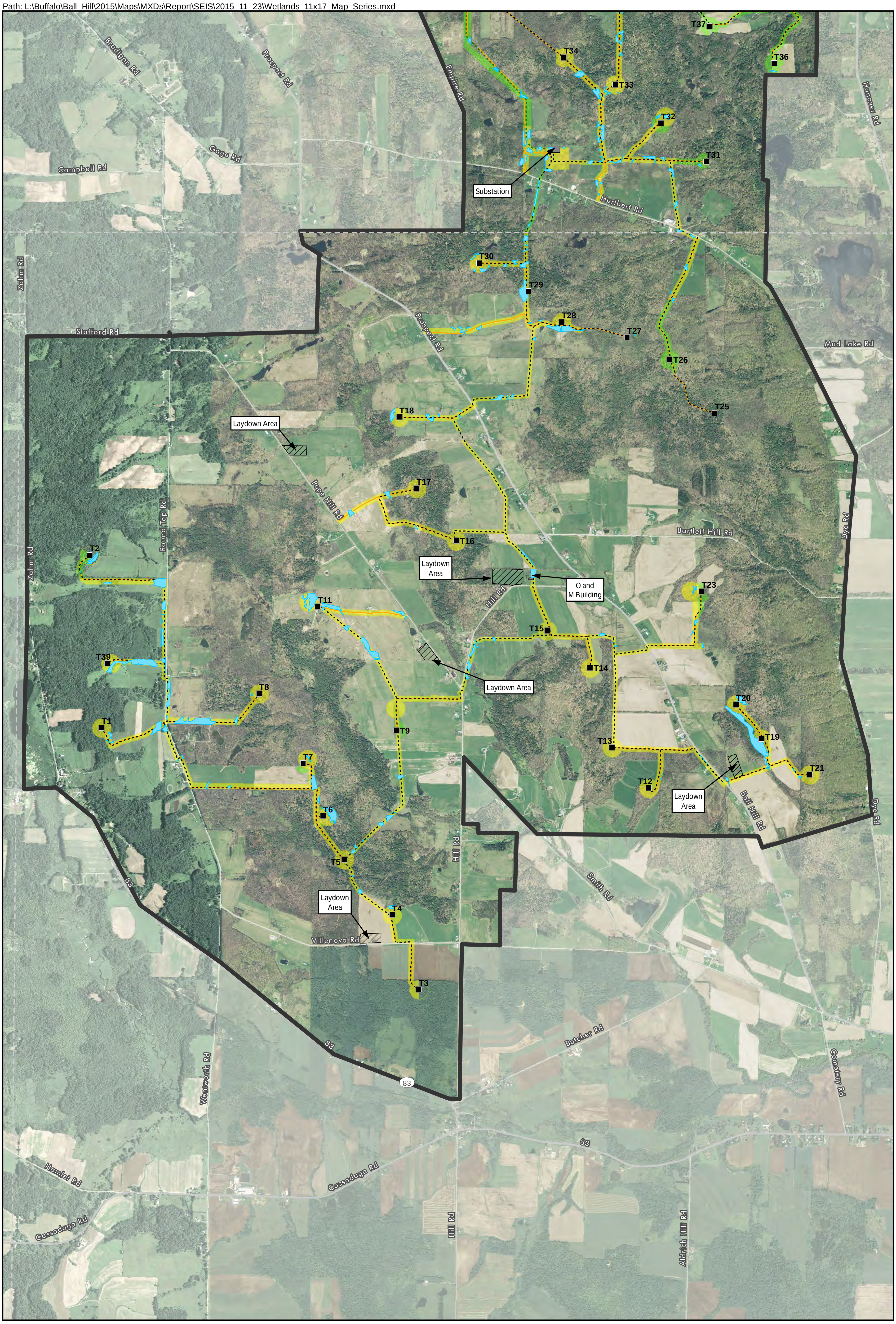

Source: Fisher, 2015; Ecology and Environment, 2008, 2011, 2013; NAIP 2011.

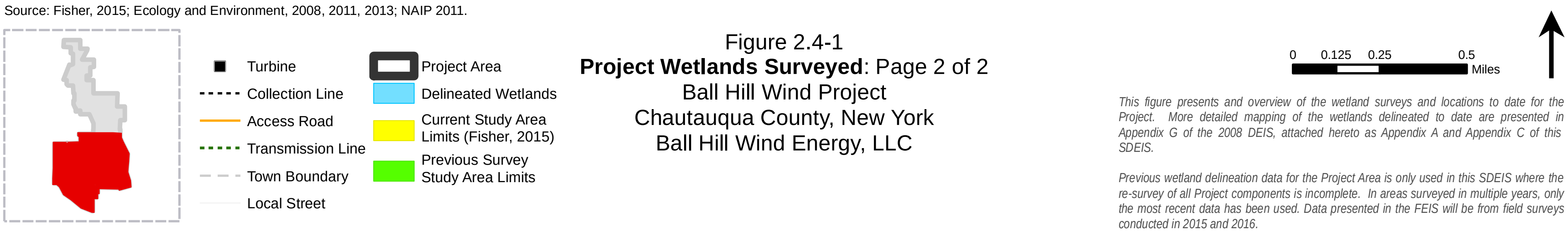

Figure 2.4-1
Project Wetlands Surveyed: Page 2 of 2
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

This figure presents and overview of the wetland surveys and locations to date for the Project. More detailed mapping of the wetlands delineated to date are presented in Appendix G of the 2008 DEIS, attached hereto as Appendix A and Appendix C of this SDEIS.

Previous wetland delineation data for the Project Area is only used in this SDEIS where the re-survey of all Project components is incomplete. In areas surveyed in multiple years, only the most recent data has been used. Data presented in the FEIS will be from field surveys conducted in 2015 and 2016.

For the generation portion of the Project, temporary impacts include wetland impacts associated with ground disturbance activities, including mechanized clearing, filling or excavation, where the Project Site would be restored to preconstruction contours, elevation, and wetland vegetation be allowed to become reestablished. Permanent impacts would result from permanent fill and loss of wetlands (from permanent facilities including permanent staging areas for turbines and permanent access roads), as well as permanent conversion of forested wetlands to emergent or shrub wetlands. These are described in greater detail below.

For the approximate 6-mile overhead electrical transmission line located between the new substation in the town of Villenova and switchyard in the town of Hanover, wetland impacts were calculated assuming a cleared 80-foot-wide permanent ROW. The total construction-related wetland impacts include the area of temporary impact during construction, the area of permanent wetland impacts associated with placement of fill for permanent facilities (those located within the footprint of any of the permanent facilities – substation or access roads), and the forested wetlands that will be cleared and permanently maintained as emergent or shrub wetlands within the electrical transmission line corridor. These are described in greater detail in Section 2.4.1, Construction Impacts.

(2) Impacts during operation include only those impacts that occur or have the potential to occur after construction and restoration are complete. No foreseeable permanent impacts will occur during operation of the Project. Temporary impacts may occur as a result of maintenance activities. These are described in greater detail in Section 2.4.2, Operational Impacts.

2.4.1 Construction Impacts

During Project construction, 29.12 acres of wetland would be disturbed. Tables 2.4-1 and 2.4-2 indicate construction impacts. Of the 29.12 acres of construction-related wetland impacts, 4.64 acres would be permanently impacted by the placement of fill and loss of wetlands; and 24.48 acres would be temporarily impacted by ground disturbance, grading, or placement of fill where preconstruction contours would be restored following construction allowing the area to return to a wetland condition. Of the 24.48 acres of wetlands subjected to temporary fill impacts during construction, 4.25 acres would be permanently impacted by the loss of function associated with clearing forested wetlands and maintaining them to prevent trees from becoming reestablished. A total of 3.74 acres of forested wetland would be cleared during construction and allowed to revert to a forested wetland condition over time, resulting in temporary forested wetland conversion. The remaining, 15.91 acres of wetland temporarily impacted by placement of fill are emergent and shrub wetlands that would revert to similar vegetative cover once contours were reestablished.

Table 2.4-1 Total Wetland Impacts

Facility	Total Construction Disturbance[1]	Ground Disturbance and Placement of Fill Impacts in all Wetlands		Forested Wetland Impacts		Emergent and Scrub/Shrub Wetlands Allowed to Revert to Their Native State
		Permanent Placement of Fill[2]	Temporary Ground Disturbance and Temporary Placement of Fill[3]	Permanent Impact due to Permanent Forest Conversion[4]	Temporary Forest Conversion[5]	
Turbines	9.60	1.64	7.96	0	3.74	4.22
Access Roads	4.60	1.98	2.62	0	0	2.62
Collection Line	3.91	0	3.91	1.08	0	2.83
Transmission and Substation	10.44	1.02	9.42	3.17	0	6.24
O&M Facility	0.57	0.57	0.57	0	0	0
Total[6, 7]	**29.12**	**4.64**	**24.48**	**4.25**	**3.74**	**15.91**

Notes:

[1] Construction disturbance includes all areas to be disturbed during construction activities; as such, they include all impacts related to clearing, temporary grading, and placement of fill. For the generation portion of the Project, this includes the acreage of all wetlands that fall within the construction ROW. For the transmission portion of the Project, this includes the acreage of all wetlands that fall within the 80-foot-wide cleared ROW, the substation, or access roads to the transmission line that fall outside of the transmission line ROW.

[2] Permanent placement of fill for both the generation portion and transmission portion of the Project refers to placement of fill within wetlands that results in a permanent loss of wetland acreage. Placement of fill includes placement of gravel fill for permanent roadways, turbine staging areas, the substation, and the O&M facility. No turbine pedestals are located within wetlands.

[3] Temporary ground disturbance and temporary placement of fill for the generation portion of the Project are defined as wetland impacts associated with filling, grading, or excavation activities where the Project Site would be restored to preconstruction contours and elevation. Temporary impacts for the transmission portion of the Project include any portion of a wetland within the 80-foot-wide cleared ROW that is not permanently filled. Additionally, this also includes impacts associated with filling, grading, or excavation activities of the substation or transmission line access roads outside the 80-foot-wide cleared ROW where the Project Site would be restored to preconstruction contours and elevation.

[4] Permanent forest conversion includes area where forested wetlands will be cleared and not be allowed to naturally regenerate to forested wetlands, but rather be maintained in a scrub-shrub or emergent state. For the generation portion of the Project, this includes all electrical collection line ROWs. For the purpose of this calculation, any clearing associated with access roads co-located with either one or two collection line circuits has been included in this number. For the transmission portion of the Project, this would include all portions of forested wetlands that fall within the 80-foot-wide cleared ROW that will not be maintained as a permanent access road (accounted for in permanent placement of fill).

[5] Temporary forest conversion includes areas where forested wetlands will be cleared and will be allowed to naturally regenerate to a forested wetlands. For the generation portion of the Project, this includes areas within the 230-foot radius around the turbine but outside the 240- by 270-foot staging area.

[6] Due to rounding, totals may not reflect the sum of numbers.

[7] Surveys of some portions of the project area were not completed during the 2015 field season. Impacts reported in these areas are based on delineations completed in 2008, 2012, and 2013. Surveys will be conducted as soon as possible to update the wetland boundaries in these areas.

Table 2.4-2 Impacts on NYSDEC Wetlands and Jurisdictional 100-foot Buffer Area

Facility	Total Construction Disturbance in NYSDEC Wetlands[1]	Ground Disturbance and Placement of Fill Impacts in NYSDEC Wetlands		Forested NYSDEC Wetland Impacts		Total Construction Disturbance in NYSDEC Adjacent Areas[1]	Ground Disturbance and Placement of Fill Impacts in NYSDEC Adjacent Areas		Forested NYSDEC Adjacent Area Impacts	
		Permanent Placement of Fill[2]	Temporary Ground Disturbance and Temporary Placement of Fill[3]	Permanent Impact due to Permanent Forest Conversion[4]	Temporary Forest Conversion[5]		Permanent Placement of Fill[2]	Temporary Ground Disturbance and Temporary Placement of Fill[3]	Permanent Impact due to Permanent Forest Clearing[4]	Temporary Forest Clearing[5]
Turbines	0	0	0	0	0	0	0	0	0	0
Access Roads	0	0	0	0	0	0	0	0	0	0
Collection Line[5]	0	0	0	0	0	0	0	0	0	0
Transmission and Substation	2.17	0.16	2.01	1.46	0	3.45	0.50	2.96	2.94	0
O&M Facility	0	0	0	0	0	0	0	0	0	0
Total	**2.17**	**0.16**	**2.01**	**1.46**	**0**	**3.45**	**0.50**	**2.96**	**2.94**	**0**

Notes:

[1] Construction disturbance includes all areas to be disturbed during construction activities; as such, they include all impacts related to clearing, temporary grading, and placement of fill. For the generation portion of the Project, this includes the acreage of all wetlands that fall within the construction ROW. For the transmission portion of the Project, this includes the acreage of all wetlands that fall within the 80-foot-wide cleared ROW, the substation, or access roads to the transmission line that fall outside of the transmission line ROW.

[2] Permanent placement of fill for both the generation portion and transmission portion of the Project refer to placement of fill within wetlands that results in a permanent loss of wetland acreage. Placement of fill includes placement of gravel fill for permanent roadways, turbine staging areas, the substation, and the O&M Facility. No Turbine pedestals are located within wetlands.

[3] Temporary ground disturbance and temporary placement of fill for the generation portion of the Project are defined as wetland impacts associated with filling, grading, or excavation activities where the Project Site would be restored to preconstruction contours and elevation. Temporary impacts for the transmission portion of the Project include any portion of a wetland within the 80-foot-wide cleared ROW that are not permanently filled. Additionally, this also includes impacts associated with filling, grading, or excavation activities of the substation or transmission line access roads outside the 80-foot-wide cleared ROW where the Project Site would be restored to preconstruction contours and elevation.

[4] Permanent forest conversion/clearing includes where forested wetlands/forested adjacent area will be cleared and not be allowed to naturally regenerate to a forested wetland/forested adjacent area, but rather be maintained in a scrub-shrub or emergent/herbaceous state. For the generation portion of the Project, this includes all electrical collection line ROWs. For the purpose of this calculation, any clearing associated with access roads co-located with either one or two collection line circuits has been included in this number. For the transmission portion of the Project, this would include all portions of forested wetlands that fall within the 80-foot-wide cleared ROW that will not be maintained as a permanent access road (accounted for in permanent placement of fill).

[5] Temporary forest conversion/clearing includes where forested wetlands/forested adjacent area will be cleared and will be allowed to naturally regenerate to a forested wetland/forested adjacent area. For the generation portion of the Project, this includes areas within the 230 radius around the turbine but outside the 240- by 270-foot staging area.

Of the wetlands impacted along the proposed transmission line, 2.17 acres are mapped as NYSDEC wetlands (SC-12, a Class II wetland; and SC-13, a Class III wetland), 0.16 acre of which would be permanently impacted by placement of fill for a permanent access road, and 2.01 acres of which would be temporarily impacted by ground disturbance or temporary placement of fill. Of the 2.01 acres of wetland temporarily subjected to ground disturbance or fill, 1.45 acres would be permanently converted from a forested wetland to an emergent or shrub wetland. In addition, construction of the transmission line ROW and transmission line access roads would impact 3.45 acres of the 100-foot buffer surrounding two state-regulated wetlands (NYSDEC Wetlands SC-12 and SC-13), 0.50 acre of which would be impacted by permanent fill, and 2.95 acres would be temporary fill impact and permanent impact due to forest conversion.

As indicated previously, the siting of some Project components remains preliminary and will be adjusted during micro-siting and the results will be presented in the FEIS. The impact levels shown here are higher than the final impacts anticipated after micro-siting has been completed, particularly along the transmission line ROW where the amount of ground disturbance to wetlands during clearing will depend on the delineated wetland limits and clearing methods selected. The final impact calculations will be included in the FEIS and demonstrate Ball Hill's commitment to continue to avoid and minimize impacts on water resources through refined layout design.

Turbines

Ball Hill will locate all turbine pedestals outside of wetlands. During the preliminary design, as presented in this SDEIS, wetlands were delineated within some of the permanent staging areas. As currently designed, construction of turbine staging areas would result in unavoidable wetland impacts associated with grading and removal of vegetation of 9.60 acres, 7.96 acres of which will be restored to preconstruction contours and 1.64 acres of which will be permanent fill impacts associated with grading at the permanent turbine staging areas. In addition to permanent fill, clearing for temporary workspace will result in temporary conversion of 3.74 acres of forested wetland that will not be maintained after construction and will be allowed to revert to forested cover over time. Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to avoid and minimize and avoid impacts on these areas. The results of this detailed engineering analysis will be included in the FEIS.

As currently designed, each turbine would require a maximum 230-foot radius from the turbine pedestal staging area to stage turbine parts and position construction equipment around the turbine site. Sufficient space is needed around the turbine base to maneuver equipment and avoid safety hazards for construction workers. The staging areas would be sited and modified to avoid and minimize impacts on wetlands to the extent practicable, while still providing a safe and functional workspace to erect the towers. These impact areas will be reassessed and micro-sited in the FEIS to decrease impacts on wetland resources.

Within this maximum 230-foot-radius staging area, generally a 270- by 240-foot rectangular area would be cleared and graded to a slope of 2% or less to facilitate the layout of turbine components. Disturbance outside of this 270- by 240-foot area would 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. The site contours of the turbine staging areas have been designed to utilize the existing base contours rather than importing significant fill volumes. Ball Hill may explore single-blade installation as a construction method to further reduce impacts. After construction, the wetland areas within the 230-foot-radius staging area outside of the 270- by 240-foot rectangular area that have been disturbed would be restored to preexisting contours and allowed to revegetate. Areas within the 270- by 240-foot rectangular area have been included in permanent fill impacts. Ball Hill may restore these areas to preexisting contours where it is possible to do so while maintaining the integrity of the turbine base. These areas would be allowed to revegetate to an emergent or scrub-shrub community.

Access Roads

Access roads for the generation portion of the Project were sited to avoid wetlands to the maximum extent practicable, a process that will continue as the Project is micro-sited. As currently designed, construction of access roads for the Project would result in unavoidable impacts on 4.60 acres of wetlands, 1.98 acres of which would be permanently impacted by the placement of fill and 2.62 acres of which would be temporarily impacted by the placement of fill that will be restored to preconstruction conditions following construction. Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to minimize and avoid impacts on these areas, the result of which will be included in the FEIS.

As a measure to minimize impacts on wetlands, Ball Hill will reduce the construction ROW width while crossing wetlands where feasible as engineering designs are finalized. As currently designed, construction disturbance within wetlands would include the removal of vegetation and grading within the 36-foot construction ROW to provide safe egress, and a temporary access road would be installed within the construction corridor. Culverts and fords would be installed during road construction in appropriate areas to maintain wetland hydrology while the roads are in place. Following construction Ball Hill would reduce access road widths to a permanent 18 feet for the generation portion of the Project and the previously disturbed wetlands would be restored to preconstruction conditions.

Wetland impacts associated with access roads for the transmission line are discussed below with overall transmission line impacts.

Collection Lines

Construction of the Project would result in 3.91 acres of temporary wetland impacts associated with underground collection lines not co-located with access roads, all of which will be restored to preconstruction contours. There would be no permanent fill impacts on wetlands associated with collection line construction. However, the construction corridor for collection lines would be maintained in an herbaceous or scrub-shrub state. As such, maintenance of the underground collection corridor would result in 1.08 acres of permanent impacts associated with conversion of forested wetlands. Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to minimize and avoid impacts on these areas, the result of which will be included in the FEIS.

Construction of the underground electrical collection system will result in the permanent conversion of forested wetlands and temporary ground disturbance from the trenching to install underground collection lines. These areas would be returned to pre-construction contours and would be allowed to revegetate to an emergent or scrub-shrub community. The lines would be placed inside a 48-inch-deep trench and then backfilled with native material. The width of the trench would vary depending on the number of circuits. Select bedding material (e.g., thermal sand) may be used if suitable soil conditions are not present on site. The collection system trenches would not create an impervious boundary and, therefore, would not cause any alteration in the subsurface hydrology of wetlands. However, where necessary, trench plugs would be used to prevent migration of water out of the wetland. Pre-existing contours would be restored after the trench is backfilled and the area is revegetated.

Transmission Line and Substation

As currently designed, construction of the transmission line will result in impacts on 10.44 acres of wetlands associated with grading and removal of vegetation, of which 9.42 acres will be restored to preconstruction conditions and 1.02 acres will be permanent fill impacts associated with access roads and the substation. Of the 9.42 acres of wetlands subjected to temporary fill impacts during construction, 3.17 acres of forested wetlands would be permanently impacted due to forest conversion.

An 80-foot-wide permanent ROW would be required for operation of the transmission line and would be cleared during construction. The ROW would be maintained during operation of the Project to prevent re-establishment of trees. These areas would be periodically maintained to retain an herbaceous or scrub-shrub cover.

Approximately 5.4 miles of access roads will be constructed along the transmission line. These roads would be 20 feet wide during construction and maintained as 12-foot-wide access roads after construction for maintenance.

Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to minimize and avoid impacts on these areas, the results of which will be included in the FEIS.

2.4.2 Operational Impacts

Impacts on wetlands may occur along collection and transmission components of the Project during maintenance to clear vegetation or during access for maintenance. In the event that future temporary impacts are required for future maintenance, Ball Hill would obtain necessary permits from the USACE and NYSDEC on an as-needed basis.

Summary of Impacts

Construction of the Project (i.e., access roads, collection lines, transmission lines, laydown and O&M areas and turbine sites) would result in total construction disturbance of 29.12 acres of wetlands, 4.64 acres of which would be permanently impacted by placement of fill associated with turbine staging areas, access roads, and the transmission substation. The remaining 24.48 acres of wetlands would be limited to temporary ground disturbance impacts or permanent impacts associated with conversion of forested wetlands to an herbaceous or scrub-shrub state. Of the wetlands impacted along the transmission line, 2.17 acres are mapped as NYSDEC wetlands (SC-12, a Class II wetland; and SC-13, a Class III wetland), 0.16 acre of which would be permanently impacted by placement of fill for a permanent access road, and 2.01 acres of which would be temporarily impacted by ground disturbance or temporary placement of fill. Of the 2.01 acres of wetland temporarily subjected to ground disturbance or fill, 1.45 acres would also be permanently impacted by forest conversion. In addition, construction of the transmission line ROW and transmission line access roads would impact 3.45 acres of the 100-foot buffer surrounding two state-regulated wetlands (NYSDEC Wetlands SC-12 and SC-13), 0.50 acre of which would be impacted by permanent fill, and 2.95 acres would be temporary fill impact and permanent impact due to forest conversion. Impacts on streams are described separately (see Section 2.3, Water Quality). Ball Hill is in the process of micro-siting and analyzing engineering options and controls in order to minimize and avoid impacts on wetlands, the results of which will be included in the FEIS. The permanent impacts on 4.64 acres of wetlands are associated with several wetlands that are located along access roads (1.98 acres), associated with turbine staging areas (1.64 acres), within the transmission substation site and access roads (1.02 acres). All other Project facilities, including the switchyard and all turbine foundations, are located outside of delineated wetlands.

Temporary impacts consist of 24.48 acres of wetland that would be temporarily impacted by grading, ground disturbance, or placement of fill during construction and would be returned to preconstruction contours and allowed to revegetate to scrub-shrub or emergent cover. All of these wetland impacts are assumed to be under federal jurisdiction for the purposes of the SDEIS. The majority of wetlands subject to temporary clearing within the construction ROW are herbaceous and scrub-shrub wetlands (15.91 acres), which are expected to quickly revert to their preconstruction conditions. Some areas that are currently forested wetlands would be temporarily cleared during construction to allow for safe construction at turbine sites, but would be allowed to revert to a forested wetland condition over time (3.74 acres). An additional 4.25 acres of forested wetlands along the transmission and collection lines would be permanently impacted in association with forest conversion.

Operation of the generation and transmission facilities could result in temporary impacts to wetlands associated with clearing to maintain ROWs for the transmission line and collection lines as well as temporary impacts to wetlands for maintenance access. Total wetland impacts for the entire Project are listed in Table 2.4-1. Impacts on state jurisdictional wetlands are presented in Table 2.4-2.

2.4.3 Mitigation

Ball Hill has commenced an intensive multi-phased siting process to avoid and minimize potential impacts on wetlands, and has considered siting factors that include topography, location of wetlands and other sensitive resources, availability of sufficient wind resources, proximity to existing roads and transmission lines, locations of residential dwellings, potential impacts from noise, and landowner access agreements. Each factor imposed limitations on the amount of flexibility available during the turbine siting process. Once these factors are considered, turbines and ancillary facilities (i.e., roads and collection system) are sited to avoid and/or minimize environmental impacts. Ball Hill made every effort to use previously disturbed areas, such as farmlands and roads, and avoid wetland and stream crossings. This process continues through micro-siting and analyzing engineering options and controls in order to minimize and avoid impacts on wetland areas, the results of which will be included in the FEIS. Despite an extensive effort to entirely avoid wetland impacts, because of other constraints and the linear nature of some Project components, it is not possible to design the Project without some impacts on wetlands while still meeting Project objectives. The process that is under way to minimize wetland impacts in the design of this Project is described below.

Avoidance and Minimization of Wetlands Impacts through Study and Careful Siting

Multiple wetland studies and delineations were previously completed for the Project to determine the extent and quality of wetlands that could potentially be impacted by the Project. Efforts to avoid and minimize impacts on wetlands from Project inception through the 2008 DEIS are summarized in Appendix A. Previous wetland studies included a desktop review of existing wetland location information and mapping, reconnaissance-level wetland surveys, and detailed wetland delineations in 2008. Since that time, additional rounds of wetland delineations were conducted in 2011/2012. These previous studies confirm that wetlands under state and federal jurisdiction exist within the Project Site and provide information on the extent and quality of those wetlands. Updated wetland delineations began in 2015 and will be completed in 2016. Each phase of the wetland delineations was used to determine changes in the wetlands in the Project Site and refine siting for the Project components to avoid and/or minimize impacts on wetlands while balancing impacts on other resources. The results of 2015/2016 updated wetland delineations will be used to further refine siting and avoid and minimize wetland impacts. The delineated wetland boundaries for the Project will be added to facility mapping and used to further refine the location of turbine sites, roads, electrical collection lines, the transmission line and substation, and the O&M building to avoid and minimize impacts on wetlands to the extent practicable. This process will continue throughout the 2016 field season, and Ball Hill will continue to micro-site and analyze engineering options and controls in order to minimize and avoid impacts on wetlands, the results of which will be included in the FEIS.

Minimization of Impacts during Construction and Operation of the Project

In addition to careful siting and avoidance of impacts as described above, Ball Hill will employ various other mitigation measures to minimize impacts on wetlands to the maximum extent practicable. For example, the size of access roads and collection and transmission line equipment access corridors within wetlands can be restricted to the minimum width necessary to safely and effectively construct and transport equipment to the turbine sites. The size and weight of the wind turbine components require a stable road surface free of obstructions, thus dictating the amount of woody vegetation that must be cleared and the size of the construction access roads. Roads would be gravel-based and would not have any impermeable top coating. Appropriately sized culverts would be used to maintain the hydrologic connectivity of the wetlands. Where possible, access road crossings have been co-located with existing crossings; therefore, the opportunity may exist to improve the connectivity of wetland areas where existing roads do not have adequate culverts or crossings.

During construction and restoration of the Project Site, BMPs would be implemented to minimize impacts on the wetland resource and, where applicable, the associated NYSDEC 100-foot buffer area. These practices include stripping and stockpiling the wetland topsoil separate from subsoil layers during grading operations; use of geotextile fabric and/or crossing mats to minimize soil compaction; and installation of appropriately designed fords or culverts to maintain wetland hydrology.

Ball Hill will follow all NYSDEC and USACE permit requirements regarding restoration of wetland impacts and employ an environmental monitor during construction. In areas where underground collection lines are not co-located with access roads, Ball Hill will return these wetlands to preconstruction grades and allow for the natural recruitment of plants into the underground collection corridor.

An Invasive Species Management Plan (ISMP) will be fully developed in consultation with NYSDEC and the USACE prior to the onset of construction activities. A draft ISMP is included in Appendix F as part of the EMP. The ISMP discusses measures to prevent the spread or introduction of invasive species into the Project Site, measures to control existing invasive communities, and long-term monitoring procedures.

Maintenance activities associated with Project would include: routine maintenance of wind turbines; collection and transmission line service; selective vegetative pruning around components; and access road maintenance. All chemical treatments will be undertaken in accordance with all manufacturer guidelines and federal, state, and local laws.

Ball Hill would utilize BMPs while installing underground collection cables. Trench plugs would be used, as appropriate, and installed immediately after cable laying and prior to trench backfilling, in order to maintain existing hydrological conditions.

Ball Hill would implement a SWPPP in accordance with NYSDEC permit requirements, which would include an Erosion and Sediment Control Plan and BMPs designed to minimize impacts on those wetlands crossed. During construction operations through permitted wetland areas, BMPs, such as silt fencing, straw bale barriers, or temporary rock sediment traps, would be installed to minimize off-site migration of Project-related sediment. SWPPP measures including spill prevention and control measures proposed for the Project are provided in Appendix E.

Mitigation for Permanent Impacts

For those wetland impacts that cannot be avoided, Ball Hill anticipates that mitigation would be required as a condition of the wetland disturbance permits required prior to construction. Within the NYSDEC and USACE permitting requirements, compensatory mitigation can only be considered after the Project proponent demonstrates avoidance and minimization to the extent possible. Conceptual Wetland Mitigation Measures will be used to develop a Conceptual Wetland Mitigation Plan and are provided in Appendix J. This appendix outlines the mitigation techniques that will be implemented in order to meet the requirements for compensatory mitigation consideration.

Based on USACE guidance, mitigation can be completed either financially, in the form of in-lieu-fee mitigation, land acquisition for preservation purposes, regional mitigation banking; or in the form of a specific wetland restoration, creation, or enhancement project developed in conjunction with the Project. Depending on agency input and local availability of existing mitigation opportunities, the mitigation may also take the form of a consolidated mitigation plan combining several available mitigation options.

Mitigation will be required for unavoidable, permanent fill impacts on regulated wetlands (wetland loss) and for loss of function associated with permanent conversion of forested wetlands (loss of wildlife habitat). The Conceptual Wetland Mitigation Measures, provided in Appendix J, take into account the permanent and temporary loss of wetland functions and values provided by the impacted wetlands. The goal of the mitigation plan is to restore, create, and/or enhance wetland hydrology, and hydric soil conditions to adequately offset the loss of function and value to the jurisdictional wetlands on the site resulting from Project implementation. A final mitigation plan will be developed in conjunction with NYSDEC and the USACE as part of the Joint Application for Permit process after wetland surveys are complete. The final mitigation plan will take into account the site-specific cumulative loss of biological function provided by the impacted wetlands, as well as any identified public value.

2.5 Biological Resources

This section discusses impacts on biological resources that may result from construction and operation of the proposed Project and associated mitigation measures to minimize such impacts to the greatest extent practicable. Information on the existing vegetation, aquatic habitat, and wildlife within the Project Area is included in Section 2.9 of the 2008 DEIS (attached hereto as Appendix A). Where feasible, Ball Hill has sited Project facilities to minimize fragmentation of forested habitat and avoid wetlands and aquatic habitats, thereby minimizing the potential for impacts on wildlife. Efforts to avoid, minimize, and mitigate impacts on biological resources are addressed here in Section 2.5.3, Mitigation. For impacts on birds and bats and related mitigation measures, see Section 2.6, Bird and Bat Resources, of this SDEIS. For impacts on and mitigation measures for wetlands and waterbodies, see Section 2.4, Wetlands, of this SDEIS.

The locations of existing ecological communities relative to the Project components are shown on Figure 2.5-1.

2.5.1 Construction Impacts

Upland Vegetation

The primary impacts on biological resources would result from temporary and permanent loss of habitat due to construction activities. During construction there would be a loss of upland vegetation due to the removal of existing vegetation through clearing of forested, scrub-shrub, and herbaceous vegetation as part of construction activities. Project construction will temporarily impact a total of 330.1 acres of land and permanently impact a total of 149.9 acres across several ecological community types (see Table 2.5-1). Table 2.5-1 provides construction impact acreages, by facility, for each of the upland eco-community types present in the Project Area. Common wildlife species associated with the vegetative communities are provided in Table 2.5-2, which is reproduced from Section 2.9, Biological Resources: Existing Conditions, of the 2008 DEIS (see Appendix A). Secondary impacts may include increased soil erosion, which may, in turn, result in a localized reduction of available wildlife habitat. Clearing and grading associated with Project construction has the potential to result in mobilization of soil once the vegetation has been removed. Soil mobilization would be most problematic on slopes, which are more susceptible to erosion. These potential impacts are most likely to occur in conjunction with access roads and the collection system, since the turbine sites would be located on relatively level ground. Impacts on soils are further discussed in Section 2.2, Biological Resources, of this SDEIS.

Table 2.5-1 Project Eco-Community Impacts

Eco-Community Type	Construction Impacts (Permanent and Temporary Impacts) (acres[1])	Project Operational Impacts (Permanent Impacts) (acres)	Areas to be Restored After Construction (Temporary Impacts) (acres)
Turbines[2]			
Agriculture (Hayfields, Row Crops, Pastures)	35.1	14.8	20.3
Beech Maple Mesic	24.5	9.1	15.4
Hemlock - Northern Hard-woods	51.4	19.7	31.7
Successional Northern Hard-woods	13.6	5.2	8.4
Successional Old Field	12.6	4.9	7.7
Access Roads[3]			
Agriculture (hayfields, row crops, pastures)	34.1	15.1	19.0
Beech Maple Mesic	5.8	2.9	2.9
Hemlock - Northern Hard-woods	18.0	7.9	10.1
Successional Northern Hard-woods	2.7	1.4	1.2
Successional Old Field	5.7	2.6	3.1
Successional Shrubland	1.4	0.5	0.9
Collection Line[4]			
Agriculture (Hayfields, Row Crops, Pastures)	28.2	1.2	27.1
Beech Maple Mesic	1.3	0.0	1.3
Hemlock - Northern Hard-woods	2.6	0.0	2.6
Successional Northern Hard-woods	0.1	0.0	0.1
Successional Old Field	0.5	0.0	0.5
Successional Shrubland	0.5	0.0	0.5
Laydown Areas and O&M[5]			
Agriculture (Hayfields, Row Crops, Pastures)	26.0	2.9	23.2
Hemlock - Northern Hard-woods	0.1	0.0	0.1
Transmission Line[6]			
Agriculture (Hayfields, Row Crops, Pastures)	10.9	10.6	0.3
Hemlock - Northern Hard-woods	0.3	0.3	0.0
Open Water	0.3	0.3	0.0

Table 2.5-1 Project Eco-Community Impacts

Eco-Community Type	Construction Impacts (Permanent and Temporary Impacts) (acres[1])	Project Operational Impacts (Permanent Impacts) (acres)	Areas to be Restored After Construction (Temporary Impacts) (acres)
Successional Northern Hardwoods	35.1	34.9	0.2
Successional Old Field	2.8	2.8	0.0
Successional Shrubland	4.3	4.0	0.3
Tree Farm/Vineyard	12.16	8.87	3.3
Total Disturbance from All Project Components			
Agriculture (Hayfields, Row Crops, Pastures)	134.3	44.5	89.8
Beech Maple Mesic	31.6	12.0	19.7
Hemlock - Northern Hardwoods	72.5	27.9	44.5
Open Water	0.3	0.3	0.0
Successional Northern Hardwoods	51.5	41.6	10.0
Successional Old Field	21.5	10.3	11.2
Successional Shrubland	6.2	4.5	1.7
Tree Farm/Vineyard	12.2	8.9	3.3
Total	**330.1**	**149.9**	**180.1**

Notes:

1 The sum of temporary and permanent impacts may not exactly equal construction impacts due to rounding.
2 Construction impacts from the turbine include the entire turbine staging area (230-foot radius); operational impacts are based on the turbine site footprint (270-foot by 240-foot).
3 Construction impacts are based on Access Road construction ROW (in some cases including collocated collection lines); operational impacts are based on 18-foot permanent access roads.
4 Construction impacts include collection ROW along existing road, new collection ROW, and the substation; operational impacts include the substation footprint.
5 Construction impacts include impacts from the construction laydown areas. Operational impacts include the O&M building site and O&M building which will be constructed on top of a construction laydown area.
6 Construction impacts are based on the 80-foot-wide cleared ROW needed for construction and installation of transmission line poles, the 20-foot-wide ROW needed for access road associated with the transmission line, and the switchyard. Project operation impacts are associated with the switchyard footprint and the 12-foot-wide permanent access roads. Impacts from pole placement are considered negligible.

Land use data was derived from the USGS Land Use/Land Cover dataset (Fry et al. 2011); the acreages of eco-communities are defined based on field visits and aerial photo interpretation.

Table 2.5-2 Common Wildlife Species Associated with Vegetative Communities and Aquatic Habitat

Beech-Maple Mesic Forest
Bats (*Lasiurus and Myotis* spp.), black bear (*Ursus americanus*), eastern chipmunk (*Tamias striatus*), flying squirrel (*Glaucomys* sp.), gray squirrel (*Sciurus carolinensis*), opossum (*Didelphis virginiana*), porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*), and white-tailed deer (*Odocoileus virginianus*). Also American toad (*Bufo americanus*), wood frog (*Rana sylvatica*), dusky salamander (*Desmognathus* spp.), mole salamander (*Ambystoma* spp.), red eft-phase of red-spotted newt (*Notophthalmus viridescens viridescens*), and woodland salamander (*Plethodon* spp.)
Hemlock-Northern Hardwood Forest
Bats, black bear, eastern chipmunk, flying squirrel, gray fox (*Urocyon cinereoargenteus*), gray squirrel, opossum, porcupine, raccoon, red squirrel (*Tamiasciurus hudsonicus*), and whitetailed deer. Also, American toad, wood frog, dusky and woodland salamander, and red eft-phase of red-spotted newt.
Successional Northern Hardwood Forest
Black bear, eastern chipmunk, eastern cottontail (*Sylvilagus floridanus*), gray fox, gray squirrel, opossum, porcupine, Red Bat *(Lasiurus borealis)*, red squirrel, and striped skunk *(Mephitis mephitis)*. Also, northern redback salamander (*Plethodon cinereus*) and northern spring salamander (*Gyrinophilus porphyriticus porphyriticus*).
Successional Old Field
Eastern cottontail, gray fox, hairy-tailed mole (*Parascalops breweri*), least shrew (*Cryptotis parva*), meadow vole (*Microtus pennsylvanicus*), raccoon, red fox (*Vulpes vulpes*), striped skunk, white-tailed deer, and woodchuck (*Marmota monax*).
Successional Shrubland
Eastern cottontail, gray fox, hairy-tailed mole, least shrew, meadow vole, raccoon, red fox, striped skunk, and white-tailed deer.
Agriculture (Cropland/Field Crops, Row Crops, Pastureland, and Vineyards)
Big brown bat (*Eptesicus fuscus*), coyote (*Canis latrans*), eastern cottontail, hoary bat (*Lasiurus cinereus*), red fox, striped skunk, white-tailed deer, and woodchuck.
Wetland Vegetative Communities
Beaver (*Castor canadensis*), muskrat (*Ondatra zibethicas*), star-nosed mole (*Condylura ristata*), and water shrew (*Sorex palustris*). Also, mole salamanders, northern water snake (*Nerodia sipedon*), and various frog, salamander, toad, and turtle species.
Aquatic Habitats
Mink (*Mustela vison*), painted turtle (*Chrysemys picta*), snapping turtle (*Chelydra serpentina*), red-spotted newt, and various frogs and toads. Macroinvertebrates and small, warmwater fish species, including blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*), darters (*Etheostoma* spp.), and fathead minnow (*Pimephales promelas*). In addition, trout species may occur in some portions of the Project Area. Class C(t) streams have the potential to contain cold-water fish species, including brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*).
Tree Farms/Vineyards
Striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), and opossum (*Didelphis virginiana*).

Sources: DeGraaf and Yamasaki 2001; Chambers 1983; Hilty and Merenlender 2002

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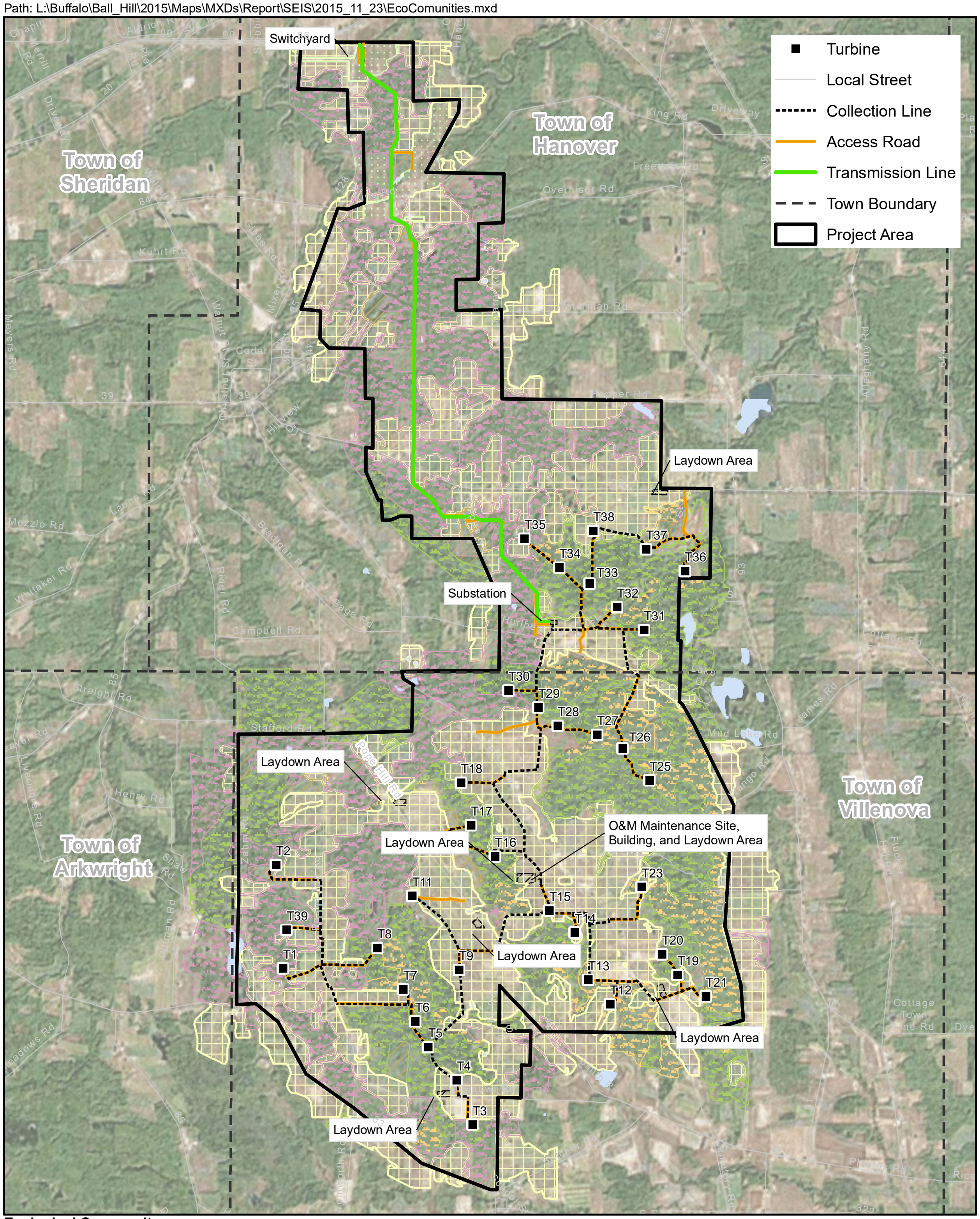

Ecological Community

- Agriculture (Hayfields, Row Crops, Pastures)
- Beech Maple Mesic
- Hemlock - Northern Hardwoods
- Open Water
- Successional Northern Hardwoods
- Successional Old Field
- Successional Shrubland
- Tree Farm/Vineyard

0 0.25 0.5 1 Miles

Figure 2.5-1
Ecological Community Types
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

Construction of the Project would result in a localized reduction in the amount of available forest habitat. Based on field surveys, the greatest percentage of forested vegetation that would be impacted by the Project is Hemlock - Northern Hardwoods (72.5 acres). Other forest communities that would be affected include successional northern hardwood forest (51.5 acres) and beech-maple mesic forest (31.6 acres). Permanent conversion of forested habitat and disturbance of other eco-communities (including successional shrubland and old field) are provided in Table 2.5-1. Habitat fragmentation resulting from Project construction would be minimized by using existing corridors (e.g., existing farm and logging roads) to the extent practicable. The reduction in the amount of forested habitat and the extent of habitat fragmentation within the Project Area would be minor in comparison with the overall acreage of forested land located in the Project Area. Impacts to the three forested communities would total 155.6 acres, or approximately 2.1% of the total 7,550.3 acres of forestland within the Project Area. Of the total 155.6 acres of impacted forestland, 81.5 acres (52.4%) would be converted to build facilities for the Project, while the remaining 74.1 acres (47.6 %) would be allowed to regenerate naturally following construction, likely remaining as successional communities throughout the life of the Project. Furthermore, this level of reduction is generally consistent with tree loss that occurs due to logging activities and maintenance of logging roads in these areas.

The existing mosaic of land uses within the region, including agricultural lands and early successional stages of forestland, indicate that disturbance is a common occurrence in this landscape.

Other upland communities that would be impacted by construction of Project facilities include agricultural land (cropland/field crops, row crops, pastureland, and vineyards) (134.3 acres) and successional old fields and shrubland (27.7 acres). These communities are routinely subjected to disturbance or have been subjected to past disturbance and are a result of re-vegetation following disturbance.

Wetlands and Aquatic Habitats

Impacts from construction on aquatic and wetland communities are discussed in Section 2.4, Wetlands. Among the impacts discussed, soil erosion may result in the transfer of sediment off the construction area to adjacent waterbodies, which may cause turbid waters and act to fill wetlands or embed stream substrate. These potential impacts could affect the quality of aquatic habitats. Mitigation measures, including a SWPPP, would be developed for the Project Site and implemented to reduce impacts from sedimentation and erosion during construction. BMPs that would be included in the SWPPP are described in Appendix E.

Threatened and Endangered Plant Species

No threatened or endangered vegetation or communities were identified within the Project Area during the field survey efforts. A small and healthy population of the state threatened butterwort (*Pinguicula vulgaris*) was identified as occurring approximately 0.5 mile north of the Project Area by the New York State Natural Heritage Program (NHP) (Conrad 2015). As this population is identified outside of the Project Area, no impacts are expected as a result of the Project. Additionally, a rich hemlock-hardwood peat swamp in the southwestern corner of the Project Area was identified by the NYSDEC NHP as a significant ecological community assemblage; however, this ecological community would not be impacted, as no Project facilities are sited in the vicinity of this resource (Conrad 2015). A shrub swamp was also identified approximately 0.25 mile east of the Project Area by the NHP as a significant ecological community assemblage; however, as this population is identified outside of the Project Area, no impacts are expected as a result of the Project (Conrad 2015). Therefore, no significant adverse impacts to threatened and endangered plant species or significant natural communities are expected as a result of construction of the Project.

Common Wildlife

Most wildlife species are not expected to experience significant direct impacts as a result of construction of the Project and are expected to avoid the Project Site during the active construction period. Wildlife species common to the eco-communities identified in the Project Area are listed in Table 2.5-2. The extent to which these species would be present at the Project Site during construction would vary. The most prevalent upland eco-communities in the Project Area are successional northern hardwood forest and agricultural land. Successional northern hardwood forest habitat supports black bear (*Ursus americanus*), eastern chipmunk (*Tamias striatus*), eastern cottontail (*Sylvilagus floridanus*), gray fox (*Urocyon cinereoargenteus*), gray squirrel (*Sciurus carolinensis*), opossum (*Didelphis virginiana*), porcupine (*Erethizon dorsatum*), red bat (*Lasiurus borealis*), red squirrel (*Tamiasciurus hudsonicus*), and striped skunk (*Mephitis mephitis*).

Agricultural land generally supports the big brown bat (*Eptesicus fuscus*), coyote (*Canis latrans*), eastern cottontail, hoary bat (*Lasiurus cinereus*), red fox (*Vulpes vulpes*), striped skunk, white-tailed deer (*Odocoileus virginianus*), and woodchuck (*Marmota monax*). Less mobile species in upland vegetative communities may experience some limited mortality during the course of construction, including small mammals that may not have time to escape areas of disturbance. This may also include nocturnal species that roost in trees during the day when construction activities take place. The same could be expected for common wildlife species that inhabit agricultural fields and lands in various stages of succession; while most species would relocate to avoid construction impacts, construction may inadvertently impact ground-dwelling or burrowing wildlife. Table 2.5-1 provides construction impact acreages, by facility, on each of the upland eco-community types that are utilized by the common wildlife species.

Construction-related impacts on bird and bat species are discussed in Section 2.6, Bird and Bat Resources.

Indirect impacts on wildlife would also result from habitat alteration associated with construction of the Project; however, these impacts are not expected to be significant. For example, within the Project Area there are approximately 7,550 acres of forested eco-communities. Impacts on forested areas from the Project are expected to total 155.6 acres, or 2.1% of the forested land in the Project Area. In addition, these localized impacts on habitat are consistent with activities and conditions that regularly occur throughout the Project Area, such as ground disturbance and tree removal associated with farming and logging activities. Some areas would be subject to permanent forest impacts due to construction and operation of Project facilities and clearing of ROWs for collection and transmission lines. Most areas with permanent forest conversion would be allowed to revegetate to an herbaceous or scrub-shrub condition. It is anticipated that wildlife in the Project Area are accustomed to disturbances of this nature and would either relocate to adjacent suitable habitat or, upon cessation of construction, make use of temporarily disturbed areas as revegetation takes place.

Threatened and Endangered Wildlife Species and Species of Special Concern

Based on consultation with the U.S. Fish and Wildlife Service (USFWS) and the NHP, no non-avian species listed as threatened or endangered potentially occur in the Project Area, except for transient individuals. Therefore, no significant adverse impacts on non-avian threatened and endangered animal species are expected as a result of construction of the Project. Potential impacts on bird and bat species are discussed in Section 2.6, Bird and Bat Resources.

Species of Local Significance

White-tailed Deer and Black Bear. Direct impacts on white-tailed deer and black bear as a result of construction of the Project would be minor, temporary, and limited to discouraging use of the areas where construction occurs. Although the Project would result in the removal of forested habitat, the clearing required for construction and operation of Project facilities would result in new understory growth and additional herbaceous/scrub-shrub habitats. Depending on the species composition of the regrowth, these habitats could provide new foraging areas for both deer and bear.

Deer typically congregate in the hemlock-northern hardwood mixed forests during the hardest part of the winter. Construction of the Project would result in some permanent impacts on hemlock-hardwood forest and permanent forest conversion throughout the Project Area. However, the reduction in the amount of hemlock-northern hardwood forest habitat as a result of the Project would be insignificant given the overall acreage of hemlock-hardwood forest in the Project Area. In addition, deer have adapted to disturbances of this nature and would either relocate to adjacent suitable habitat or make use of temporarily disturbed areas as revegetation takes place following construction. Therefore, the Project is not likely to cause any significant adverse impact on deer wintering concentration areas.

Southern black bear range has expanded in recent years and currently includes the entirety of Chautauqua County, wherein the Project Area lies (NYSDEC 2014). However, construction of the Project is not expected to cause a significant adverse effect on black bears, which can adapt to changing habitat conditions and have the ability to temporarily relocate to adjacent suitable habitat. Thus, any individual bears would likely tend to avoid the Project Site during construction activities.

Trout. Construction of the generation portion of the Project would not cause significant adverse impacts on trout. Construction of access roads associated with the transmission portion of the Project may cross three designated trout streams (Class C(t) streams: S54, S1014, and S1014A), depending on final design, all three would also be crossed overhead by the transmission line. Access roads that cross these streams would be installed within a narrowed 20-foot-wide construction ROW, and their permanent width would be reduced to 12 feet. Permanent culverts of an appropriate type and size to maintain sufficient flow may be used for equipment stream crossings at some locations. Upon completion of construction of the transmission line, O&M vehicles would be ATVs, or comparable, and utilize either permanent culverts or wetland mats.

The transmission line may also cross three additional designated trout streams (Class C(t) streams: S54A, S56, and S56A) that would not likely be crossed by access roads. Due to the overhead location of the transmission line, impacts associated with the crossings are expected to be minimal, though clearing of the ROW for the transmission line would remove minor lengths of riparian vegetation that provide shading and shelter for these streams. However, stumps would be left in place to facilitate natural revegetation of the ROW. Additionally, trees will not be felled into streams or on stream banks. Ball Hill will implement a SWPPP in conformance with NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activities to avoid or minimize runoff and erosion. Any construction or disturbance in or near protected streams must be permitted through NYSDEC and the USACE and will be part of Ball Hill's Joint Permit Application and other applicable permits. The conditions contained within the permits issued by the agencies would serve to further protect these important natural resources.

Herpetofauna. Construction of access roads, the collection system, and transmission system could impact wetlands that may provide habitat for herpetofauna (amphibian and reptile species). Ball Hill would work closely with NYSDEC to minimize and/or avoid impacts on vernal pools and other wetland communities that provide habitat for herpetofauna species. Construction methods in wetlands are discussed in Section 2.4, Wetlands, and will be more fully addressed in the Joint Permit Application to be submitted to NYSDEC and the USACE. Maintaining water quality during construction in an effort to provide sufficient habitat for these species would be addressed through the SWPPP. Measures, such as perimeter sediment and erosion controls, would be used to protect standing bodies of water, wetlands, streams, and other potential herpetofauna habitats during construction.

2.5.2 Operational Impacts

Upland Vegetation

Permanent impacts on upland vegetation, which provides habitat for wildlife, would result from ongoing maintenance of the turbine sites, electrical collection and transmission system, and access road ROWs during operation of the Project. Vegetation would be permanently removed from the locations of the turbine pedestal, turbine crane pad, ancillary Project facilities (i.e., substation, switchyard, and O&M building) and permanent access roads (18 feet wide for turbines and laydown areas and 12 feet wide for the transmission portion of the Project). Permanent impacts from the Project would affect 149.9 acres of vegetation. The remainder of the Project (180.1 acres) would be allowed to revegetate naturally, although portions would be subject to periodic removal of woody vegetation to maintain an herbaceous or scrub-shrub state, especially adjacent to access roads and within collection and transmission system corridors. The degree of impact would depend on the type and amount of vegetation to be cleared, the rate of revegetation, and the frequency of maintenance (clearing/mowing) during operation of the Project. Although 74.1 acres of forested land (of the 155.6 acres impacted) will be allowed to naturally revegetate, this would not occur within the lifetime of the Project (approximately 20 years). Converted forests would continue to be vegetated and there would not be a total loss of habitat in these areas. However, since it is forest conversion, these impacts are considered permanent. The reduction in the amount of forested within the Project Site would be minor, however, in comparison with the overall acreage of forested land located in the Project Area (7,550.3 acres).

Ball Hill does not expect to use herbicides or pesticides to control vegetation or pests along access roads and turbine maintenance areas. Generally, these areas are not expected to promote vegetation growth because of the use of geotextile fabric and gravel construction and because of the periodic use of the access roads by vehicles. In some cases, herbicidal spot control of upland invasive species might be required along access roads and turbine maintenance areas. If the use of herbicides becomes necessary to control vegetation, application would be performed by a certified contractor and in accordance with the ISMP and all applicable regulations. The natural vegetative conditions would be restored after construction and preserved to the maximum extent practicable throughout the Project Area.

Wetlands and Aquatic Habitat

Impacts on aquatic and wetland communities are discussed in Section 2.4, Wetlands.

Threatened and Endangered Plant Species

No threatened or endangered vegetation or plant communities were identified within the Project Site through consultation with the USFWS and NHP, or during the field survey efforts. A rich hemlock-hardwood peat swamp in the southwestern corner of the Project Area was identified by NYSDEC as a significant community assemblage; however, this ecological community would not be impacted by the Project as no Project facilities are sited in the vicinity of this resource. Therefore, no impacts on threatened or endangered plant species or significant natural communities are expected as a result of construction of the Project.

Common Wildlife

Operation of the Project is not expected to result in significant adverse impacts on most wildlife species. Vegetation along access road shoulders and in collection and transmission ROWs would be maintained in an herbaceous or scrub-shrub state. This maintenance could have impacts on less mobile species, including ground-dwelling and burrowing mammals, which could be impacted by vehicle traffic used to access areas in need of vegetative maintenance, and nocturnal species that roost in trees during the day when maintenance activities would take place. As recognized from other active wind power projects throughout the United States, operation of the Project does have the potential to impact birds and bats. These potential impacts are discussed in Section 2.6, Bird and Bat Resources.

The Project is expected to result in minimal loss of habitat relative to the available habitat in the Project Area and region. In addition, the impacts on habitat are consistent with activities and conditions that regularly occur throughout the Project Area, such as mowing of vegetation, access road use associated with farming and logging activities, and tree removal. It is anticipated that wildlife in the Project Area are accustomed to disturbances of this nature and would either relocate to adjacent suitable habitat or adapt to post-construction site conditions. The conditions of available habitat would improve following construction, because areas would be allowed to naturally revegetate.

Threatened and Endangered Wildlife Species

Based on consultation with the USFWS and the NHP during preparation of the 2008 DEIS, and consultation with the NHP in 2012 and 2015, no non-avian species listed as threatened or endangered potentially occur in the Project Area, except for transient individuals (Stilwell 2007; see Appendix C of the 2008 DEIS, Agency Correspondence [see Appendix A]; and Conrad 2015 and Pietrusiak 2012; see Appendix Q). The endangered clubshell (*Pleurobema clava*) and special concern rayed bean (*Villosa fabalis*) have been identified by the USFWS as occurring in Chautauqua County, but based on consultation with USFWS, these species have not been identified specifically within the Project Area. Therefore, no impacts on non-avian threatened or endangered animal species or their potential habitat is expected as a result of operation of the Project. Potential impacts on threatened and endangered bird and bat species, including agency notification procedures if these species are found, are discussed in Section 2.6, Bird and Bat Resources.

Species of Local Significance

Operation of the Project facilities may slightly increase vehicle traffic within deer wintering areas where access roads traverse hemlock-northern hardwood forests. However, use of the access roads would be infrequent and consistent with current winter use levels throughout the area (i.e., snowmobile trails and logging activities) and Ball Hill enforces a speed limit of 20 miles per hour (mph). Further, access road and collection and transmission line ROWs may provide corridors for movement of deer and additional edge habitat for foraging. Edge habitat refers to the transitional area between two habitat types (in this case forest habitat and emergent or scrub-shrub habitat) and is used by deer for feeding and traveling. Operation of the Project is also unlikely to have a significant adverse impact on black bears. The Project Area is within the expanding range of the southern black bear. Bears are adapted to wide range of habitat types and likely range over a relatively large area; the Project Area comprises only a small portion of their range. While operation of the Project may slightly increase traffic and human presence in areas where only minimal disturbance occurs, deer and bears would be expected to avoid direct interaction with humans. Operation of Project is unlikely to cause significant adverse impacts on trout and herpetofauna, as full restoration of temporarily disturbed wetlands and waterbodies would take place following construction.

2.5.3 Mitigation

The overall impacts from construction and operation of the Project on vegetation, wildlife, and wildlife habitat are anticipated to be minimal as a result of careful site planning and use of BMPs. To minimize impacts on vegetation, aquatic habitat, and fish and wildlife, facilities have been sited, to the extent practicable, within previously disturbed areas, such as reverting farm fields, along existing farm roads, and successional hardwood forests. Where practicable, the access roads, collection system, and transmission line have been located in areas with minimal tree growth, such as edges of farm fields, or collocated with existing logging roads.

After initial siting of the facilities, the locations of Project components were modified based on field surveys to avoid wetlands and other high-quality habitats to the greatest extent practicable. In many cases, turbines, access roads, and collection and transmission lines were relocated or eliminated to reduce impacts, primarily on forest habitat and wetland communities (see Section 2.4, Wetlands). Few modifications were needed after initial siting because experience from prior layouts allowed the avoidance of wetlands and other areas and habitats of concern to the greatest extent practicable during the initial planning stages. Further reduction of impacts to biological resources will be realized upon final Project design as micro-siting of turbines and components continues. These impacts will be analyzed and presented in the FEIS.

The Project layout has been designed to protect existing habitats by minimizing the clear cutting of trees and, where practicable, co-locating roads and collection and transmission lines with existing logging roads and trails. In addition, temporary and permanent access roads have been located, wherever feasible, along hedge rows within agricultural fields. Where construction activities would require the removal of any trees of economic value, landowners would be compensated in accordance with their individual easement agreements. In many cases, these existing logging roads and trails have not been adequately maintained and may adversely impact streams and aquatic habitat by directly traversing these features. The Project will result in a collateral improvement to some of those existing crossings through the installation of culverts at stream crossings to accommodate access roads. This may also provide alternative routes for ATVs and other vehicles that may otherwise use off-road areas.

When construction is complete within all jurisdictional boundaries, restoration of disturbed areas that do not require permanent facilities will take place in a manner that prevents impacts from invasive species. An ISMP has also been developed and would be implemented to establish revegetation by native, non-invasive species in areas disturbed by construction of the Project. The ISMP is included in this SDEIS in Appendix F, which will serve as a reference source to aid in the management of environmental issues that may potentially be encountered during construction of the Project. Furthermore, the ISMP provides framework for the daily and long-term monitoring and reporting structure to ensure that the Project goals are accomplished within the parameters set forth in the permits issued for the Project. The ISMP is intended to be a “living” document, which will continuously evolve as the Project progresses and/or as unanticipated issues arise.

Areas temporarily impacted during the construction of the Project will be restored to pre-construction contours and revegetated immediately following the completion of regulated activities throughout the Project Site. An appropriate native seed mixture shall be applied to disturbed areas. All seed will be from local sources, to the extent possible dependent upon seed availability, and applied at recommended rates. A facultative wetland (Wet Meadow Mix) seed mixture, or an equivalent approved seed mix, will be used in the restoration of all wetland areas and riparian zones impacted by construction activities. Additional details are provided in Appendix F as part of the ISMP.

Impacts on fish and wildlife would be further minimized through the implementation of BMPs. Erosion control structures would be used to prevent the off-site migration of soil and minimize impacts on fish and other aquatic species. Silt fencing would be installed along the construction ROW in all areas adjacent to wetlands, in accordance with the SWPPP. BMPs that would be used during construction to prevent excess storm water runoff from the construction areas would be implemented via the SWPPP, as discussed in Section 2.3, Water Quality. The clearing of natural vegetation adjacent to streams would be limited to the material that poses a hazard or hindrance to construction or Project facilities. Snags that provide shelter in streams for fish would not be disturbed unless they cause serious obstructions, scouring, or erosion. Trees would not be felled into any stream or onto the immediate stream bank. All in-stream work, as well as any work that may result in the suspension of sediment, shall not occur during the trout spawning and incubation period (October 1 through April 30), unless prior approval is obtained from NYSDEC. These and additional mitigation measures to protect water quality and wetlands are discussed in Section 2.3, Water Quality, and Section 2.4, Wetlands. Crossing methods and any potential impacts on protected streams and wetlands are subject to approval by NYSDEC and the USACE.

2.6 Bird and Bat Resources

This section provides updated information on the potential impacts and mitigation related to bird and bat resources in the Project Area. Information on the existing bird and bat resources within the Project Area is included in the 2008 DEIS (attached to this SDEIS as Appendix A); Section 2.11, Traffic and Transportation; and Appendix J. The following additional bird and bat studies have been conducted in the Project Area since the time of the 2008 DEIS and are included in this SDEIS:

- A breeding bird survey in June 2011 (see Appendix K);
- Eagle surveys from March 2012 through February 2013 (see Appendix K);
- A passive bat acoustical study from April 2012 through October 2012 (see Appendix L); and
- An acoustical study to determine probably presence/absence of northern long-eared bat in the summer of 2015 (see Appendix L).

All of these additional surveys were coordinated with NYSDEC and the USFWS; see reports in Appendices K and L for details. A brief summary of results for each of these studies along with updates on bird species sightings, Bald Eagle nests, NHP reporting, and White Nose Syndrome (WNS) are presented here prior to the impacts discussion. The full reports for these studies are presented in Appendix K and Appendix L of this SDEIS.

Breeding Bird Survey

In May 2011, NYSDEC suggested that an additional breeding bird survey be conducted to better understand the local breeding population and diversity and to see if baseline conditions changed since the previous survey. In 2011, a supplemental breeding bird survey spanning two days (June 16 and 17) was conducted by Ecology and Environment, Inc. (E & E) at 25 of the proposed wind turbine locations (which were very similar to current proposed wind turbine locations). Five-minute point counts were conducted following USGS Breeding Bird Survey protocol between sunrise and approximately 10:30 a.m. All birds seen or heard during the point count were recorded.

A total of 502 birds of 66 species were identified across the 25 survey points. The most common species recorded were Bobolink (93 birds), Red-winged Blackbird (67 birds), and Savannah Sparrow (31 birds). The total number of birds recorded per point ranged from nine to 72, with an average of 20.8 birds detected per survey point. The total number of species recorded per point ranged from four to 18, with an average of 11.0 species detected per survey point.

No federally or state-listed threatened or endangered species were observed during the surveys or time spent traveling throughout the Project Area (during non-survey time). One state-listed species of special concern, the Grasshopper Sparrow, was identified. The solitary Grasshopper Sparrow was identified by sound, and was heard singing multiple times throughout the 5-minute survey period. Based on the time of year, the habitat (an agricultural field dominated by wheat and other tall grasses), and their known breeding range, it is likely this was a breeding individual.

Eagle Surveys

In April 2012, the USFWS recommended that eagle surveys be conducted in the Project Area following the *Draft Eagle Conservation Plan Guidance* (USFWS 2011). In anticipation of this recommendation, Ball Hill initiated surveys in March 2012. E & E conducted eagle point-count surveys at 13 locations within the Project Area, concentrated in the areas of proposed turbines and along the proposed transmission line (see Figure 2-1 in Appendix K [Breeding Bird Surveys]). Each point-count survey was conducted over the course of one hour. Two rounds of surveys were conducted for each month from March 2012 through February 2013.

Seventeen Bald Eagle sightings and two Golden Eagle sightings were recorded during the point-count surveys. Two additional, incidental Bald Eagle sightings were made outside of the point-count radii. Bald Eagles were identified in the Project Area during six of the 24 survey rounds (both March rounds, the late April round, the early August round, and the early September and October rounds). Golden Eagles were identified during two of the 24 survey rounds, with both observed during the March migration period. The sighting rates in the Project Area (not including incidental sightings) were 0.05 Bald Eagle per hour and 0.01 Golden Eagle per hour.

Bird Species Identified and Federally and State-listed Species

During the breeding bird and eagle surveys, E & E staff identified a few bird species that were not previously identified in the Project Area; see Table 2.6-1 for an updated list of bird species identified in the Project Area.

Table 2.6-1 All Bird Species Identified within the Project Area during Field Surveys

Common Name		
Canada Goose	Pileated Woodpecker	Nashville Warbler
Wood Duck	Eastern Wood-Pewee	Yellow Warbler
Mallard	Acadian Flycatcher	Chestnut-sided Warbler
Ring-necked Duck	Alder Flycatcher	Magnolia Warbler
Bufflehead	Willow Flycatcher	Black-throated Blue Warbler
Hooded Merganser	Least Flycatcher	Yellow-rumped Warbler
Common Merganser	Eastern Phoebe	Black-throated Green Warbler
Ring-necked Pheasant	Great Crested Flycatcher	Blackburnian Warbler
Ruffed Grouse	Eastern Kingbird	Pine Warbler
Wild Turkey	Northern Shrike	Palm Warbler
Common Loon (SC)	Blue-headed Vireo	Bay-breasted Warbler
Great Blue Heron	Warbling Vireo	Black-and-White Warbler
Green Heron	Red-eyed Vireo	American Redstart

Table 2.6-1 All Bird Species Identified within the Project Area during Field Surveys

Common Name		
Turkey Vulture	Blue Jay	Ovenbird
Osprey (SC)	American Crow	Mourning Warbler
Bald Eagle (T)	Common Raven	Common Yellowthroat
Northern Harrier (T)	Horned Lark (SC)	Hooded Warbler
Sharp-shinned Hawk (SC)	Purple Martin	Scarlet Tanager
Cooper's Hawk (SC)	Tree Swallow	Eastern Towhee
Red-shouldered Hawk (SC)	Northern Rough-winged Swallow	Chipping Sparrow
Broad-winged Hawk	Barn Swallow	Field Sparrow
Red-tailed Hawk	Black-capped Chickadee	Savannah Sparrow
Rough-legged Hawk	Tufted Titmouse	Grasshopper Sparrow (SC)
Golden Eagle (E)	Red-breasted Nuthatch	Song Sparrow
American Kestrel	White-breasted Nuthatch	Swamp Sparrow
Merlin	Brown Creeper	White-throated Sparrow
Peregrine Falcon (E)	Carolina Wren	White-crowned Sparrow
Killdeer	House Wren	Dark-eyed Junco
Solitary Sandpiper	Winter Wren	Snow Bunting
Spotted Sandpiper	Golden-crowned Kinglet	Northern Cardinal
American Woodcock	Ruby-crowned Kinglet	Rose-breasted Grosbeak
Ring-billed Gull	Blue-gray Gnatcatcher	Indigo Bunting
Rock Pigeon	Eastern Bluebird	Bobolink
Mourning Dove	Veery	Red-winged Blackbird
Black-billed Cuckoo	Swainson's Thrush	Eastern Meadowlark
Yellow-billed Cuckoo	Hermit Thrush	Common Grackle
Barred Owl	Wood Thrush	Brown-headed Cowbird
Chimney Swift	American Robin	Orchard Oriole
Ruby-throated Hummingbird	Gray Catbird	Baltimore Oriole
Belted Kingfisher	Northern Mockingbird	Purple Finch
Red-bellied Woodpecker	Brown Thrasher	House Finch
Yellow-bellied Sapsucker	European Starling	American Goldfinch
Downy Woodpecker	American Pipit	House Sparrow
Hairy Woodpecker	Cedar Waxwing	
Northern Flicker	Blue-winged Warbler	

Key:

E = State listed endangered.
SC = State listed Species of Special Concern.
T = State listed threatened.

During field surveys, two state-listed endangered species (the Golden Eagle and Peregrine Falcon), two state-listed threatened species (the Bald Eagle and Northern Harrier), and seven state-listed special concern species (the Common Loon, Osprey, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, Horned Lark, and Grasshopper Sparrow) were observed in the Project Area.

In 2011, there were two known Bald Eagle nests within 10 miles of the Project Area plus an unspecified number of Bald Eagle nests along Cattaraugus Creek more than 10 miles from the closest Project Area boundary (Roblee 2012). Evidence of Bald Eagle nesting was discovered in 2012 at two additional locations within 10 miles of the Project Area. Subsequent to 2012, additional information became available on other nests within approximately 10 miles of the Project Area.

The specific nest locations are considered sensitive; therefore, only general locations are included here with approximate distances from the Project Area. The information is summarized based on NHP responses, discussions with Ken Roblee and Brianna Gary of NYSDEC (Roblee 2012; Gary 2015), and E & E field observations.

- The "Thruway nest" occurs approximately 0.8 miles northwest of the proposed transmission line and is in the vicinity of the NYS Thruway. It is approximately 5 miles from the closest proposed turbine location. This nest site has been active for several years.
- The "Dayton nest" occurs approximately 5.5 miles southeast of the Project Area. This nest site has been active for eight or more years.
- There are an unspecified number of active nests along Cattaraugus Creek in the vicinity of the Cattaraugus Indian Reservation. The reservation is approximately 10.0 miles north of the Project Area at its closest point and the nests are thus more than 10 miles from the Project Area boundary.
- The "Pomfret nest" is located approximately 7.0 miles west of the Project Area in the vicinity of the Fredonia reservoir. NYSDEC discovered nesting activity in this location in 2012.
- E & E discovered the "Hanover nest" in early April 2012. The nest is located in the vicinity of the Silver Creek reservoir approximately 1 mile east of the nearest Project component (an access road). Two adult Bald Eagles were observed regularly at the nest during subsequent visits in April and May 2012. A single Bald Eagle was observed perched near the nest in October and December 2012 and January and February 2013. The adult eagles were never observed inside or on the nest, but they were observed perched in the same tree as the nest. The eagles exhibited territorial behavior by driving off an Osprey and another adult Bald Eagle that approached the area. It is possible that there was an early nest failure and/or they were a young pair. Upon discovery of this nest, E & E informed NYSDEC of its location and status. On two occasions E & E observed one of the Bald Eagles flying to this site from the northeast (opposite direction of Project Area). The nest has remained active through 2015.
- The "Lake Erie nest" is located approximately 3 miles northwest of the Project Area in the vicinity of Eagle Bay. This nest was established in approximately 2011.

Although no longer protected under the federal Endangered Species Act (ESA), the Bald Eagle is federally protected under the Bald and Golden Eagle Protection Act (BGEPA) and protected as a threatened species by NYS. The USFWS indicated Bald Eagle occurs in Chautauqua County but did not identify any other federally listed threatened or endangered species as occurring in the Project Area (Stillwell 2007; see Appendix C of the 2008 DEIS, attached hereto as Appendix A). The NYS NHP was contacted in 2012 and again in 2015 for the purpose of identifying any federally or state-listed species that may potentially occur within the Project Area. Responses were received on September 6, 2012 and March 17, 2015, indicating a total of seven rare bird species that potentially occur within 10 miles of the Project Area (Pietrusiak 2012; Conrad 2015, see Appendix Q); no federally listed species were identified. A total of five state-threatened and state-endangered species were identified, including the state-endangered Short-eared Owl, and the state-threatened Bald Eagle, Henslow's Sparrow, Northern Harrier, and Sedge Wren. Additionally, one species of special concern, the Red-headed Woodpecker and one protected bird species (under the Migratory Bird Treaty Act), the Great Blue Heron were identified by the NHP. The Great Blue Heron was identified by the NHP due to the Project Area's proximity to a heronry.

Passive Bat Acoustical Study (2012)

In May 2011, NYSDEC suggested that an additional passive bat acoustical study be conducted to see if baseline conditions changed since the previous study. On April 14, 2012, two AnaBat SD1 bat detectors were installed by E & E biologists on a meteorological tower within the Project Area. The detectors were set at approximately 5 meters (low detector) and 40 meters (high detector) above ground level (AGL). The detectors were taken down on October 25, 2012. The following summary is based on the data collected during this entire survey period, which represents 196 survey nights. The high detector was functional all 196 survey nights, although a few nights experienced some technical difficulties where a portion of the survey night may not have been recorded. The low detector was fully functional for 190 of the 196 survey nights (96.9%). See Appendix L for further explanation of sampling success.

A total of 4,530 bat passes were recorded during the survey period, and 2,243 (49.5%) of these passes were of sufficient quality to be identified to low-frequency, mid-frequency, or *Myotis* species groups (see Appendix L for methodology). The low-frequency species group could include hoary bats, big brown bats, and silver-haired bats, while the mid-frequency species could include eastern red bats and tri-colored bats. Bat passes identified to the *Myotis* species group could possibly include eastern small-footed bats, Indiana bats, little brown bats, and northern long-eared bats. Mean total activity for both detectors combined for the entire survey was 11.7 bat passes per detector night (bp/dn). The high detector had a total activity level of 6.9 bp/dn while the low detector had a total activity level of 16.7 bp/dn for the entire survey period. The period of highest total activity at the high detector was observed at the end of July through the beginning of

August. The period of highest total activity for the low detector was observed in early September.

Low-frequency bat calls were the most prevalent (1,334 bat passes) and comprised 59.6% of the identifiable bat passes. *Myotis* species (469 bat passes, or 20.9%) and mid-frequency bat calls (437 bat passes, or 19.5%) were less common than those from low-frequency bats. All three species groups—low-frequency, mid-frequency, and *Myotis* species bats—were more prevalent at the low detector than the high detector. The average number of low-frequency bat passes per detector night at the low detector was 5.1 bp/dn, compared with 1.8 bp/dn at the high detector. Mid-frequency bat activity was found to be only slightly higher at the low detector compared with the high detector (1.3 bp/dn vs. 1.0 pb/dn respectively) while the *Myotis* species group was detected approximately 30 times more often by the low detector than by the high detector (2.4 bp/dn vs. 0.1 bp/dn).

Northern Long-Eared Bat Acoustic Survey (2015)

In July 2015, an acoustical survey was initiated in response to the recent listing of the northern long-eared bat as threatened by the USFWS under the ESA. This species is also listed as threatened in NYS. Acoustic surveys followed the guidelines outlined in the USFWS Work Plan for Ball Hill, submitted to the USFWS on July 23, 2015 (E & E 2015) and subsequently reviewed , which was based on recommendations in the 2015 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS 2015 [USFWS Guidelines]) applicable for northern long-eared bat presence/probable absence surveys for the 2015 field season. Over a three-week period, beginning July 29 and concluding August 19, 2015, AnaBat (Titley Scientific) bat detectors were installed at 49 sites or 99 detector locations (two detectors per site with three detectors at one site), in suitable habitat within the Project Area and set to record for a minimum of two consecutive nights. Directional microphones were located approximately 1.5 meters AGL at each location. Each detector was housed in a case allowing only the microphone to be exposed through a 45º angle PVC tube. Detectors were placed in suitable habitat locations within parcels with approved access throughout the Project Area that were most likely to capture high quality bat call sequences (e.g., forest openings, access roads, riparian corridors, and wooded edge habitat).

All recorded bat passes were analyzed using automated species identification software approved for use by the USFWS. The software programs, or automated classifiers, included Bat Call Identification, Inc. (BCID) Eastern USA (Version 2.7c) and Kaleidoscope Pro (Version 3.1.4B, Wildlife Acoustics, Inc.). BCID identified 17,515 total bat passes (2% of these were identified as unknown) with the majority (87%) identified as big brown bat (49%), silver-haired bat (27%), or eastern red bat (11%). According to BCID, 10% of the files were identified as either hoary bat (5%) or tri-colored bat (5%) and the myotis species composed less than 2% of the total bat passes (see Table A-2 in Appendix L [Bat Acoustic Monitoring Report]). Kaleidoscope Pro identified 31,812 total bat passes (7% of these were identified as unknown) with the majority (76%) identified as big brown bat (37%), eastern red bat (26%), silver-haired bat (13%), and hoary bat

(12%). According to Kaleidoscope Pro, the remainder of the bat passes were little brown bat (3%) or tri-colored bat (1%), and 1% identified as either eastern small-footed bat or northern long-eared bat (see Table A-3 in Appendix L [Bat Acoustic Monitoring Report]).

Fourteen detector nights had significant maximum likelihood estimation (MLE) p-values for presence of northern long-eared bats (see Table 3-2 in Appendix L [Bat Acoustic Monitoring Report]). For detector nights with significant MLE p-values, 10 call files were preliminarily identified as northern long-eared bat calls by the automated classifier BCID at detector locations 7-B, 10-A, 15-B, 35-B, 38-B, 47-A, and 52-B, and 46 call files were preliminarily identified as northern long-eared bat calls by the automated classifier Kaleidoscope at detector locations 11-B, 38-B, 42-A, and 58-A (see Table 3-2 in Appendix L). Both software programs identified calls as northern long-eared bats at Site 38-B on August 12, 2015.

A panel of E & E biologists reviewed all files from detector locations where either program identified a file as northern long-eared bat with a significant p-value. A consensus on visual confirmation for northern long-eared bat was achieved at sites 38-B, 42-A, and 52-B (see Table 3-2 in Appendix L). Based on the previously defined presence determinations, presence of northern long-eared bat was considered “possible” at two sites (survey points 42-A and 52-B) and “probable” at one other site (survey point 38-B).

White Nose Syndrome Update

Since the 2008 DEIS, the status of WNS has spread and worsened. WNS, which has been associated with the mortality of more than 5.7 million bats comprising seven species, including eastern small-footed bats and Indiana bats, is an additional threat to current populations in the eastern half of the United States (Bat Conservation International [BCI] 2015). WNS was first documented on hibernating bats in a New York cave during the winter of 2006, and is named for the presence of a white fungal growth around the affected bats’ muzzle, ears, and wing membranes (Blehert et al. 2009). Thus far, bats with WNS have been confirmed in 26 U.S. states and five Canadian provinces, and predictions are that WNS will continue to spread (BCI 2015). To date, WNS has been documented in 20 NYS counties, including a hibernaculum in Erie County that is approximately 50 miles from the Project Area, and is presumed by NYSDEC to occur throughout NYS (Heffernan 2015). The BCI map indicating current extent of WNS throughout North America shows bat hibernation areas being present in the southern portion of Chautauqua County although the disease has yet to be detected there (BCI 2015). During its most recent winter hibernacula surveys, NYSDEC observed statewide declines of 98% for northern bats, 95% for tri-colored bats, 90% for little brown bats, 71% for Indiana bats, and 13% for eastern small-footed bat compared with the numbers observed during hibernacula surveys conducted prior to the discovery of WNS; therefore, the mortality toll on these species from WNS has been severe (NYSDEC 2012a).

2.6.1 Construction Impacts

Construction-related activities (e.g., clearing, infrastructure construction, equipment noise, increased vehicle traffic, and human presence) can potentially impact birds and bats by causing temporary displacement from habitat and direct mortality. Because these impacts are generally only temporary in nature, impacts on bird and bat populations are typically not significant. Pre-construction monitoring and/or seasonal restrictions can also help avoid and minimize impacts.

Potential construction impacts on habitat would be caused by ground disturbance and tree removal, which are also associated with farming and logging practices, which are common in the area. At this stage of Project development, it is uncertain when tree clearing activities would be conducted. Tree clearing during the late fall, winter or early spring months would present the lowest potential risk to birds by avoiding potential disturbance of nests. Tree clearing during the late spring, summer, or early fall would have the greatest potential to have an adverse impact on nesting birds. Tree clearing during these months will be minimized to the greatest extent practicable if total avoidance is not achieved due to Project timing considerations.

2.6.1.1 Potential Impacts on Migratory Birds

No significant adverse impacts on migratory bird populations, including raptors, passerines, and waterbirds, are expected as a result of construction of the Project. Most species are expected to temporarily avoid immediate areas during active construction.

During construction, increased traffic and machinery are expected within the Project Area, which could potentially lead to a short-term increase in bird mortality as a result of vehicle collision. It is expected that, while bird mortality could potentially increase on a short-term basis during construction, the increase would not significantly impact birds at the population level. Implementing BMPs to reduce vehicular speed limits will help minimize impacts. Ball Hill will employ a 20 mph speed limit during construction for safety and wildlife protection reasons. This speed limit would only apply to dedicated construction roads located on the Project Site. Ball Hill will also instruct Project personnel to be alert for wildlife, to use additional caution while driving in low visibility conditions, to restrict travel to established travel routes and work areas, and what to do when encountering dead or injured wildlife. Site specific environmental and wildlife information will be included in the site safety orientation given to all site employees before they can work on the Project.

2.6.1.2 Potential Impacts on Breeding Birds

No significant adverse impacts on breeding bird populations are expected as a result of Project construction. If Project construction commences prior to the breeding bird season, it is anticipated that local breeding birds would likely avoid areas of construction activity during the construction period. If construction were to begin during the breeding season, birds that have been exposed to similar disturbances (e.g., farming activities) and are accustomed to regular disruption would likely remain in the area, while other birds not accustomed to regular or periodic anthropogenic disturbances would likely relocate to nearby suitable habitat, if available. Incidental loss of some nests, eggs, and/or young is possible when construction activities (e.g., land clearing) are conducted during the breeding season; however, Ball Hill will avoid loss of active nests, eggs and/or young to the extent possible. Ball Hill will instruct Project workers to immediately report any discovery of a bird nest the on-site environmental supervisor so that protective measures, such as non-disturbance buffers can be implemented and Ball Hill will contact NYSDEC and USFWS.

During construction, it is expected that the increased noise and activity resulting from construction activities would cause displacement rather than mortality, as birds are highly mobile. Surveys performed by E & E suggest that many of the bird species present in the Project Area are common and are likely accustomed to human-induced disturbances, such as farming and logging. It is expected that displaced birds would utilize contiguous habitat and remain local.

Increased traffic throughout the Project Area would also increase the likelihood of nest destruction and abandonment, due either to direct mortality or indirect noise disturbance. However, access roads would be utilized and construction vehicles would stay on these roads to the extent practicable, which along with a 20 mph speed limit would reduce the extent of disturbance and minimize any potentially adverse impacts on breeding birds.

The potential for habitat loss has been minimized through site planning (i.e., the placement of turbines in agricultural areas where practicable). A majority of the construction impacts would occur in agricultural lands, which are subject to regular disturbance throughout most years (e.g., farming, tilling, and harvesting) and generally harbor a relatively low diversity of bird species due to their homogenous nature and regular disturbance. While some disturbance would occur as a result of construction, it is expected that any disturbances to birds utilizing the Project Area would be highly localized and temporary. No significant impacts are anticipated.

Ball Hill has sited Project facilities and roadways in an attempt to minimize impacts on ecologically important lands to the maximum extent practicable. By doing so, the Project aims to further limit the total impacts on bird and bat populations by minimizing habitat fragmentation. The most disturbed areas would be those associated with the wind turbines, the majority of which would be sited in agricultural fields, which are already subject to regular disturbance. The reduction in the number of turbines from the layout identified in the DEIS has also helped reduce disturbances.

Outside of short-term, minor, and localized construction disturbance, no significant adverse impacts on breeding birds are anticipated.

2.6.1.3 Potential Impacts on Threatened or Endangered Bird Species

Only limited use of the Project Area by bird species listed as endangered, threatened, or of special concern is anticipated during construction. Occurrences would be related to migratory, transient/foraging, and breeding behavior. Species that breed in the Project Area would likely occur in very low numbers, and the potential for impacts during construction would be minimized by the use of on- site environmental personnel and immediate incorporation of adaptive management measures upon discovery of nesting prior to or during construction. Of the listed species mentioned above, disruption by construction (e.g., land clearing) during the breeding season could potentially affect the Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, and Grasshopper Sparrow because these species could potentially breed in the Project Area. It is anticipated that monitoring in grassland habitats (for the Northern Harrier and Grasshopper Sparrow) and forested areas (for the Sharp-shinned Hawk, Cooper's Hawk, and Red-shouldered Hawk) would identify nests and reduce potential impacts during construction. Transient and/or migratory use by the other listed species is not expected to result in any significant adverse impacts during construction.

If endangered, threatened, or special concern bird species are identified as nesting immediately prior to or during construction (see Section 2.6.3.3, Construction, for the surveying plan), then monitoring, avoidance, and minimization measures would be implemented to reduce the potential for construction to negatively impact these species. Potential avoidance and mitigation measures are discussed in Section 2.6.3.2, Bird and Bat Conservation Strategy. With implementation of monitoring activities, no significant adverse impacts from construction on threatened, endangered, or special concern bird species are anticipated.

Bald Eagles

The USFWS issued the *National Bald Eagle Management Guidelines* (*Guidelines*) (USFWS 2007), which include general recommendations for land management practices that will benefit and avoid disturbing Bald Eagles. Nesting Bald Eagles are sensitive to a variety of human activities, but not all eagle pairs react to human activities in the same manner. The variability in response may be related to a number of factors, including visibility, duration, noise, and extent of the area affected by the activity; prior experiences with humans; and tolerance of the individual nesting pair (USFWS 2007). According to the *Guidelines*, the chronology of typical reproductive activities of Bald Eagles in the northern United States, including NYS, is as follows:

- Nest building (December-February);
- Egg laying/incubation (February-April);
- Hatching/rearing young (March-June); and
- Fledging young (June-August).

These are the time periods during which Bald Eagles are sensitive to anthropogenic disturbance, with nest building considered to be when eagles are most sensitive. After fledging, juvenile Bald Eagles usually roam up to 0.25 miles from the nest site and are still dependent upon adults to feed them for approximately six weeks (USFWS 2007).

The USFWS recommendations for avoiding nest site disturbances include: 1) maintaining a distance buffer between the activity and the nest, 2) maintaining a landscape buffer (forested or natural areas) between the activity and nest trees, and 3) avoiding disruptive activities during the breeding season (USFWS 2007). Under the activity-specific guidelines, construction of a wind farm is interpreted as a Category B activity (i.e., building construction of three or more stories). Given the locations of known Bald Eagle nests in the vicinity of the Project Area, construction activity is not anticipated to be directly visible from any of the nest sites because of forest cover and topography. Therefore, the recommended minimum distance buffer is 660 feet, or 1/8 mile (USFWS 2007), which is outside the Project Area boundary and would be maintained during Project construction.

Since the nearest Bald Eagle nest is outside the limits of the Project Area and beyond the minimum USFWS guidance (2007) for construction, no significant adverse impacts from construction activities on Bald Eagles are anticipated. Ball Hill will continue to coordinate with the USFWS regarding the potential risk from the Project on eagles.

Ball Hill will also continue to coordinate with NYSDEC regarding the potential risk from the Project on eagles and/ or conditions that will be included in state permits regarding potential Bald Eagle impacts. It is anticipated that there will be permit conditions from NYSDEC regarding monitoring for Bald Eagles and other listed species before or during construction and such measures will help avoid and minimize any potential impacts from construction.

2.6.1.4 Potential Impacts on Bats

There is a potential for impacts on both tree bats and cave bats as a result of habitat alteration or loss associated with construction of the Project. Activities, such as infrastructure construction, equipment noise, increased vehicle traffic, and human presence, would not be expected to have a significant adverse effect on bat populations because bats are most active at night when construction is not taking place and because they can temporarily relocate. However, tree clearing activities have a potential to have an adverse impact on bats within the Project Area.

Potential construction impacts on habitat would be caused by ground disturbance and tree removal, which are also associated with farming and logging practices, which are common in the area. At this stage of Project development, it is uncertain when tree clearing activities would be conducted. Tree clearing during the late fall, winter or early spring months would present the lowest potential risk to bats by avoiding potential removal of roosting or maternity trees. Tree clearing during the late spring, summer, or early fall would have the greatest potential to have an adverse impact on colonial roosting bats, such as the tri-colored bat, big brown bat, and *Myotis* species, if a roost or maternity colony were to be cut down. Tree clearing during these months will be minimized to the greatest extent practicable if total avoidance is not achieved due to Project timing considerations.

Changes in vegetation may influence the behavior of bats by changing microclimatic conditions and the quality of habitat for foraging or roosting bats (National Research Council [NRC] 2007). Bats may also become attracted to openings made in forested areas from tree clearing activities for access roads as they may find foraging opportunities in the openings. It is anticipated that any bats that are present in the Project Area would return to areas that were temporarily disturbed following the completion of construction activity. The 2012 acoustic study suggests that a robust bat population is present within the Project Area, so there is a potential for some adverse impacts during construction of the Project. These risks will be reduced if tree clearing activity can be limited to the later fall, winter, or early spring months. If tree clearing cannot be limited to these months, Ball Hill will minimize any adverse construction impacts on active roost trees and bat species within the Project Area. If necessary based on NYSDEC and USFWS coordination, Ball Hill will have qualified biologist(s) conduct tree inventories to identify potential roost trees and monitor with acoustic devices and/or conduct dusk exit surveys, or other similar methods as coordinated with NYSDEC and USFWS.

2.6.1.5 Potential Impacts on Threatened or Endangered Bat Species

The geographic range of the federally and state-listed threatened northern long-eared bat encompasses western New York, including the Project area. The nearest known hibernacula for this species occur near Akron and Mount Morris, New York, approximately 50 miles northeast and 68 miles east of the Project area, respectively. Summer occurrence of this species occurs throughout all of NYS, where their presence would be expected to increase in likelihood in late summer, during usual peak migration season. Based on their probable presence during the 2015 acoustic survey in the Project Area, impacts to this species could occur from construction activities. Ball Hill will continue to consult with the USFWS and NYSDEC regarding surveys and protective measures for this species. Tree clearing will be minimized in the late spring, summer, and early fall months to the greatest extent practicable to minimize impacts to this species.

The geographic range of the federally and state-listed endangered Indiana bat does not extend into western NYS; therefore, it is not expected to be present. No Indiana bat hibernacula or summer maternity colonies have been identified in western New York (USFWS 2007). The known Indiana bat hibernacula in NYS closest to the Project Area are in Onondaga County, approximately 150 miles to the northeast, and in Jefferson County, approximately 190 miles to the northeast. The closest known summer occurrence of the Indiana bat in NYS is from Seneca and Cayuga counties, approximately 120 miles to the northeast. Outside of NYS, known Indiana bat hibernacula have been identified in central and southern Pennsylvania, which are a similar distance away from the Project as those located in NYS. The closest known summer occurrence of the Indiana bat outside of NYS is from Elk County, Pennsylvania, approximately 55 miles south of the Project. Indiana bats have also been recorded to roost in the summer in Ashtabula County, Ohio, approximately 77 miles southwest of the Project. Based on the known locations of Indiana bat hibernacula and maternity colonies in NYS, and no previous documentation of this species in western New York, it is unlikely that Indiana bats would be found residing in or migrating through the Project Area, therefore, the potential for any impacts is considered remote. Since Indiana bats are capable of migrating upwards of 300 miles (USFWS 2004), complete avoidance of impacts on Indiana bats within that range can never be absolutely guaranteed.

Very limited information is available on the life history or distribution of the eastern small-footed bat, a NYS-listed species of special concern. It is unlikely but still possible that this species could utilize the Project Area because New York had an estimated pre-WNS winter population of roughly 3,000 to 3,500 eastern small-footed bats and the Project Area contains suitable forested blocks for bats in general (Erdle and Hobson 2001). Since eastern small-footed bats generally do not roost in trees, vegetation clearing would have minimal impact on this species. A desktop review of the Project Area and site visits made as part of the Project's pre-construction environmental surveys did not identify any barren land or high elevation forested areas with rocky outcrops. However, if any talus piles or rocky outcrops in forested areas exist in the Project Area and are discovered and disturbed during construction, the potential exists for disturbance of eastern small-footed bat roosts, if present. In addition, excessive noise or ground vibration produced during construction may disturb torpid eastern small-footed bats in their roosts and result in their effort to relocate. Eastern small-footed bats relocating to another day roost are expending extra energy to do so and are unprotected from diurnal predators, such as raptors.

Eastern small-footed bats are not known to occur in or within 10 miles of the Project Area and suitable roost habitat does not appear to be present (Seoane 2006, 2008; Pietrusiak 2012; Conrad 2015). However, if these bats are present, they would likely occur in very low numbers and the potential for impacts during construction would be minimal.

2.6.1.6 Bird and Bat Fatality Approximations

Data from comparable sites are not available regarding fatality of birds and bats resulting from construction activities. Due to the relatively short period during which construction would take place, it is expected that bird and bat fatalities would be minimal. BMPs would be followed during Project construction to minimize bird fatalities to the maximum extent practicable and trained environmental personnel would be employed, if necessary, to further reduce potential bird impacts. While some bird fatalities may occur, impacts at the population level are expected to be negligible.

2.6.2 Operational Impacts

Operation of wind turbines can potentially impact birds and bats through collisions with the turbine blades and towers, or transmission lines; displacement from habitat; or influence on migration or other behavior. Collisions are typically the primary operation-related impact associated with wind facilities. Potential impacts can vary among different bird and bat populations and groups.

2.6.2.1 Potential Impacts on Migratory Birds

The dynamics of migration and the potential impacts from the operation of wind turbines differ among groups of birds. Therefore, this section presents separate discussions of the potential impacts on the migration of raptors, passerines, and waterbirds. Raptors migrate almost exclusively during the day, passerine species migrate during the night, and waterbirds migrate during both day and night (Richardson 1998).

Raptors

Raptor migration is diffuse away from the Great Lakes shorelines, and the nearest proposed turbine location is approximately 7 miles from the Lake Erie shoreline. There are no geographical or topographical features in the Project Area that would attract or concentrate migrating raptors. No concentrated flight paths were identified during the spring or fall migration surveys, and survey findings were consistent with existing knowledge of the bird resources in the region. Therefore, relatively low numbers of migrant raptors are anticipated to occur in the Project Area, especially as compared to the known spring season concentrated flight path adjacent to Lake Erie.

A comparison of the Project's pre-construction raptor migration survey results with other pre-construction survey reports is useful for examining avian use among wind project sites (see Tables 2.6-2 and 2.6-3). The survey results from the Ball Hill Project Area are similar to those from other sites throughout NYS, suggesting that the risk to migratory raptors using the Project Area would be similar to the risks present at other sites. Based on comparative studies of raptor passage rates through wind farm sites in NYS (see Tables 2.6-2 and 2.6-3) and small number of raptor fatalities experienced at wind sites in NYS to date, the overall raptor fatality rate in the Project Area is expected to be low.

Table 2.6-2 Spring Migratory Raptor Survey Data from Proposed Wind Power Sites in New York

Location	Year	Dates Sampled	No. of Days	No. of Hours Sampled	Total No. Individuals	Raptors/ hr	No. of Species Seen
Clinton, Clinton Co.	2005	4/18-4/20	3	(21)	0	0	0
Altona, Clinton Co.	2005	5/4-5/6	3	(21)	0	0	0
Wethersfield, Wyoming Co.	2005	4/22-4/29	3	21	5	0.1	3
Bliss, Wyoming Co.	2005	4/21-4/28	3	(21)	19	(0.9)	4
Ellenburg, Clinton Co.	2006	4/30-5/5	3	18	20	1.1	5
Chateaugay, Franklin Co.	2006	4/19-4/28	3	21	40	1.9	12
Dairy Hills, Wyoming Co.	2005	4/15-4/26	5	20	50	(2.5)	6
Cohocton, Steuben Co.	2005	Not reported	10	60	164	2.73	11
Marble River, Clinton Co.	2005	4/5-5/6	10	60	170	2.83	11

Table 2.6-2 Spring Migratory Raptor Survey Data from Proposed Wind Power Sites in New York

Location	Year	Dates Sampled	No. of Days	No. of Hours Sampled	Total No. Individuals	Raptors/ hr	No. of Species Seen
Jericho Rise, Franklin Co.	2007	4/4-5/28	8	32	112	3	10
High Sheldon, Wyoming Co.	2005	4/2-5/14	7	37	119	3.2	7
Moresville, Delaware Co.	2005	3/28-5/10	8	45	170	3.8	6
Arkwright, Chautauqua Co.	2005/ 2007	4/16-5/22	5	20	55	4.37	8
Stockton, Chautauqua Co.	2005/ 2007	4/16-5/15	5	20	122	4.65	8
Howard, Steuben Co.	2006	4/3-5/14	9	52.5	260	4.95	11
Windfarm Prattsburgh, Steuben Co.	2005	Not reported	10	(60)	314	5.23	15
Ball Hill Wind Project, Chautauqua Co.	**2007/ 2008**	**3/30-5/13**	**9**	**63**	**671**	**5.3**	**12**
Steel Winds, Erie Co.	2005	4/1-5/9	7	48	292	6.1	11
West Hill, Madison Co.	2005	4/5-5/16	10	60	375	6.25	12
St. Lawrence, Jefferson Co.	2006	4/14-5/12	4	12	79	6.5	10
Ripley-Westfield, Chautauqua Co.	2008	3/17-5/29	34	236.2	1,581	6.7	14
St. Lawrence, Jefferson Co.	2006	4/14-5/12	4	12	91	7.5	8
Alabama, Genesee Co.	2005	4/16-4/29	5	20	177	9	8
St. Lawrence, Jefferson Co.	2007	3/21-5/1	7	21	205	9.8	9
St. Lawrence, Jefferson Co.	2007	3/21-5/1	7	21	232	11.0	8
Chautauqua Windpower, Chautauqua Co. – Inland area	2003	3/17-5/22	8	42	505	12.0	10
Horse Creek, Jefferson Co.	2005	3/30-5/7	10	58	700	12.1	14
Chautauqua Windpower, Chautauqua Co. – Ridge area	2003	3/17-5/22	25	88	3,547	40.3	14
Chautauqua Windpower, Chautauqua Co. – Lake Erie plain	2003	3/17-5/22	11	38	1,790	47.1	16
Ripley-Westfield, Chautauqua Co. – Escarpment and Lake Erie Plain (outside Project Area)	2008	3/17-5/11	10	64.4	3,357	52.1	12

Source: NYSDEC 2010a with additional entries provided by E & E.

(#) = Value not reported in original results – the number was calculated by NYSDEC based on original report text and tables.

Table 2.6-3 Fall Migratory Raptor Survey Data from Proposed Wind Power Sites in New York

Location	Year	Dates Sampled	No. of Days	No. of Hours Sampled	Total No. Individuals	Raptors/ hr	No. of Species Seen
Bliss, Wyoming Co.	2005	9/12-9/17	3	(21)	0	0	0
Clinton, Clinton Co.	2005	9/23-9/28	3	(21)	0	0	0
Altona, Clinton Co.	2005	9/24-9/30	3	(21)	0	0	0
Chateaugay and Bellmont, Franklin Co.	2007	10/16-11/28	9	60	48	0.8	8
Ripley-Westfield, Chautauqua Co.	2008	9/4-11/12	10	71	80	1.1	7
Chateaugay and Bellmont, Franklin Co.	2006	9/16-10/26	3	21	34	1.6	5
Allegany, Cattaraugus Co.	2007	9/8-10/11	11	63.8	125	2.0	10
Jericho Rise, Franklin Co.	2007	9/12-10/26	7	28	59	2.1	7
Jordanville, Herkimer Co.	2006	10/13-11/30	44	234.7	629	(2.7)	12
Ball Hill Wind Project, Chautauqua Co.	**2007/ 2008**	**9/15-11/1**	**3**	**21**	**94**	**2.8**	**8**
Dairy Hills, Wyoming Co.	2005	9/11-10/10	4	16	48	(3)	6
Windfarm Prattsburgh, Steuben Co.	2004	Not reported	13	73	220	3.01	10
High Sheldon, Wyoming Co.	2005	8/29-11/4	8	53.5	168	3.1	9
Cohocton, Steuben Co.	2004	Not reported	8	41	128	3.1	8
Moresville, Delaware Co.	2005	8/31-11/3	11	72	228	3.2	11
Cohocton, Steuben Co.	2005	Not reported	7	40	131	3.27	10
Centerville, Allegany Co.	2006	9/11-10/21	3	21.5	73	3.4	10
Howard, Steuben Co.	2005	9/1-10/28	10	57	206	3.6	12
Marble River, Clinton Co.	2005	9/6-11/2	10	60	217	3.6	15
Arkwright, Chautauqua Co.	2005/ 2007	9/17-10/28	12	18	49	4.37	5
Stockton, Chautauqua Co.	2005/ 2007	9/17-10/15	6	18	38	4.65	4
Wethersfield, Wyoming Co.	2005/ 2006	9/13-11/1	6	44.8	231	5.2	11
West Hill, Madison Co.	2005	9/6-10/31	11	65	369	5.68	14
Alabama, Genesee Co.	2005	9/11-10/10	5	19	148	8	4
Horse Creek, Jefferson Co.	2005	9/9-10/16	11	63.5	575	9.1	13
St. Lawrence, Jefferson Co.	2006	9/23-11/11	10	30	288	9.6	10

Source: NYSDEC 2010a with additional entries provided by E & E.

(#) = Value not reported in original results – the number was calculated by NYSDEC based on original report text and tables.

A raptor's use of the rotor-swept area increases the individual's collision risk (Strickland et al. 2011); however, there is the potential for some displacement at a wind farm site following construction, which could reduce the potential collision risk to raptors. Moreover, some raptors appear to avoid wind farm sites all together, as suggested by a study conducted by Garvin et al. (2011) where they compared the abundance and behavior of raptors at a wind energy facility in Wisconsin. The study found that the number of raptors declined by 47% when post-construction levels were compared to pre-construction levels. They also found that some raptors exhibit avoidance behavior by generally remaining at least 100 meters from the turbines and above the height of the rotor swept zone. The study concluded that the degree of behavioral response to the turbines was dependent on the species (Garvin et al. 2011). As raptor use in the Project Area is relatively low and the likelihood of turbine avoidance is high, the potential for impacts is low. No biologically significant adverse impacts on migrant raptors are anticipated as a result of Project operation.

Passerines

Nocturnal migrant passerine birds run the risk of colliding with all tall structures, including wind turbines. Nocturnal migrant passerines comprise the greatest number of bird fatalities in a review of post-construction mortality studies at existing wind projects in the eastern United States (American Wind Wildlife Institute [AWWI] 2015). The majority of post-construction surveys have found that bird fatalities typically accumulate in small numbers over the course of a season (Strickland et al. 2011). However, in 2011 several larger fatality events occurred at wind energy facilities in the mid-Atlantic Highlands resulting from the nighttime artificial lighting associated with buildings and inside nacelles (Young et al. 2012; Wald 2011). These large fatality events can be avoided through lighting design for Project buildings (avoid flood lighting and have lights pointed down) and successfully implementing BMPs to keep nacelle lighting turned off at night, which will be implemented for this Project (see Section 2.6.3.4, Lighting and Structural Mitigation).

There are no geographical or topographical features within the Project Area that would attract or concentrate nocturnal migrant passerines. The Project Area is not immediately proximate to any large waterbodies or isolated habitat patches that large numbers of nocturnal migrants would use as stopover areas. Outside of such areas, passerine migration is typically diffuse over a broad front. Results of the nocturnal radar study conducted in the Project Area are generally consistent with this assessment (Stantec Consulting 2008). The migratory passage rates over the Project Area in fall 2006 were below average and in spring 2007 were above average, but both were within the values of studies conducted at other locations (see Appendix J of the 2008 DEIS attached hereto as Appendix A). A radar study was conducted along the southern shore of Lake Erie at Evangola State Park in 2012 by the USFWS; however, at this time only preliminary results of this study have been made publically available (USFWS 2013a). This location is approximately 11 miles north of the Project Area.

In fall 2006 and spring 2007, the respective mean flight altitudes for passerines were 768 feet and 1,230 feet higher than the maximum turbine height for the then planned turbine technology. Based on these results, the majority of nocturnal migration occurs well above the height of the proposed turbines. The mean flight altitude in fall and spring were similar to each other and to other locations in the eastern United States where similar studies have been conducted (NYSDEC 2010b). Approximately 9% of all nocturnal targets in fall 2006 and approximately 3% of all nocturnal targets in spring 2007 flew below 394 feet AGL, a close approximation to the then-proposed maximum turbine height. The currently proposed maximum turbine heights for the Project (approximately 500 feet) are higher than the AGL height used to analyze nocturnal radar studies but below the flight altitudes observed. In addition, the rates of passage below the maximum turbine heights are still expected to be within the range of results from other radar studies in the northeastern United States (NYSDEC 2010b). In providing comment on the DEIS, NYSDEC providing the following conclusions regarding the Ball Hill radar studies and possible avian impacts: "The data collected during the 2006 fall and 2007 spring migration radar studies at Ball Hill Windpark indicate that the targets observed were less likely to be struck by turbine blades then compared to data collected at other wind power projects in western New York due to the higher mean flight level of passerines and the low percentage of targets in the rotor swept area. However, these indicators should be balanced to some degree by the higher numbers of passerines observed during spring. It is important to point out that this review does not provide a distinction between potential impacts to bats vs. birds as individual target identification was not possible" (Edick 2009; see Appendix Q).

There are conditions under which nocturnal migrants are more susceptible to collision, such as when adverse weather conditions cause birds to fly at lower altitudes. Studies have documented that bird collisions with communication and television towers, which can be much taller than wind turbines, increased during periods of low cloud ceilings, heavy fog, and precipitation.

It is likely that nocturnal migrant passerines would comprise a majority of the bird fatalities resulting from the Project operation, based on data collected from post-construction mortality studies at other wind farms, communication towers, and buildings. Based on results from other nearby wind projects, bird fatalities would likely be distributed among many species, with low numbers of any particular species in a given year. The potential mortality risk to migrant passerines is considered to be low based on the Project's location, passage rate and flight altitude data from radar studies (in addition to other regional radar studies), avoidance behavior of passerines exhibited at wind energy facilities, and known fatality rates from post-construction monitoring at regional wind energy facilities. No biologically significant adverse impacts are anticipated for any passerine species resulting from operation of the Project.

Waterfowl/Waterbirds

The Project is not located in an area where there are large movements of migratory or local waterfowl/waterbirds. Post-construction studies at existing wind energy facilities have shown that waterfowl/waterbirds are less susceptible to collision than other species groups (Erickson et al. 2002; BirdLife International 2003; Kingsley and Whittam 2007 as cited in National Wind Coordinating Collaborative

[2010]; AWWI 2015). Therefore, the potential risk for waterfowl/waterbird mortality resulting from the Project is anticipated to be very low.

2.6.2.2 Potential Impacts on Breeding Birds

Given the various habitats and site topography in the Project Area, there is a fairly high diversity of breeding bird species; however, the majority of the turbines would be sited in agricultural fields and open areas, habitats with a relatively low species diversity and density. There is a significant degree of existing habitat fragmentation in the Project Area due to agricultural operations and logging. By siting Project components away from wetlands and mature forests to the extent possible, potential impacts on resident birds would be minimized.

Much of the Project would be constructed in agricultural areas and along edges of young woodlands, and breeding birds in these habitats may demonstrate temporary displacement. Most breeding birds are expected to habituate to the presence of the turbines, and long-term displacement would be minimal. Grassland-nesting species (i.e., Bobolink and Eastern Meadowlark) may not habituate to the presence of the turbines as much as species in other habitats. Some species are more susceptible to displacement than others (Kerlinger and Guarnaccia 2009; Shaffer et al. 2012), and displacement may be limited to the immediate area (i.e., the surrounding field) of each turbine, depending on site-specific conditions, including habitat, size of field, hay mowing, and pesticide practices. A study at the Noble Bliss Windpark in Wyoming County, New York, concluded that bird diversity and abundance around turbines decreased in the year following construction (Kerlinger and Guarnaccia 2009). In the next following year, bird diversity rebounded, while abundance did not. A study at the Noble Wethersfield Windpark in Wyoming County, New York, concluded that one species of bird, the Bobolink, showed an effect of turbine displacement following construction, with significantly fewer Bobolinks within 246 feet (75 m) of turbines situated in hayfields (Kerlinger and Guarnaccia 2010). However, another species of bird, the Savannah Sparrow, did not show a significant difference in abundance with distance from the turbines. Avian displacements similar to those observed at these two wind farms are expected in the Project Area, with some species but not others exhibiting displacement effects.

Construction of Project components in wooded areas would result in some forest fragmentation and negatively impact some forest-dwelling species (i.e., Wood Thrush, Ovenbird); however, there are no extensive forest tracts in the Project Area, and fragmentation is already prevalent. Some avian species (e.g., Indigo Bunting and Mourning Warbler) would likely benefit from fragmentation. The pattern of long-term displacement in wooded areas is unclear because long-term studies of bird displacement due to wind turbines in wooded areas are limited. However, as stated previously, impacts vary by bird species (Kerlinger and Guarnaccia 2009), and some species have the potential to adapt to the presence of wind turbines (The Ornithological Council 2007).

No substantial negative impacts on habitat through loss, degradation, or displacement of breeding birds are anticipated. No significant long-term adverse impacts on breeding birds are anticipated from operation of the Project.

2.6.2.3 Potential Impacts on Threatened or Endangered Bird Species

During field surveys, two state-listed endangered species (the Golden Eagle and Peregrine Falcon), two state-listed threatened species (the Bald Eagle and Northern Harrier), and seven state-listed special concern species (the Common Loon, Osprey, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, Horned Lark, and Grasshopper Sparrow) were observed in the Project Area. Generally these species were observed in low numbers, and significant impacts would not be anticipated to these species. The potential impacts on these species and the additional species listed by the USFWS and NYSDEC in the NHP reports (i.e., Great Blue Heron, Short-eared Owl, Northern Harrier, Sedge Wren, Red-headed Woodpecker, and Henslow's Sparrow) within 10 miles of the Project Area are discussed below.

Golden Eagles

Two migrant Golden Eagles were observed in the Project Area by E & E staff during the spring raptor surveys conducted on March 30 and April 7, 2008, and two migrant Golden Eagles were observed during the eagle surveys conducted on March 13 and 27, 2012. There are no active Golden Eagle nests in NYS, and the Project Area is outside of this species' breeding range. Golden Eagles are very rare in winter in western New York as the wintering range for the eastern population is in the mid-Atlantic Highlands to the south (i.e., Pennsylvania and West Virginia). No activities pertinent to the life cycle of the Golden Eagle would regularly bring it to the Project Area except as a migrant or occasional transient. With such low utilization of the Project Area, the potential for direct mortality or injury of Golden Eagles resulting from collision with wind turbines is considered to be very low. Similarly, as breeding is not expected in the Project Area, the potential for harassment, displacement, or habitat impacts are also remote. Therefore, no potential significant adverse impacts on the Golden Eagle are anticipated.

Peregrine Falcon

One Peregrine Falcon was observed in the Project Area by E & E staff during the eagle surveys conducted on June 27, 2012. Peregrine Falcons can occur in the Project Area at any time throughout the year, but are more likely during the fall and spring migrations. The potential for direct mortality or injury of Peregrine Falcons as a result of collisions with wind turbines is considered to be low, as they are not common to the Project Area and there are no potential nesting sites (e.g., cliff faces, tall buildings, or bridges) in or near the Project Area. No potential significant adverse impacts on Peregrine Falcons are anticipated.

Bald Eagles

Two Bald Eagles were observed by E & E staff in the Project Area during spring raptor surveys conducted in 2007 (one migrant on April 23, 2007, and one local bird on April 30, 2007). Two Bald Eagles were observed during spring raptor surveys conducted in 2008 (one migrant and one local bird, both on April 7, 2008). During the 2012-2013 eagle surveys, a total of 17 Bald Eagle sightings were made. Of the total 17 Bald Eagle sightings during the eagle surveys (not including incidental sightings), seven were observed flying at least partially within the rotor swept zone (RSZ) for a total of 19 minutes, or 0.10% of the total survey time spent within the Project Area. This suggests that Bald Eagles do not frequently fly within the RSZ and that wind turbines would pose a minimal threat to eagles.

Several Bald Eagle nesting areas have been identified within 10 miles of the Project Area; see description of locations in Section 2.6, Bird and Bat Resources. Based on suitable foraging habitat and relative proximity to the nearest nesting locations, Bald Eagles may enter the Project Area en route to visit East Mud Lake, West Mud Lake, Lake Erie, Silver Creek Reservoir, Fredonia Reservoir, and the Dayton gravel ponds. Coming from the nearest nesting locations, Bald Eagles could reach these small lakes without crossing the Project Area; however, as has been documented during the 2012 eagle surveys, some flights within the Project Area are expected. Eagle populations in western New York and especially Chautauqua County are rapidly expanding; as populations continue to increase, greater nest densities may occur in preferable habitats, and eagles may also begin to nest in less ideal habitats further from foraging areas.

The USFWS published a final rule (Eagle Permit Rule [50 Code of Federal Regulations 22.26]) on September 11, 2009, under the BGEPA authorizing limited issuance of permits to take Bald and Golden Eagles. A permit would authorize the take of Bald and Golden Eagles where the take is (1) compatible with the preservation of the Bald Eagle and the Golden Eagle, (2) necessary to protect an interest in a particular locality, (3) associated with but not the purpose of the activity, and (4) for individual incidences (i.e., the take cannot be practicably avoided) and programmatic take (i.e., the take is unavoidable even though advanced conservation practices are being implemented). The USFWS published the Draft Eagle Conservation Plan Guidance in February 2011 and revised in April 2013 (USFWS 2011, 2013b), which explains the USFWS's approach to issuing permits to individual companies or broad, industry-wide permits for ongoing take of eagles under this authority, and provides guidance for permit applicants (Project proponents). The final rule notes that wind power is an industry sector for which programmatic permits are appropriate.

E & E met with the USFWS in Cortland, New York, on December 11, 2012, to go over the Project's survey results to date and to discuss appropriate avoidance and minimization measures for the Project to reduce risks to eagles. It is anticipated that there will be permit conditions from NYSDEC regarding monitoring for Bald Eagles and other listed species during Project operation and measures to avoid and minimize any potential impacts from operation.

Bald Eagles may occur in the Project Area throughout the year. As such, there is potential for direct mortality or injury to Bald Eagles resulting from collision with wind turbines and the potential for harassment, displacement, or habitat impacts; however, these risks appear to be minimal. To date, few impacts on Bald Eagles as a result of wind farm development have been reported with eight Bald Eagle fatalities reported at wind energy facilities in North America: three in Iowa; two in Ontario; two in Wyoming; and one in Maryland (2012) (Allison 2012; Pagel et al. 2013).

Additional regulatory rulings are anticipated in 2016 as updates for the Eagle Permit Rule, and Ball Hill will continue to coordinate with the USFWS and NYSDEC regarding potential risks from the Project to eagles. While the potential for unavoidable Bald Eagle-related impacts exists, it is anticipated that the Project would not significantly impact local or migrating Bald Eagles. Ball Hill will include avoidance and minimization measures in a project-specific Bird and Bat Conservation Strategy (BBCS), as discussed in section 2.6.3.2.

Northern Harrier

E & E staff observed Northern Harriers in the Project Area on several occasions during spring and fall raptor surveys, spring migratory surveys, and eagle surveys. This species breeds in Chautauqua County and is a regular occurrence in many areas of NYS. It is a confirmed or suspected breeder in or near the Project Area. The Northern Harrier is a ground-nesting raptor that uses various wetland and upland habitats, including cattail marshes, wet meadows, and hayfields for nesting. It is highly visible in all seasons and has a large hunting range (McGowan and Corwin 2008). Because there is ample suitable nesting habitat in and near the Project Area, the potential risk of displacement is low. Very few Northern Harrier fatalities resulting from collisions with wind turbines have been documented, even at sites that have relatively high use by this species (Erickson et al. 2002). This is likely due to Northern Harrier foraging behavior that is typically well below the rotor sweep zone. It is anticipated that local Northern Harriers would habituate to the presence of wind turbines; however, the collision risk is considered low to moderate because of the species' frequency of occurrence in the Project Area.

Short-eared Owl

The Short-eared Owl is listed by the NHP as occurring in the town of Sheridan in Chautauqua County. This location is assumed to be a wintering location rather than a breeding area, because this species is a very rare breeder in western New York and no breeding has been documented in Chautauqua County (McGowan and Corwin 2008). This species is listed as endangered in NYS primarily because of its rare breeding status and decline in population. Although breeding Short-eared Owls are very rare in western New York, wintering Short-eared Owls occur with regularity. Suitable habitat occurs throughout much of Chautauqua County, including the Project Area, for wintering Short-eared Owls. Short-eared Owls have been observed in five out of 38 years during the Dunkirk-Fredonia Christmas Bird Count (CBC) and eight out of 71 years during the Jamestown CBC

(Audubon 2015). Although this species was not observed during field surveys, it is suspected that a few birds may forage in the Project Area in some winters. The potential impact on this species is anticipated to be low.

Sedge Wren

The Sedge Wren has been identified by the NHP as occurring in the town of Sheridan in Chautauqua County. Typical breeding habitat for this species consists of moist sedge meadows with grasses and scattered shrubs (McGowan and Corwin 2008). This elusive species is unpredictable, as it often does not reappear from year to year in the same breeding location. Habitat is often temporary and replaced over time by plant succession (McGowan and Corwin 2008). The Sedge Wren is secretive and spends most of its time near the ground, with limited flights just above the vegetation. The potential risk of turbine collision for this species is considered to be very low, and the potential risk of displacement is also considered to be very low because suitable habitat would not be altered.

Red-headed Woodpecker

The Red-headed Woodpecker has been identified by the NHP as occurring within 10 miles of the Project Area. This species is an uncommon and declining inhabitant of western New York that prefers deciduous hard woods and open country with scattered trees. Their breeding habitat is present within the Project Area; however, their current distribution in western New York favors the immediate Lake Erie shoreline and they are less likely to occur in higher elevations. While this species can potentially occur within the Project Area, the potential risk of turbine collision is considered low. As such, it is anticipated that no potential significant adverse impacts will result from the Project for this species.

Henslow’s Sparrow

Henslow’s Sparrow has been identified by NHP as occurring in the town of Arkwright, Chautauqua County, approximately 6 miles west of the Project Area. This rare and declining species has been identified in western New York only sparingly over the past decade. Typical breeding habitat consists of wet grasslands with tall, dense vegetation and thick litter (McGowan and Corwin 2008). The Henslow’s Sparrow is secretive, singing from inconspicuous perches on low forbs, shrubs, or grasses. Suitable habitat for this species would not be altered by construction or operation of this Project; therefore, the potential risks of turbine collision and displacement are considered to be very low. As such, it is anticipated that no potential significant adverse impacts will result from the Project for this species.

Great Blue Heron

The Great Blue Heron has been identified by the NHP because a grouping of more than 50 nests per year (a heronry) has been documented at Dibble Hill/Farrington Hollow in the town of Arkwright, Chautauqua County, approximately 2 miles west of the Project Area. While not a federally or state-listed endangered or threatened species, the Great Blue Heron is protected by the federal Migratory Bird Treaty Act. The Great Blue Heron typically nests in colonies, usually near water, and is primarily a fish eater, wading along the shorelines of marshes, lakes, and rivers (Butler 1992). There are numerous foraging areas near the heronry, including waterbodies within the Canadaway Creek Wildlife Management Area, Canadaway Creek and multiple tributaries, Black Pond, West Mud Lake, Fredonia Reservoir, Cassadaga Lake, and various other waterbodies.

There are relatively few creeks and ponds within the Project Area, although herons could traverse the Project Area if they wanted to forage at East Mud Lake, Silver Creek Reservoir, or the north branch of Conewango Creek, all of which are located east or northeast of the Project Area. Herons are not prone to collisions with wind turbines. In a review of bird collisions at wind facilities (Erickson et al. 2001) based on 31 studies, 78% of the carcasses found (outside of California) were passerines and only 3.3% were waterbirds (National Research Council 2007). The potential risks of collision and displacement of Great Blue Herons resulting from Project operation is considered low. As such, it is anticipated that no potential significant adverse impacts will result from the Project for this species.

Species of Special Concern

Species of special concern are those that NYS feels warrant attention and consideration because they are uncommon in New York or have highly specific habitat requirements and deserve careful monitoring. Although rare, current information does not justify listing these species as either endangered or threatened, and they are not afforded the legal protection of such a listing. All of the species of special concern identified in the Project Area (Common Loon, Osprey, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, Horned Lark, and Grasshopper Sparrow) were documented in very low numbers (see Appendix K). Of these seven species, Common Loon and Osprey do not breed in the Project Area, and the other five species may breed in low numbers in the Project Area. The potential risks of collision and displacement resulting from Project operation are considered to be very low for each of these species. As such, it is anticipated that no potential significant adverse impacts will result from the Project for these species.

2.6.2.4 Potential Impacts on Bats

Operation of the Project may result in impacts on bats. Direct impacts on bats primarily result from turbine collisions. Post-construction mortality surveys at operating wind projects in the United States have shown that tree bats comprise a large majority of the total number of bat fatalities (AWWI 2015; Arnett et al. 2008; Kerns et al. 2005). Generally, cave bats appear to be less vulnerable to the impacts with turbines. Although it is a cave bat, the tri-colored bat also has a high relative mortality rate at wind farms, potentially indicating it is also vulnerable to turbine impacts like tree bats. Pre-construction acoustic surveys have shown that these species, which are most likely to be impacted, compromise the vast majority of observed bat passes at the high detector, which was located within an RSZ (see Appendix K). As discussed above, WNS has a greater impact on the cave bat species group than it does on tree bat species due to the proliferation of the disease in cave populations (Frick et al. 2010). The significance of localized bat mortality from wind operations on a population as a whole is largely not understood, and current national research is aimed at addressing this issue.

On September 3, 2015, the American Wind Energy Association (AWEA) announced that 17 of its member companies, including RES, the parent company of Ball Hill, will voluntarily limit the operations of wind turbine generators in low-wind speed conditions during the fall bat migration season (AWEA 2015). Engagement in this voluntary program will greatly reduce risk to bats during migration, when numbers of bats passing through the Project Area would be expected to increase dramatically. By slowing blade rotations to fewer than one to three revolutions per minute during the period when migrating bats are most at risk, Ball Hill expects to greatly reduce impacts on bats from the operating turbines as has been demonstrated in multiple research studies performed by the Bats and Wind Energy Collaborative.

It is anticipated that the risk to the resident/summering bat populations in the Project Area would be much lower than the risk to migrants because collisions with migrating tree bat species have been shown to exceed those of other bat species. For example, 151 of the 203 dead bats found during the 2007 post-construction study at the Maple Ridge project were of the three tree bat species mentioned above (Jain et al. 2009a). In addition, bat fatalities at wind projects in general are higher during the fall migration season compared with the spring or summer months (Arnett et al. 2008). As the population sizes and trends of most bats in NYS are unknown, it is uncertain what level of impact results from wind projects, especially in light of the even greater mortality risk from WNS. Approximations of the level of bat fatalities are presented in Section 2.6.2.6, Bird and Bat Fatality Approximations.

2.6.2.5 Potential Impacts on Threatened or Endangered Bat Species

As indicated previously, the northern long-eared bat was shown to have "probable" presence in the Project Area based on summer 2015 surveys. Based on its presence, there is a potential risk of collision with turbines in the Project Area. Fatalities of this species have been documented from operation of wind projects in the Northeast (Gruver and Bishop-Boros 2015). These fatalities have been documented in small numbers, even at sites where northern long-eared bats have been found to be present in large numbers. The voluntary program to minimize bat impacts described in Section 2.6.2.4, Voluntary Impacts on Bats, will also reduce the potential impacts on northern long-eared bats from the Project. Ball Hill will continue to coordinate with the USFWS regarding survey results and avoidance and minimization measures, and other possible regulatory requirements for this species.

Based on the known locations of Indiana bat hibernacula and maternity colonies in NYS, and no previous documentation of this species in western New York, it is unlikely that Indiana bats would be found residing in or migrating through the Project Area. Therefore, the potential for any impact is considered remote (see Section 2.6.1.4, Potential Impacts on Bats). However, since Indiana bats are capable of migrating upwards of 300 miles (USFWS 2004), complete avoidance of impacts on Indiana bats within that range can never be absolutely guaranteed.

The eastern small-footed bat has not been identified in the Project Area or in the vicinity, but there is potential bat habitat at the site (i.e., forested areas). The available data indicate that eastern small-footed bats tend to be low, erratic fliers, flying roughly 1 to 3 meters off the ground (Harvey et al. 1999). This suggests that these bats are less likely to fly in the RSZ than other bats. To date, only two eastern small-footed bat fatalities have been discovered at wind energy facilities in the United States (Gruver and Bishop-Boros 2015). Because of the potentially limited presence and flight tendencies of the eastern small-footed bat, collisions with wind turbines or barotrauma-related mortality is not anticipated to occur.

Since eastern small-footed bats generally do not roost in trees, vegetation clearing as part of regular Project maintenance would have minimal impact on this species. A desktop review of the Project and site visits made as part of the Project's pre-construction environmental surveys did not identify any barren land or high elevation forested areas with rocky outcrops. However, if any talus piles or rocky outcrops in forested areas are discovered and disturbed during vegetation clearing or decommissioning activities, the potential exists for disturbance of eastern small-footed bat roosts, if present.

Eastern small-footed bats are not known to occur in the Project Area, and suitable roost habitat for this species does not appear to be present. However, if these bats are present and breeding, they would likely occur in very low numbers; thus, the potential for significant adverse impacts during operation would be minimal.

2.6.2.6 Bird and Bat Fatality Approximations

Birds

Bird fatality rates ranged from 0.66 to 9.29 birds/turbine/study period and from 0.44 to 5.63 birds/MW/study period at New York sites where recent, rigorous post-construction mortality monitoring has been conducted (see Table 2.6-4). Bird fatality rates in the Project Area are anticipated to be similar to those recorded elsewhere in NYS. This assumption is based on the habitat found in the Project Area, the lack of features in the Project Area that would suggest increased use, and the results of bird surveys and literature review.

It is anticipated that the bird fatality rates for the Project would be within the range of bird fatality rates presented in Table 2.6-4. The lower-bound estimate for the Project fatality rate was based on the results of the 2008 Noble Bliss three-day surveys (Jain et al. 2009e), and the upper-bound estimate was based on the results of the 2006 Maple Ridge Wind Project daily surveys (Jain et al. 2007). Based on these studies using a per turbine basis, the lower-bound estimate of bird fatalities is 24 birds per study period, and the upper-bound estimate of bird fatalities is 334 birds per study period. It is expected that the actual number of bird fatalities as a result of the Project would fall within these bounds. If approximations are based on 100 MW of the Project rather than the number of turbines, then the lower-bound estimate is 44 birds fatalities per period (based on Noble Bliss 2008 data [Jain et al. 2009e]), and the upper-bound estimate is 563 bird fatalities per period (based on Maple Ridge 2006 data [Jain et al. 2007]).

Table 2.6-4 Bird Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal)		Reference
			Number of Bird Fatalities/ Turbine/ Period	Number of Bird Fatalities/ MW/Period	
Maple Ridge, Lewis County, New York – Mixed (agriculture and forest)					
Daily surveys	6/17 – 11/15	2006	9.29	5.63	Jain et al. 2007
3-day surveys	6/29 – 11/15	2006	4.47	2.71	Jain et al. 2007
Weekly surveys	7/11 – 11/13	2006	3.13	1.90	Jain et al. 2007
Weekly surveys	4/30 – 11/14	2007	3.87	2.34	Jain et al. 2009a
Weekly surveys	4/15 – 11/9	2008	3.42	2.07	Jain et al. 2009b
Noble Bliss, Wyoming County, New York – Mixed (agriculture and forest)					
Daily surveys	4/21 – 11/14	2008	4.30	2.86	Jain et al. 2009e
3-day surveys	5/9 – 11/14	2008	0.66	0.44	Jain et al. 2009e
Weekly surveys	5/9 – 11/14	2008	0.74	0.50	Jain et al. 2009e
Daily surveys	4/15 – 11/15	2009	4.45	2.97	Jain et al. 2009c
Weekly surveys	4/15 – 11/15	2009	2.87	1.91	Jain et al. 2009c
Noble Clinton, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/13	2008	1.43	0.96	Jain et al. 2009d
3-day surveys	4/26 – 10/13	2008	3.26	2.17	Jain et al. 2009d
Weekly surveys	5/8 – 10/13	2008	2.48	1.65	Jain et al. 2009d
Daily surveys	4/15 – 11/15	2009	1.50	1.00	Jain et al. 2010b
Weekly surveys	4/15 – 11/15	2009	1.76	1.17	Jain et al. 2010b
Noble Ellenburg, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/29 – 10/13	2008	2.09	1.40	Jain et al. 2009c
3-day surveys	4/28 – 10/13	2008	1.37	0.91	Jain et al. 2009c
Weekly surveys	4/28 – 10/13	2008	1.18	0.78	Jain et al. 2009c
Daily surveys	4/15 – 11/15	2009	5.69	3.79	Jain et al. 2010a
Weekly surveys	4/15 – 11/15	2009	2.29	1.53	Jain et al. 2010a
Cohocton and Dutch Hill, Steuben County, New York – Mixed (agriculture and forest)					
Daily surveys	7/15 – 9/17	2010	2.06	1.37	Stantec Consulting 2011
Weekly surveys	7/15 – 9/17	2010	1.16	0.77	Stantec Consulting 2011
Munnsville, Madison and Oneida Counties, New York – Mixed (agriculture and forest)					
Dog searches (recurrence unknown)	4/15 – 11/15	2008	1.71	1.14	Stantec Consulting 2009
Weekly surveys	4/15 – 11/15	2008	2.22	1.48	Stantec Consulting 2009

Table 2.6-4 Bird Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal) Number of Bird Fatalities/ Turbine/ Period	Number of Bird Fatalities/ MW/Period	Reference
Noble Wethersfield, Wyoming County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	2.55	1.70	Jain et al. 2011a
Noble Altona, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/15	2010	2.76	1.84	Jain et al. 2011b
Weekly surveys	4/26 – 10/15	2010	1.55	1.04	Jain et al. 2011b
Noble Chateaugay, Franklin County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	2.48	1.65	Jain et al. 2011c
High Sheldon, Wyoming County, New York – Mixed (agriculture and forest)					
Daily and weekly surveys	4/15 – 11/15	2010	2.64	1.76	Tidhar et al. 2011a
Daily and weekly surveys	5/15 – 11/15	2011	2.36	1.57	Tidhar et al. 2011b

Bats

Bat fatality rates ranged from 0.7 to 40.0 bats/turbine/study period and from 0.46 to 16.3 bats/MW/study period at New York sites where recent, rigorous post-construction mortality monitoring has been conducted (see Table 2.6-5). Bat fatality rates at the Project are anticipated to be similar, if not lower, to those recorded elsewhere in NYS. This prediction is based on the results of the habitat surveys, acoustical monitoring studies, literature review, and because there are no features in the Project Area suggesting evidence of large roosts or hibernacula in the Project Area that would concentrate foraging bats. Although results of the most recent pre-construction acoustic survey showed relatively higher bat activity (see Appendix L [Bat Acoustic Monitoring Report]), the current knowledge base does not allow using estimates of bat activity from pre-construction surveys to reliably estimate post-construction fatalities (USFWS 2012). Ball Hill's plan to voluntarily reduce operations during the times of increased bat risk will likely result in lower mortality than the sites previously studies that did not employ similar operational reductions.

Table 2.6-5 Bat Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal)		Reference
			Number of Bat Fatalities/ Turbine	Number of Bat Fatalities/ MW/Period	
Maple Ridge, Lewis County, New York – Mixed (agriculture and forest)					
Daily surveys	6/17 – 11/15	2006	24.53	14.87	Jain et al. 2007
3-day surveys	6/29 – 11/15	2006	22.34	13.54	Jain et al. 2007
Weekly surveys	7/11 – 11/13	2006	15.2	9.21	Jain et al. 2007
Weekly surveys	4/30 – 11/14	2007	15.24	9.42	Jain et al. 2009a
Weekly surveys	4/15 – 11/9	2008	8.18	4.96	Jain et al. 2009b
Noble Bliss, Wyoming County, New York – Mixed (agriculture and forest)					
Daily surveys	4/21 – 11/14	2008	7.58	5.05	Jain et al. 2009e
3-day surveys	5/9 – 11/14	2008	14.66	9.78	Jain et al. 2009e
Weekly surveys	5/9 – 11/14	2008	13.01	8.67	Jain et al. 2009e
Daily surveys	4/15 – 11/15	2009	8.24	5.5	Jain et al. 2009c
Weekly surveys	4/15 – 11/15	2009	4.46	2.97	Jain et al. 2009c
Noble Clinton, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/13	2008	5.45	3.63	Jain et al. 2009d
3-day surveys	4/26 – 10/13	2008	4.81	3.21	Jain et al. 2009d
Weekly surveys	5/8 – 10/13	2008	3.76	2.5	Jain et al. 2009d
Daily surveys	4/15 – 11/15	2009	9.72	6.48	Jain et al. 2010b
Weekly surveys	4/15 – 11/15	2009	5.16	3.44	Jain et al. 2010b
Noble Ellenburg, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/29 – 10/13	2008	8.17	5.45	Jain et al. 2009c
3-day surveys	4/28 – 10/13	2008	6.94	4.63	Jain et al. 2009c
Weekly surveys	4/28 – 10/13	2008	4.19	2.79	Jain et al. 2009c
Daily surveys	4/15 – 11/15	2009	8.01	5.34	Jain et al. 2010a
Weekly surveys	4/15 – 11/15	2009	3.7	2.47	Jain et al. 2010a
Cohocton and Dutch Hill, Steuben County, New York – Mixed (agriculture and forest)					
Daily surveys	4/15 – 11/15	2009	40	16	Stantec Consulting 2011
Weekly surveys	4/15 – 11/15	2009	13.8	5.53	Stantec Consulting 2011
Munnsville, Madison and Oneida Counties, New York – Mixed (agriculture and forest)					
Dog searches (re-currence unknown)	4/15 – 11/15	2008	2.9	1.93	Stantec Consulting 2009
Weekly surveys	4/15 – 11/15	2008	0.7	0.46	Stantec Consulting 2009
Noble Wethersfield, Wyoming County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	24.45	16.3	Jain et al. 2011a
Noble Altona, Clinton County, New York – Mixed (agriculture and forest)					
Daily surveys	4/26 – 10/15	2010	6.51	4.34	Jain et al. 2011b
Weekly surveys	4/26 – 10/15	2010	3.87	2.58	Jain et al. 2011b
Noble Chateaugay, Franklin County, New York – Mixed (agriculture and forest)					
Weekly surveys	4/26 – 10/15	2010	3.66	2.44	Jain et al. 2011c

Table 2.6-5 Bat Fatality Rates from Post-Construction Studies Conducted at New York State Wind Energy Facilities

Wind Project and Location	Monitoring Start/End Date	Year	Reported Mortality Rate (adjusted for searcher efficiency and scavenger removal) Number of Bat Fatalities/ Turbine	Number of Bat Fatalities/ MW/Period	Reference
High Sheldon, Wyoming County, New York – Mixed (agriculture and forest)					
Daily and weekly surveys	4/15 – 11/15	2010	3.50	2.33	Tidhar et al. 2011a
Daily and weekly surveys	5/15 – 11/15	2011	2.67	1.78	Tidhar et al. 2011b

It is anticipated that the bat fatality rates for the Project would be within the range of bat fatality rates provided in Table 2.6-5. The lower-bound estimate for the fatality rate for the Project was based on the results of the 2008 weekly survey results from the Munnsville Wind Project in Madison and Oneida counties (Stantec Consulting 2009), and the upper-bound estimate was based on the results of 2009 daily surveys conducted at the Cohocton and Dutch Hill Wind Project in Steuben County (Stantec Consulting 2011). Based on these approximations, the lower-bound estimate of bat fatalities is 25 bats per study period (based on 2008 data for the Munnsville Wind Project [Stantec Consulting 2009]), and the upper-bound estimate is 1,440 bat fatalities per study period (based on Cohocton and Dutch Hill 2009 data [Stantec Consulting 2011]). If approximations are based on 100 MW of the Project rather than the number of turbines, the lower-bound estimate of bat fatalities is 46 bats per study period (based 2008 data for the Munnsville Wind Project [Stantec Consulting 2009]), and the upper-bound estimate is 1,630 bats per study period (based on Noble Wethersfield 2010 data [Jain et al. 2011a]).

The bat fatality rates discussed above are only estimates. There can be considerable variation in fatality rates, especially for bats. The actual number of bat fatalities can be determined only with post-construction mortality studies; however, this estimate allows an evaluation of the potential impacts.

2.6.3 Mitigation

2.6.3.1 Siting Approach

The primary mitigation measure taken to avoid or reduce the potential for significant bird and bat impacts was the approach to siting of the Project, which Ball Hill continued with its refined layout. Initially, studies of potential Project areas were conducted using a literature review to ensure that no regional bird or bat populations would be adversely impacted should the Project be constructed and operated. During the siting phase, Ball Hill selected available and appropriate locations for turbines, in part, by avoiding, and thus preserving, potentially important habitat, which minimized potential impacts on wetlands, habitat, and land use—all of which are related indirectly to birds and bats. The Project is also sited in an area that avoids topographical features that could potentially attract raptors and migrating birds. These considerations would minimize potential impacts on birds and bats. See Section 1.3, Project Alternatives, for further details on the siting approach for the Project.

2.6.3.2 Bird and Bat Conservation Strategy

Ball Hill will prepare and implement a site-specific BBCS outlining various processes that has and/or will be employed through construction, operation, and decommissioning at the Project to:

- Comply with all state and federal avian and bat conservation and protection laws and regulations applicable to the Project;
- Document adherence to the USFWS Land-based Wind Energy Guidelines (USFWS 2012);
- Ensure that any impacts on avian and bat resources are identified, quantified, and analyzed; and
- Implement various conservation, avoidance, minimization, and mitigation measures to address any impacts that result from operation of the Project. This would be accomplished through adherence to the adaptive management process identified in the USFWS Land-based Wind Energy Guidelines.

The specifics of the voluntary program to avoid and/or reduce impacts on bats will be included in the BBCS.

2.6.3.3 Construction

Clearing for road and infrastructure construction, equipment noise, and increased vehicle traffic could adversely impact birds and bats during construction of the Project. Impacts on birds and bats due to construction would be minimized through the implementation of BMPs. Erosion control structures would be used to prevent off-site migration of soil and minimize impacts on aquatic resources. Silt fencing would be installed along the construction ROW in all areas adjacent to wetlands, in accordance with the SWPPP, as discussed in Section 2.3, Water Quality. Clearing of natural vegetation adjacent to streams would be limited to the material that poses a hazard or hindrance to construction or Project facilities.

If construction takes place in suitable nesting habitat for endangered, threatened, or special concern bird species in the spring and early summer, the work area would be surveyed and cleared by an environmental supervisor in advance of construction. If threatened, endangered, or special concern bird species are found nesting in the immediate vicinity of a construction area, Ball Hill would identify potential impacts, evaluate options, and develop a mitigation plan to address site-specific occurrences of the identified species. Measures that may be implemented would depend on the nest's proximity to construction, the construction activities involved, the species involved, the date and stage of the breeding season, and other potential factors (e.g., hay mowing). Possible avoidance measures may include delaying construction until the young have fledged from the nest, continual monitoring during the initial construction period to ensure the birds are not impacted, or implementation of a non-disturbance buffer. Ball Hill will coordinate any such activities with the USFWS and NYSDEC.

2.6.3.4 Lighting and Structural Mitigation

During nights of inclement weather and/or poor visibility, passerines may fly at lower altitudes and, for unknown reasons, be attracted to lights, especially steady (i.e., non-blinking) lights, such as those fixed to the tops of some turbines. This attraction is supported by data collected from tall structures (e.g., communication/television towers and buildings), which indicate that bird collisions increase during nights with poor visibility at structures with steady lights (Gehring et al. 2009). In order to reduce this potential, Ball Hill would avoid using non-blinking lights where practicable. In addition, Ball Hill would:

- Provide the minimum allowable lighting in accordance with FAA recommendations; these lights would be flashing red aviation warning lighting and would operate only at night.
- Avoid using floodlights at any structures on site or steady light sources near the turbines. Lighting at the substation would consist of pole-mounted flood lights directed downward at the substation infrastructure. Outdoor lights would be controlled by manual or motion detection switches at the substation and only be lit when maintenance personnel must work in the substation during nighttime or periods of low light.
- Locate the majority of collection lines underground. All overhead electric lines (collection or transmission lines) will be built to Avian Power Line Interaction Committee standards outlined in the Suggested Practices for Avian Safe Power lines.

2.6.3.5 Post-construction Monitoring

Post-construction mortality monitoring would be implemented by Ball Hill to evaluate the actual impacts of the Project on birds and bats as per the approach and objectives in Tier 4 of the USFWS Land-based Wind Energy Guidelines. This would help establish the bird and bat fatality rates for the Project and allow comparison to the predicted rates and significance of the impacts. Prior to operation of the Project, Ball Hill will develop a study plan for post-construction monitoring through coordination with NYSDEC and the USFWS. It is anticipated that monitoring will include fatality studies involving searching for bird and bat carcasses beneath turbines in the first full year following the start of operations.

Results of the first year of post-construction fatality monitoring will be reviewed with NYSDEC and the USFWS following completion of the survey. If bird or bat impacts are significantly greater than anticipated then Ball Hill will continue to coordinate with the agencies and through the adaptive management process in the BBCS (see Section 2.6.3.2, Bird and Bat Conservation Strategy), will identify additional monitoring and/or minimization measures to reduce impacts.

2.7 Visual Resources

To investigate potential visual impacts associated with the Project, Ball Hill retained the services of Saratoga Associates, P.C. (Saratoga) to conduct a visual resources assessment (VRA). The purpose of the VRA is to identify potential visual and aesthetic impacts and to provide an objective assessment of the visual character of the Project, using standard accepted methodologies. Saratoga has revised and updated the VRA completed for the 2008 Ball Hill DEIS (see Appendix K of the 2008 SDEIS, attached hereto as Appendix A) to include changes to the Project and incorporate comments on the original VRA. The revised 2015 VRA is a replacement for the 2008 VRA and is attached as Appendix M.

This section includes a discussion of potential visual impacts of the Project associated with construction and operation of the Project and potential nighttime visibility and shadow flicker impacts associated with the operation of the Project. In addition, the VRA describes the efforts that have been made in the design of the Project to mitigate visual impacts. Section 4.0, Cumulative Impacts, discusses cumulative visual impacts resulting from this Project and other proposed projects in the vicinity of the Project Area.

Methodology

Consistent with VRA practice, the VRA prepared for the Project assesses the potential visibility of the Project and objectively determines the difference between the visual characteristics of the landscape setting with and without the Project in place. The process follows basic NYSDEC Program Policy "Assessing and Mitigating Visual Impacts" (NYSDEC 2000) (NYSDEC Visual Policy) and SEQRA criteria to minimize impacts on visual resources. This visual policy requires a visual assessment when a proposed facility is potentially within the viewshed of a designated aesthetic resource.

There are no specific federal rules, regulations, or policies governing the evaluation of visual resources. However, the methodology employed in the Project VRA is based on standards and procedures used by the USDA (National Forest Service 1974, 1995), the U.S. Department of the Interior (USDOI), the Bureau of Land Management (USDOI 1980), and U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA) (USDOT FHWA 1981).

A VRA comprises the following steps:

- Define the existing landscape character/visual setting to establish the baseline visual condition from which visual change is evaluated;
- Conduct a visibility analysis (viewshed mapping and field investigations) to define the geographic area surrounding the proposed facility from which portions of the Project might be seen;
- Identify sensitive aesthetic resources to establish priority viewpoints from which further analysis of potential visual impact is conducted;

- Select key receptors from which detailed impact analysis is conducted;
- Depict the appearance of the facility upon completion of construction;
- Evaluate the aesthetic effects of the visual change (qualitative analysis) resulting from Project construction, completion and operation; and
- Identify opportunities for effective mitigation.

Consistent with NYSDEC Visual Policy, the visual study area for the VRA of the turbines extends to a minimum 5-mile radius from the outermost turbines (hereafter referred to as the "5-mile study area" or "study area"). Beyond this distance it is assumed that natural conditions of atmospheric and linear perspective would significantly reduce visual impacts. However, considering the scale of the Project and recognizing that the proposed wind turbines would, at times, be visible at distances greater than 5 miles, site-specific consideration has been given to resources of high cultural or scenic importance that are located beyond the typical 5-mile radius. For the transmission line, the structures will be much shorter (approximately 90 feet), and therefore only a 3-mile radius study area was considered.

Visual Character

Landscape character is defined by the basic pattern of landform, vegetation, water features, land use, and human development. A description of the current visual character of the Project Area is provided here to establish a baseline condition from which to evaluate visual change. Additional information and descriptions of the existing visual character of the Project Area are included in Section 2.0 of Appendix M.

The topography within the Project Area rises quickly from the gently sloping land bordering Lake Erie to a series of undulating ridge tops with deeply cut generally north-south aligned ravines and valleys. Elevation throughout the study area averages 1,000 to 1,500 feet above sea level; however, in the uplands, such as those around Boutwell Hill State Forest and Canadaway Creek Wildlife Management Area, elevations range between 1,725 to 2,150 feet above sea level. Terrain throughout the Project Area consists largely of undulating hills, ridges, and areas of smaller rounded hillocks, often bisected by ravines.

Vegetation within the Project Area includes the dominant tree species representative of the northern hardwood zone found throughout much of the Western New York region (including beech, maple, ash, elm, and hemlock). A mix of open field and woodlots is interspersed with a significant amount of secondary growth edge habitat. For the most part, this secondary growth takes the form of hedgerows, wood borders, and old fields. The Project Area landscape remains primarily rural agriculture with the exceptions of the villages of South Dayton and Forestville, which each feature greater housing and business density as well as tree-lined streets.

Water features are not a major component of the visual landscape within the vicinity of the Project. The largest water feature in the area, Lake Erie, is approximately 7.1 miles from the nearest proposed turbine.

Inventory of Visually Sensitive Resources

Because it is not practical to evaluate every conceivable location where the Project might be visible, it is accepted visual assessment practice to limit detailed evaluation of aesthetic impact to locations generally considered by society, through regulatory designation or policy, to be of cultural and/or aesthetic importance. The visually sensitive resources were selected to include the following:

- Resources of statewide significance (as required by the NYSDEC Visual Policy);
- Resources of local interest – places of local sensitivity or high intensity of use; and
- Other places for analysis, including locations not rising to the threshold of statewide significance or local interest, have been included to represent isolated pockets of visibility along sparsely populated rural roadways; most were selected based on field observations of open vistas.

For the turbine analysis, 56 visual resource locations were identified within the 5-mile study area (see Table 2.7-1 and Figures 1 and 2 in Appendix M). These include recreational and tourist resources, highway corridors/roadside receptors, and residential and community resources (i.e., hamlets and schools). Only two of these resources (the Boutwell Hill State Forest and the Overland Trail Canadaway Creek Wildlife Management Area) are of statewide significance. Of the 56 visual resources inventoried, 13 would likely be screened from the turbines by intervening landforms or vegetation and were therefore eliminated from further study. In addition to inventoried resources within the 5-mile study area, a number of visually sensitive resources outside the study area were also identified and included in Table 2.7-1. Refer to Figure A1 of the Appendix M for a map of the viewshed within 7.5 miles of the turbines.

In addition to the selection of specific visual resources, a general assessment of the study area's landscape was conducted to define the existing visual conditions. The analysis identified four types of landscape units within the study area:

- Village Center: The villages of South Dayton and Forestville and a very small portion of the village of Perrysburg lie within the 5-mile turbine study area. The villages of Silver Creek and Forestville lie within the 3-mile transmission line study area. These villages are primarily residential and commercial community centers with built structures and tree-lined streets dominating the visual landscape.
- Rural Hamlet: Rural hamlets are characterized by low- to medium-density clusters of older residential dwellings and very limited to no retail or commercial services. A number of rural crossroad hamlets exist within the study area.

These areas vary in size but are generally typified by a small group of houses in an otherwise rural area. Residences (a mix of old and new and of varying maintenance) and accessory structures (e.g., barns and garages) are a main feature of rural hamlets. Places of worship, community buildings, and general stores are also common.

- Rural Agricultural: This landscape unit is predominantly a patchwork of open land, including working cropland/pastures and a succession of old-fields transected by property-line hedgerows, occasionally interspersed with woodlots. The terrain itself consists of relatively level topography with gentle low-lying hills and small rounded hillocks, primarily under 1,000 feet high but including a few that are up to approximately 1,800 feet. Within this unit, population densities are very low and structures are sparsely located.
- Forest Land: Forest cover dominates large areas of land throughout the study area. In addition to privately owned forested land, the study area contains the Boutwell Hill State Forest and the Canadaway Creek Wildlife Management Area. Vegetation is predominantly mature, second-growth deciduous woodland with occasional stands of evergreen cover.

Viewers engaged in different activities while in the same landscape unit are likely to perceive their surroundings differently. The viewer/user groups identified within the study areas include local residents, local workers, through travelers, recreational users, and tourists. The sensitivity of recreational users to visual quality is variable, but to many, visual quality is an important and integral part of the recreational experience. Different viewer/user groups would also have different durations of time for their views. For example, a local resident would have a longer view duration than a through traveler on the NYS Thruway.

2.7.1 Construction Impacts

The construction of the Project will require using large cranes and other construction vehicles, which will be visible from locations in and around the Project Area. Components will be delivered in sections via large semi-trucks. Additional construction area will be needed at each site, and temporary construction areas will be located within the Project Area. However, the construction period is expected to be relatively short. As such, construction-related visual impacts will be temporary, short-term, and reversible and are not expected to result in prolonged adverse visual impacts on area residents or visitors.

2.7.2 Operational Impacts

Character of Project Visibility

The Project would involve the construction of 36 turbines and their associated infrastructure (electrical collection and transmission components and facilities). These turbines will have a hub height of 308 feet (94 meters) and a rotor diameter of 380 feet (116 meters) resulting in an apex of blade rotation reaching approximately 499 feet. The rotor and nacelle will be mounted on a tubular steel tower approximately 16 feet in diameter at the base and 8 feet in diameter at the hub.

Table 2.7-1 Visual Resource Visibility and Impact

Visual Resource Information				Potential Visibility				
Map ID	Receptor Name	Municipality	Inventory Type	Theoretical View Indicated by Viewshed -Excluding Existing Vegetation (See Figure 1 of Appendix M)	Theoretical View Indicated by Viewshed -Including Existing Vegetation (See Figure 2 of Appendix M)	Potential View	Approximate Number of Turbines Visible	Distance (miles) to nearest turbine/ distance zone
Recreational and Tourist Resources								
25	Hill Side Acres (Western NY Land Conservancy)	Town of Arkwright	Local Importance	●	○	○	0	2.0/Middleground
26	Arkwright Hills Campground	Town of Arkwright	Local Importance	○	○	◘	0	4.1/Background
35	Woodside Country Campground	Town of Arkwright	Local Importance	○	○	○	0	4.1/Background
36*	Boutwell Hill State Forest and Overland Trail	Town of Arkwright	Statewide Significance	○	●	●	36	3.3/Background
38*	Canadaway Creek WMA	Town of Arkwright	Statewide Significance	●	●	●	36	1.9/Middleground
20	American Legion Post 953 Ball Fields	Village of Forestville	Other Places for Analysis	●	●	◘	12	2.8/Middleground
21	Village of Forestville Park	Village of Forestville	Other Places for Analysis	●	○	◘	0	3.0/Background
22	Walnut Falls	Village of Forestville	Other Places for Analysis	●	○	◘	0	2.8/Middleground
7*	Tri-County Country Club	Town of Hanover	Local Importance	●	●	●	10	0.6/Foreground
11	Town of Hanover Park	Town of Hanover	Other Places for Analysis	○	○	○	0	3.6/Background
51	Village of South Dayton Park	Village of South Dayton	Other Places for Analysis	●	●	◘	5	3.5/Background
Highway Corridors/Roadside Receptors								
28	Center Road	Town of Arkwright	Other Places for Analysis	●	●	●	36	3.3/Background
29	Round Top Road	Town of Villenova	Other Places for Analysis	●	●	●	31	0.4/Foreground
30	Putnam Road	Town of Arkwright	Other Places for Analysis	●	●	●	31	0.8/Middleground
32	Farrington Hollow Road	Town of Arkwright	Other Places for Analysis	●	●	●	32	1.5/Middleground
33*	NYS Route 83	Town of Arkwright	Local Importance	●	●	●	36	0.5/Middleground

Table 2.7-1 Visual Resource Visibility and Impact

Visual Resource Information				Potential Visibility				
Map ID	Receptor Name	Municipality	Inventory Type	Theoretical View Indicated by Viewshed -Excluding Existing Vegetation (See Figure 1 of Appendix M)	Theoretical View Indicated by Viewshed -Including Existing Vegetation (See Figure 2 of Appendix M)	Potential View	Approximate Number of Turbines Visible	Distance (miles) to nearest turbine/ distance zone
8*	NYS Route 39	Town of Hanover	Local Importance	●	●	●	36	0.3/Foreground
9	Hurlbert Road	Town of Hanover	Other Places for Analysis	●	●	●	17	0.4/Foreground
12	Hanover Road	Town of Hanover	Other Places for Analysis	●	●	●	33	0.4/Foreground
13*	NYS Thruway (I-90)	Town of Hanover	Local Importance	●	●	●	33	4.6/Background
16	Bennett State Road	Town of Hanover	Other Places for Analysis	●	●	●	32	2.6/Middleground
17	Bradigan Road	Town of Hanover	Other Places for Analysis	●	●	●	12	1.5/Middleground
24	Creek Road	Town of Hanover	Other Places for Analysis	●	●	●	21	1.5/Middleground
55*	County Route 93	Town of Hanover	Other Places for Analysis	●	●	●	36	1.5/Middleground
39	Epolito Road	Town of Sheridan	Other Places for Analysis	●	○	◘	0	4.3/Background
2*	Prospect Road	Town of Villenova	Other Places for Analysis	●	●	●	36	0.3/Foreground
40	County Route 72	Town of Villenova	Other Places for Analysis	●	●	●	35	0.7/Middleground
41	South Hill Road	Town of Villenova	Other Places for Analysis	●	●	●	36	0.7/Middleground
43	Pope Hill Road	Town of Villenova	Other Places for Analysis	●	●	●	36	0.3/Foreground
47*	NYS Route 322	Town of Villenova	Other Places for Analysis	●	●	●	25	1.9/Middleground
48*	NYS Route 83	Town of Villenova	Local Importance	●	●	●	29	0.4/Foreground
54*	Flucker Hill Road	Town of Villenova	Other Places for Analysis	●	●	●	36	1.5/Middleground
Residential/Community Resources								
27	Hamlet of Arkwright	Town of Arkwright	Local Importance	●	○	○	0	3.3/Background
31	Hamlet of Black Corners	Town of Arkwright	Local Importance	●	●	●	10	1.5/Middleground

Table 2.7-1 Visual Resource Visibility and Impact

Visual Resource Information				Potential Visibility				
Map ID	Receptor Name	Municipality	Inventory Type	Theoretical View Indicated by Viewshed -Excluding Existing Vegetation (See Figure 1 of Appendix M)	Theoretical View Indicated by Viewshed -Including Existing Vegetation (See Figure 2 of Appendix M)	Potential View	Approximate Number of Turbines Visible	Distance (miles) to nearest turbine/ distance zone
34	Hamlet of Griswold	Town of Arkwright	Local Importance	○	○	○	0	3.8/Background
37	Hamlet of Town Corners	Town of Arkwright	Local Importance	●	●	●	29	2.7/Middleground
49*	Pine Valley Central Schools	Town of Cherry Creek	Local Importance	●	●	●	15	3.9/Background
1	Hamlet of Cottage	Town of Dayton	Local Importance	●	◘	◘	1	3.4/Background
3	Hamlet of Nashville	Town of Hanover	Local Importance	●	●	●	4	1.7/Middleground
5	Hamlet of Balltown	Town of Hanover	Local Importance	●	○	◘	1	3.3/Background
6	Hamlet of Parcells Corners	Town of Hanover	Local Importance	●	●	●	2	0.8/Middleground
10	Hamlet of Smiths Mills	Town of Hanover	Local Importance	●	●	●	15	3.0/Background
14	Hamlet of Dennison Corners	Town of Hanover	Local Importance	●	●	◘	1	3.0/Background
15	Hamlet of Keaches Corners	Town of Hanover	Local Importance	●	○	◘	0	3.2/Background
4	Hamlet of West Perrysburg	Town of Perrysburg	Local Importance	●	○	○	0	3.7/Background
23	Hawkins Corner	Town of Sheridan	Local Importance	●	●	●	26	4.2/Background
42*	Hamlet of Hamlet	Town of Villenova	Local Importance	●	●	●	16	0.8/Middleground
44	Hamlet of Wrights Corners	Town of Villenova	Local Importance	●	●	●	17	1.2/Middleground
45	Hamlet of Balcom	Town of Villenova	Local Importance	●	●	●	21	1.8/Middleground
46	Balcom Corners	Town of Villenova	Local Importance	●	●	●	23	1.9/Middleground
18	Forestville School Complex	Village of Forestville	Local Importance	●	○	○	0	2.7/Middleground
19	Village of Forestville	Village of Forestville	Local Importance	●	●	●	26	1.9/Middleground

Table 2.7-1 Visual Resource Visibility and Impact

Visual Resource Information				Potential Visibility				
Map ID	Receptor Name	Municipality	Inventory Type	Theoretical View Indicated by Viewshed -Excluding Existing Vegetation (See Figure 1 of Appendix M)	Theoretical View Indicated by Viewshed -Including Existing Vegetation (See Figure 2 of Appendix M)	Potential View	Approximate Number of Turbines Visible	Distance (miles) to nearest turbine/ distance zone
50	Village of South Dayton - Downtown	Village of South Dayton	Local Importance	●	●	◘	13	3.4/Background
52	Village of South Dayton - Residential	Village of South Dayton	Local Importance	●	●	●	25	3.4/Background
53*	Village of South Dayton/Hamlet of Skunks Corner	Village of South Dayton	Local Importance	●	●	●	23	3.2/Background
56	Chautauqua County Equestrian Trail	Towns of Charlotte and Cherry Creek	Local Importance	●	●	●	29	3.2-5/Background
Resources beyond 5 miles								
N/A	Hatch Creek State Forest	Towns of Gerry and Ellington	Statewide Significance	○	○	○	N/A	9.2/Background
N/A	Harris Hill State Forest	Towns of Gerry and Ellington	Statewide Significance	◘	◘	◘	N/A	9.2/Background
N/A	Zoar Valley Multiple Us Area	Towns of Collins, Persia and Otto	Local Importance	○	○	○	N/A	9.6/Background
N/A	Evangola State Park	Town of Brant	Statewide Significance	◘	◘	◘	N/A	10.1/Background
N/A	Seaway Trail	Various	National Significance	◘	◘	◘	N/A	6.7/Background
N/A	Lake Erie	Various	Other Places for Analysis	●	●	●	N/A	6.9/Background

Key:
◘ = Filtered through trees or limited view through structures possible
○ = No visibility indicated
● = Visibility indicated
* Visual simulations of the turbines from these locations are presented in Appendix M.

The maximum operating rotational speed of the blades would not be more than approximately 14.9 revolutions per minute (rpm) or about one revolution every four seconds. The FAA requires perimeter turbines to be lighted, as well as interior turbines, with a maximum gap between lit turbines of no more than 0.50 miles (2,640 feet). Based on these guidelines and the evaluated 36-turbine layout, approximately 22 of the proposed turbines may be illuminated at night for aviation safety. Refer to Figure 3 of Appendix M for a viewshed of the FAA lighting. One aviation obstruction light will be affixed to the rear portion of the nacelle on each turbine to be illuminated.

When visible, the well-defined vertical form of turbines on the horizon introduces a contrasting and distinct perpendicular element into the landscape. The proposed turbines will be the tallest visible elements within the view and will be disproportionate to other elements on the regional landscape. The distribution of turbines across an extended area will result in the Project being perceived as a dominant visual element. The moderately paced sweeping rotation of the turbine blades will heighten the conspicuity of the turbines, no matter the degree of visibility. Generally, the neutral off-white color of the proposed turbine tower, nacelle, and blades will be viewed against the background sky. Under these conditions the turbines will be highly compatible with the hue, saturation, and brightness of the background sky and distant elements of the natural landscape. When the turbines are backlit (turbine facing viewer is in shade) it is anticipated that it will be less compatible with the background sky. Figures A3 through A16 of Appendix M show simulations of the proposed turbines.

In addition to the wind turbines, the Project will involve the construction of gravel access roads, interconnection cables, a transmission line, an operation and maintenance facility, and an electrical substation and switchyard. It is anticipated that the interconnection cables (between the turbines) will be buried, unless engineering and environmental obstacles are encountered.

Proposed Transmission Line

The proposed approximate 5.8-mile overhead transmission line will be constructed to connect the turbines with an existing National Grid 230-kV transmission line in the town of Hanover. This connection will occur at a ±3-acre switchyard located near the northern terminus of the overhead transmission line southeast of the intersection of Bennett State Road (CR 85) and Stebbins Road (CR86) in the town of Hanover. Also, a 175- by 290-foot substation will be located at the southern terminus of the overhead transmission line north of Hurlbert Road in the town of Hanover. The proposed transmission line will be placed on wood or wood-like laminated monopole structures varying in height. Figures C3 through C4 in Appendix M show simulations of the proposed transmission line.

Project Visibility Impacts

Viewshed maps have been prepared to determine whether the Project would likely be visible from a given location. Viewshed mapping is used to define the zone of visual influence (ZVI) as well as identify the geographic area within which there is a relatively high probability that some portion of the proposed Project would be visible. Figures 1 and 2 of Appendix M show the locations within the study area with potential and/or predicted visibility of the turbines. These maps are used to quantify the percentage of visibility of the turbines in the study area and to determine the visibility at identified visual resources (see Table 2.7-1).

The vegetated viewshed map (see Figure 2 of Appendix M) indicates that one or more of the proposed turbines could theoretically be visible from approximately 32.9% of the 5-mile radius study area (based on vegetative viewshed). Approximately 67.1% of the study area will likely have no visibility of any wind turbines. Visibility is most common in the agricultural uplands from cleared lands with downslope vistas in the direction of turbine groupings.

While viewshed mapping indicates that the Project would be visible within portions of the village of South Dayton and the village of Forestville, as well as several hamlets within the study area, field confirmation through a site visit by Saratoga Associates staff determined the prevalence of mature street trees and site landscaping combined with one- to three-story residential and commercial structures. Because of this, views would generally be screened by intervening vegetation and localized structures, although at some locations filtered or framed views are likely to be visible through foreground vegetation and buildings. Direct views are more prevalent on the outskirts of these community centers where localized residential and commercial structures, street trees, and site landscaping are less likely to provide a visual barrier.

Open views of the Project would be available from many roadways where roadside vegetation is lacking. These roadways would include but are not limited to the NYS Thruway, NYS Routes 39, 83, and 322, County Routes 93 and 87, North and South Hill Road, Pope Hill Road, Farrington Hollow Road, Round Top Road, Aldrich Hill Road, Hanover Road, and Flucker Hill Road. Many of these views may be long distance (background view) and fleeting as viewers pass in vehicles or short in duration.

Views along roadways located in the center of the Project area are likely to include turbines on both sides of the road. The field of view from some locations may exceed 180 degrees. Roadways such as Prospect Road (see Figure A3), Hurlbert/Dye Road, Round Top Road, and Pope Hill Road will be impacted by such view extents.

No views, or limited views, would occur on the backside of the many hills and within ravines found throughout the 5-mile study area. Where topography is oriented toward the turbines, dense forest cover commonly prevents distant views.

The area most directly affected by views of the Project would be where there is a significant amount of cleared or agricultural land within immediate proximity to the Project. Residents and visitors would regularly encounter proximate views of one or more turbines within the foreground and near-middle ground distances (e.g., 0.50 to 1.50 miles). This is also the distance at which the visual contrast of the turbines would be greatest. Within such proximity, turbines frequently appear and disappear behind intervening foreground landforms and vegetation as viewers move about the Project Area.

Viewshed maps have also been prepared to determine whether the transmission line would likely be visible from a given location. (See Figures C1 and C2 of Appendix M for a representation of the locations within the study area with potential and/or predicted visibility of the transmission line.) The vegetated viewshed map of the transmission line (see Figure C2) indicates that part of the transmission line would theoretically be visible from approximately 24.9% of the 3-mile radius study area (based on vegetative viewshed). Approximately 75.1% of the study area will likely have no visibility of the transmission line. Visibility is most common from properties adjacent or close to the proposed transmission line, or in the agricultural uplands from cleared lands with downslope vistas in the direction of turbine groupings. Visibility from the villages of Silver Creek and Forestville would be limited by intervening buildings and vegetation.

Photo Simulations

To illustrate how the actual turbines would appear within the study area from a variety of distances and locations, 14 representative photo simulations were prepared. The specific locations of these simulations were chosen from the list of identified visual resources or their relevance to the factors affecting visual impact (considering identified visual resources, landscape units, viewer/user groups, as well as other factors, such as distance and duration/frequency of view). These simulations do not include views from all potentially affected visual resources but, rather, provide representative examples of how the Project would appear under varying circumstances of distance and landscape character. Table 7 of Appendix M lists the key receptors selected for photo simulation.

Because the visibility of wind turbines would most commonly affect local residents from rural homes, during daily travel along local roads and because most open vistas of the Project typically occur in isolated locations along rural roadways, such viewpoints were selected for photo-simulation even though there would be relatively few viewers from these locations. The locations of simulated viewpoints as well as all photo simulations, are presented in the VRA (see Appendix M).

Photo simulations were also prepared for the transmission line, which are provided as Figures C3 and C4 in Appendix M. Viewpoints were selected to provide typical views of the transmission line.

Shadow Flicker

Under certain conditions, the rotating blades of wind turbines can cast shadows moving across nearby structures and the surrounding landscape. When the repeating change of light intensity falls across a narrow opening, such as a window, it can cause a flicker effect at a receptor location as the shadow appears to flick on and off. This effect is known as shadow flicker. Shadow flicker may occur outside when light passes through vegetation or other structures, but mostly the shadow would be perceived as it moves across the landscape. Shadow flicker would only occur when certain conditions coincide. This would include the following:

- The turbine blades are rotating during daylight hours (sunrise to sunset), as shadow flicker would not occur at night. Shadow flicker would not occur when the turbine blades are in line with the sun or the turbine is not in operation.
- The sun is low in the sky (e.g., evenings and mornings), since shadows cast during midday would be close to the turbine and within safety buffers.
- Shadow flicker would not occur on foggy or overcast days when daylight is not sufficiently bright to cast shadows.
- A receptor is within 10 rotor diameters of the turbine. Beyond this distance, atmospheric conditions would prevent a clear shadow, and a receptor would only be able to perceive that there is an object in front of the sun.

Because of constantly changing solar aspect and azimuth, shadows would be cast on specific days of the year and may pass a stationary receptor relatively quickly. Shadow flicker would not be an everyday event or be of extended duration when it does occur. Additionally, shadow flicker is most likely to occur during early morning or late afternoon hours; thus, specific receptor locations may experience shadow flicker, but the occupants of the receptor may either be inactive or absent. For example, receptors such as residential dwellings located to the west of a turbine will fall within the shadow zone shortly after sunrise when affected residents are typically asleep with shades drawn. Receptors located to the east of a turbine would fall within the shadow zone shortly before sunset (see Figure 5 in Appendix M for typical shadow pattern). In this case, receptors such as schools or office buildings are likely to be unoccupied during this time.

In order to assess the potential for the Project to cause shadow-flicker an analysis was conducted using *WindPRO 2.7 Basis* software (WindPro) and associated shadow module. Based on the dimensions of the GE 116 2.3 MW turbine, sunshine probabilities, topography, and turbine and receptor locations, WindPro was used to calculate the theoretical number of hours per year the shadow of a rotor would fall at any of the 243 existing structure locations (receptors) within a 3,806-foot radius of any proposed turbine location, which is equal to 10 rotor diameters of the proposed turbine model. Receptors were identified through a combination of air-photo interpretation and field verification. (See Appendix M for a detailed discussion of data inputs and results of the shadow-flicker analysis.) WindPro uses a series of conservative assumptions to calculate the likely hours per year of shadow flicker at each inventoried receptor. These assumptions include, among others, that every receptor is conservatively assumed to have windows 1 meter above the ground in all directions (WindPro refers to this as "green house" mode). WindPro also considers monthly average sunshine probabilities and the annual average possible operating hours and wind direction, based on historic weather data. While topography is considered in the calculation of shadow time totals, vegetation coverage is not. Visual screening is also possible at many receptors and may reduce the actual amount of shadow flicker received.

Table 8 of Appendix M summarizes the number of hours per year each inventoried structure would theoretically fall within the shadow zone of one or more proposed turbines, based on topography only. The table also notes where vegetation will likely block views of the turbine, which could reduce shadow flicker impacts. The locations of inventoried structures are included on Figure 6 and Figure 7 of Appendix M.

Based on the expected values of the 243 studied receptors located within 3,608 feet of any turbines (based on topography only):

- Fifty-four (22.2%) will theoretically not be impacted.
- Two (0.8%) will theoretically be impacted 0 to 2 hrs/yr.
- Eighty-two (33.8 %) will theoretically be impacted 2 to 10 hrs/yr;
- Seventy-one (29.2%) will theoretically be impacted 10 to 20 hrs/yr.
- Twenty-six (10.7%) will theoretically be impacted 20 to 30 hrs/yr.
- Five (2.1%) will theoretically be impacted 30 to 40 hrs/yr.
- Three (1.2%) will theoretically be impacted 40+ hrs/yr.

There are no regulations or guidelines that establish an acceptable degree of shadow flicker impact on a potential receptor. Industry standard utilizes a 30-hour per year threshold that identifies residences where mitigation may be appropriate. Saratoga provided more detailed analysis of the specific impacts at these receptors (see Appendix M).

2.7.3 Mitigation

The Project design has been continuously evaluated and the proposed location of turbines reflects guidance from landowners, agencies, local authorities, and project consultants. By their very nature, modern wind power projects include highly visible facilities. The need to position wind turbines on hilltops and ridgelines cannot be readily avoided because those are the areas where the wind resources are the best. Given the scale of projects and character of the community, overall visual impacts could not be noticeably reduced through the relocation of individual turbines. Turbines have been sited at a minimum setback from residential structures as required by local laws in order to reduce impacts on individual receptors. In addition to meeting the requirements of the Towns' laws with respect to setback, Ball Hill implements corporate safety setbacks to all wind projects. Whenever practicable, Ball Hill policy directs that a wind energy turbine be located at least 500 meters (1,642 feet) from an existing residence. Such separation of uses assures maximum screening benefit of existing woodland vegetation, where such exists, and minimizes the potential for extended duration shadow flicker on nearby residences.

Section 4.0 of Appendix M provides a list of potential mitigation measures that could be implemented for the Project. To minimize visual impacts, certain aspects were included in the professional design of the turbines. The tubular style towers that have been selected, rather than skeletal or lattice frame towers, will minimize textural contrast and provide a simpler, visually appealing form. While the FAA mandates that white or light gray be used for aviation safety, these colors are also well suited to minimizing visual contrast with the background sky. Where specifications permit, non-specular paint will be used on all outside surfaces to minimize reflective glare. Additional mitigation measures will be considered on a case-by-case basis.

Ball Hill has developed a decommissioning plan, which is included in Appendix N of this DEIS, to address the removal of turbines when the Project is taken out of service.

There are no regulations or guidelines that establish an acceptable degree of shadow flicker impact on a potential receptor. Based on the limited number of hours any structure may be impacted, shadow flicker is not expected to create an adverse impact on most nearby residential dwellings. For residences where shadow flicker is greatest, mitigation of the disturbance in a specific room may be implemented by the use of window shades or vegetative screening. Any additional mitigation measures, such as curtailment, will be taken on a case-by-case basis where shadow flicker or other adverse visual impacts pose a significant problem for a landowner in accordance with the Project complaint resolution process described in Section 1.2.2.

2.8 Sound

An evaluation of the potential operational sound impacts from the Project on residents in the vicinity of the Project Area began with the background sound level survey described in detail in the 2008 DEIS (attached hereto as Appendix A), Section 2.15, Sound. The 2008 evaluation was completed using a computer modeling analysis of turbine sound levels based on the then-current design of the Project. This section provides an updated assessment for the Project of impacts of sound, a new sound-level assessment report (see Sound Level Assessment Report, Ball Hill Wind Project [Epsilon Associates, Inc. 2015] in Appendix O of this SDEIS), identifies potential sound impacts from construction and operation of the Project, and discusses mitigation measures.

The Towns of Villenova and Hanover's wind energy facility laws require that operational sound levels at non-participatory residences existing at the time of construction shall not exceed a day-night sound level ("A"-weighted) (L_{10}) of 50 decibels (A-weighted) (dBA). If the ambient sound level at a non-participating residence is L_{10} 50 dBA or over (Town of Villenova), or L_{10} 48 dBA or over (Town of Hanover), the limit changes to the ambient L_{10} dBA plus 5 dBA. For more details on the wind energy laws of the Town of Villenova and Town of Hanover see Appendix O of the 2008 DEIS (attached hereto as Appendix A).

In the 2008 DEIS, Hessler Associates Inc. (Hessler) developed a sound study for the proposed layout and showed the analysis utilizing the "A"-weighted 24-hour equivalent continuous sound level (L_{eq}) standard modeling using sound emission data provided by vendors (see Appendix L of the 2008 DEIS, attached hereto in Appendix A). GE (vendor utilized during 2008 DEIS) and other vendors do not provide L_{10} emission data for their turbines; so that the L_{eq} levels resulting from the modeling must be converted to L_{10}. Hessler provided their analysis in 2008 utilizing L_{eq} and, subsequently, Ball Hill utilized the L_{eq} emission data in the current modeling analysis.

A sound level that is recorded/modeled in L_{10} indicates that during any hour of the day, 10% of the time (or for six minutes in one hour), the L_{10} sound level is exceeded (i.e., 90% of the time the actual sound level is quieter than this value and 10% of the time it is louder). As such, the L_{10} captures the near-maximum level occurring during the measurement, which from a practical standpoint, usually consists of episodic events such as passing cars or barking dogs.

In December 2015, Epsilon Associates, Inc. (Epsilon) conducted a sound-level assessment for the Project. Ball Hill is considering up to 36 wind turbine generators (WTGs) comprised of either GE 2.3-116 or Vestas V110-2.2 models or something similar with a hub height of 94 to 95 meters and a rotor diameter of 110 to 116 meters. Epsilon's study references the 2008 Hessler study to determine existing sound levels in the vicinity of the Project, includes computer modeling to predict future sound levels when the wind turbines and associated electrical substation are operational, and compares the operational sound levels with applicable state and local criteria. Epsilon modeled the sound from the Project in L_{eq} based on available data, and then added 1 dBA to the modeled maximum L_{eq} turbine sound levels to convert L_{eq} to L_{10} sound levels for evaluating compliance with the local noise limits (see Appendix O of this SDEIS for the 2015 Sound Level Assessment Report prepared by Epsilon).

2.8.1 Construction Impacts

Sound from construction activities associated with the Project is likely to cause minor temporary impacts at a number of locations in the Project Area. Because construction activities would constantly move from place to place around the Project Area, it is unlikely that there would be significant impacts at any single receptor for an extended period of time. In general, the maximum potential sound impact at any single residence might be analogous to a few days to a few weeks of repair or repaving work occurring on a nearby road or to the sound of machinery operating on a nearby farm. At residences that are more than 1,600 feet from turbine locations (the Ball Hill self-imposed setback from a residence), the sounds from turbine site construction are likely to be perceived as far off sound from diesel-powered earthmoving equipment, such as exhaust sound, irregular engine revs, backup alarms, gravel dumping, and the clanking of metal tracks. Construction of other Project infrastructure (e.g., access roads) may be closer to some residences and would include sound from similar sources.

The magnitude of sound impacts depends on the type of construction activity, the sound level generated by various pieces of construction equipment, the duration of the construction phase, and the distance between the source of the sound and the receiver. Construction activities associated with the Project were evaluated using a conservative maximum potential sound scenario, under which it was assumed that all construction equipment was used during an hour on site. A construction sound algorithm was used to calculate projected sound levels at various distances and sensitive receptor locations. This algorithm considered construction equipment sound specification data, usage factors, and relative distances. The following logarithmic equation was used to compute projected sound levels:

$$Lp1 = Lp2 + 10Log(U.F.) - 20\log(\mathrm{d1}/\mathrm{d2}):$$

where:

Lp1 = The average noise level (dBA) at a noise-sensitive receptor due to the operation of a unit of equipment throughout the day.
Lp2 = The equipment maximum noise level (Lmax) (dBA) at a reference distance (d2).
U.F. = A usage factor that accounts for a fraction of time an equipment unit is in use throughout the day.
d1 = The distance from the receiver to the unit of equipment in feet.
d2 = The distance at which equipment noise level data is known (reference distance = 50 feet).

Noise levels (maximum sound level [L_{max}]) and usage factor data for construction equipment were obtained from Table 9.1 in the Federal Highway Administration (FHWA) Highway Construction Noise Handbook (U.S. Department of Transportation [USDOT] FHWA 2006).

Construction of the Project is anticipated to consist of several phases, including access road construction, foundation construction, tower and turbine installation, and substation construction. The sound levels expected for each phase of construction are shown in Tables 2.8-1 through 2.8-4. As presented in the table, the farther away the sound receptor is from the activity, the lower the sound level at the receptor.

Access Roads

The A-weighted sound pressure levels for all construction equipment that would be utilized during road construction are presented in Table 2.8-1. At 50 feet, the cumulative A-weighted sound pressure level would be 90 dBA.

Table 2.8-1 Maximum Sound Levels for Access Road Construction

Construction Equipment	Quantity	Usage Factor (%)	L_{max} SPL at 50 Feet (dBA)	Lp1 (dBA) Distances				
				50 Feet	250 Feet	500 Feet	1,000 Feet	1,500 Feet
Excavator	2	40	81	80	66	60	54	50
Grader	2	40	85	84	70	64	58	54
Bulldozer	2	40	82	81	67	61	55	51
Compactor	2	20	83	79	65	59	53	49
Water Truck	2	40	76	75	61	55	49	45
Dump Truck	8	40	76	81	67	61	55	52
Loader	2	40	79	78	64	58	52	48
Truck-mounted Jackhammer	1	20	90	83	69	63	57	53
Total[1]	--	--	--	**90**	**76**	**70**	**64**	**60**

Source: USDOT FHWA 2006.

Notes:
[1] The total is a logarithmic sum.

Key:
dBA = A-weighted decibels
L_{max} = maximum sound level
Lp1 = The average sound level at a sound sensitive receptor due to the usage factor throughout the day.
SPL = sound pressure level

Wind Turbine Generator Foundations

The A-weighted sound pressure levels for all major construction equipment that would be utilized during WTG foundation construction are presented in Table 2.8-2. The cumulative construction sound level would be 90 dBA at a distance of 50 feet.

Table 2.8-2 Maximum Sound Levels for WTG Foundation Construction

Construction Equipment	Quantity	Usage Factor %	L_{max} SPL at 50 Feet (dBA)	Lp1 (dBA) Distances				
				50 Feet	250 Feet	500 Feet	1,000 Feet	1,500 Feet
Excavator	2	40	81	80	66	60	54	50
Grader	2	40	85	84	70	64	58	54
Bulldozer	1	40	82	78	64	58	52	48
Compactor	1	20	83	76	62	56	50	46
Water Truck	1	40	76	72	58	52	46	42
Dump Truck	4	40	76	78	64	58	52	48
Loader	1	40	79	75	61	55	49	45
Truck-mounted Jack-hammer	1	20	90	83	69	63	57	53
Concrete Truck	6	40	79	83	69	63	57	53
Total[1]				**90**	**76**	**70**	**64**	**60**

Source: USDOT FHWA 2006.

Notes:
[1] The total is a logarithmic sum.

Key:
dBA = A-weighted decibels
L_{max} = maximum sound level
Lp1 = The average sound level at a sound sensitive receptor due to the usage factor throughout the day.
SPL = sound pressure level

Wind Turbine Generators

Table 2.8-3 presents the A-weighted sound pressure levels for all major construction equipment that would be utilized during the erection of WTGs.

Table 2.8-3 Maximum Sound Levels for WTG Erection

Construction Equipment	Quantity	Usage Factor %	L_{max} SPL at 50 Feet (dBA)	Lp1 (dBA) Distances				
				50 Feet	250 Feet	500 Feet	1,000 Feet	1,500 Feet
Crane	3	16	81	78	64	58	52	48
Forklift	2	40	85	84	70	64	58	54
Flatbed Truck	4	40	74	76	62	56	50	46
Manlift	2	40	85	84	70	64	58	54
Total				**88**	**74**	**68**	**62**	**58**

Source: USDOT FHWA 2006.

Key:
dBA = A-weighted decibels
L_{max} = maximum sound level
Lp1 = The average sound level at a sound-sensitive receptor due to the usage factor throughout the day.
SPL = sound pressure level

Substation

The A-weighted sound pressure levels for all construction equipment that would be utilized during substation construction are presented in Table 2.8-4.

Table 2.8-4 Maximum Sound Levels for Substation Construction

Construction Equipment	Quantity	Usage Factor %	L_{max} SPL at 50 Feet (dBA)	Lp1 (dBA) Distances				
				50 Feet	250 Feet	500 Feet	1,000 Feet	1,500 Feet
Excavator	2	40	81	80	66	60	54	50
Grader	2	40	85	84	70	64	58	54
Bulldozer	1	40	82	78	64	58	52	48
Compactor	1	20	83	76	62	56	50	46
Water Truck	1	40	76	72	58	52	46	42
Dump Truck	4	40	76	78	64	58	52	48
Loader	1	40	79	75	61	55	49	45
Truck-mounted Jack-hammer	1	20	90	83	69	63	57	53
Concrete Truck	4	40	79	81	67	61	55	51
Manlift	1	20	75	68	54	48	42	38
Total				**89**	**76**	**70**	**64**	**60**

Source: USDOT FHWA 2006.

Key:
dBA = A-weighted decibels
L_{max} = maximum sound level
Lp1 = The average sound level at a sound-sensitive receptor due to the usage factor throughout the day.
SPL = sound pressure level

Using the algorithm described above, the maximum total sound level that might temporarily occur from turbine foundation construction at the closest residences (at least 1,642 feet away) would be 60 dBA and 58 dBA for turbine erection. As a point of reference, the sound level of average speech is considered to be 60 dBA at a distance of 3 feet. Such levels would not generally be considered acceptable on a permanent basis or outside of normal daytime working hours (when all Project construction is planned), but as a temporary, daytime occurrence, construction sound of this magnitude may go unnoticed by many in the Project Area. For others, Project construction sound may be considered an unavoidable minor and temporary impact.

Construction of the non-turbine components of the Project may occur closer to residences (i.e., access roads and collection lines). Construction of non-turbine components would also be conducted in phases. Equipment utilized would differ in each phase of construction. In general, heavy equipment would be used during ground clearing and excavation activities. Sound generated during construction is primarily from diesel engines that power the equipment. Of note, equipment presented in Tables 2.8-1 through 2.8-4 would not be used in every phase of construction and the equipment utilized would not generally be operated continuously at full load, nor would the equipment always be operated simultaneously. Construction sound levels presented in Table 2.8-1 through 2.8-4 are those which would be experienced by people outdoors. A house would provide significant attenuation for those who are indoors (up to 27 dBA lower with windows closed).

Sound levels of up to 90 dBA are only likely to occur at, or within 50 feet of any specific construction site. Consequently, construction activities at each turbine site would result in sound levels that are substantially below 90 dBA at homes, due to the setback distance of at least 1,600 feet. There may be some cases, however, where road construction or trenching operations occur closer to homes (within 50 feet), and a short-term sound level of 90 dBA or more would theoretically be possible. However, during much of the construction phase, the construction-generated sound should be similar to the agricultural activities that occur in the Project Area.

Sound from the daily vehicular traffic to and from the Project Site during construction is expected to be negligible in magnitude relative to normal traffic levels (even given the rural nature of the roads in the Project Area). It would also be temporary in duration at any given location and would be limited to normal daytime work hours.

2.8.2 Operational Impacts

2.8.2.1 Sound Model Results and Impact Assessment

No significant or sustained adverse sound impact over baseline conditions is expected at non-participating homes in the Project Area. This subsection describes how operating sound levels at receptors were calculated, the assessment criteria against which sound modeling results were evaluated, and the results of the sound impact analysis.

Modeling Methodology

Epsilon predicted sound impacts associated with the two types of proposed WTGs and proposed substation transformer using Cadna/A noise calculation software (DataKustik Corporation 2015). This software, which implements the ISO 9613-2 international standard for sound propagation (*Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation*), offers a refined set of computations accounting for local topography, ground attenuation, drop-off with distance, barrier shielding, and atmospheric absorption of sound from multiple sound sources.

Conservative modeling assumptions were made to account for the occasional occurrence of conditions that may favor propagation of sound from the Project or increase the perceptibility of turbine sound. Because of the various conservative assumptions made about operating wind turbine sound profiles, most of the time nominal sound levels from the Project are likely to be significantly less than the "worst possible case" predicted in this analysis.

An appropriate ground absorption coefficient of 0.5 was used in the model since all of the intervening ground between the turbines and potentially sensitive receptors essentially consists of open farm fields, pasture land, or wooded areas. Although wind direction effects can be modeled with this software, to be conservative, the sound level from each turbine was assumed to be the downwind sound level in all directions simultaneously. Turbine sound levels would be less for upwind receptors. This approach yielded a contour plot that essentially shows the maximum possible sound level at any given point.

At the risk of significantly overestimating potential Project sound levels, the various conservative assumptions in the modeling analysis have been applied to ensure that Project sound does not exceed predicted levels under most normal conditions and also to allow some design margin for times when atmospheric conditions may favor sound propagation relative to average conditions, such as at night and during temperature inversions. Sound levels that are lower than those predicted in the modeling plots are expected to occur almost all of the time. The model represents a theoretical worst-case condition at any given receptor point. For additional detail on the sound modeling methodology, see the Sound Level Assessment Report by Epsilon (see Appendix O).

GE 2.3-116 Turbine Sound Level

The sound power level produced by the GE 2.3-116 was provided by the manufacturer. Sound power level is based on the measured sound pressure level at a given point and effective source radiating surface, or wave front area at that point. Knowledge of the sound power level allows the sound pressure level (SPL) of the source, the quantity perceived by the ear and measured with instruments, to be determined at any point.

The proposed GE 2.3-116 wind turbines considered for the Project have a rotor diameter of 116 meters and a hub height of 94 meters. Table 2.8-5 presents the manufacturer-provided broadband sound power level as a function of wind speed for the GE unit used as input to the model. Under peak sound-producing operating conditions, each turbine has an A-weighted sound power level (LwA) of 107.5 plus an uncertainty factor of 2.0 dBA, as provided by the manufacturer. Octave-band sound power levels are presented in Table 2.8-6 for hub height wind speeds of 10 meters per second (m/s), corresponding to the maximum LwA level output. This represents the operating condition for which compliance with the Town of Hanover and Town of Villenova sound limit of 50 dBA was evaluated.

Table 2.8-5 GE 2.3-116 Broadband Sound Power Level (dBA) as a Function of Wind Speed

	Wind Speed at Hub Height of 94 meters AGL (m/s)						
	4	5	6	7	8	9	≥10
Turbine LwA[1]	95.0	95.8	98.2	101.6	104.5	105.8	107.5

Source: Epsilon 2015.

Note:
[1] Does not include uncertainty factor

Key:
AGL = above ground level
LwA = A-weighted sound power level
m/s = meters per second

Table 2.8-6 GE 2.3-116 Octave-Band Sound Power Levels (dBA)

Turbine LwA[1] (dB) by Octave-Band Center Frequency (Hz)								
31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
78.7	88.7	95.1	99.9	102.9	102.1	97.7	89.2	68.4

Source: Epsilon 2015.

Note:
[1] Octave-band sound power levels at hub height wind speeds of 10 meters per second, not including uncertainty factor

Key:

dB = decibels
Hz = Hertz
kHz = kiloHertz
LwA = A-weighted sound power level

2.8.2.2 Assessment Criteria

There are several metrics against which the predicted sound from the Project was compared to determine if any adverse environmental impacts might occur. The first of these measures is the local regulatory sound limit; the second is a set of sound assessment guidelines published by NYSDEC. Each of these criteria is described in the DEIS (see Appendix A), Section 2.15, Sound: Environmental Setting, and has been applied to the noise modeling results detailed in Appendix O of this SDEIS and is summarized below.

Preliminary sound modeling indicated that the potential for community sound impacts exists with this Project. This early modeling work essentially performed the function of the First Level Noise Impact Assessment in the NYSDEC assessment procedure and made it clear that a Second Level Impact Assessment was necessary because nominal increases of 6 dBA or more were evident at a number of residences. The Second Level Impact Assessment noise model considered the actual circumstances of the site including any attenuation that might be afforded by such factors as terrain, vegetation, or man-made barriers (see the 2015 Sound Level Assessment Report by Epsilon in Appendix O of this SDEIS).

2.8.2.3 Comparison to Local Regulatory Limits

GE 2.3-116

As illustrated in Figure 6-1 in Appendix O, predicted L_{10} sound levels from the Project under conditions of maximum wind turbine sound power output (corresponding to a hub height wind speed of 10 m/s) are less than or equal to the 50 dBA limit specified by the Towns of Hanover and Villenova at all 335 receptors representing the closest structures to the Project.

Based on the modeling results for the GE 2.3-116, the limits specified by the Towns of Hanover and Villenova would not be exceeded at any of the receptor locations.

With regard to "pure tones," as defined in the Hanover and Villenova Town ordinances, an evaluation of the maximum one-third octave-band sound power levels for the GE 2.3-116 model, provided by the turbine manufacturer. This analysis indicates that even under conditions of maximum turbine sound power output, corresponding to hub height wind speeds of 10 m/s, no pure tones shall be emitted.

NYSDEC Criteria

The predicted L_{eq} sound levels at the nearest structures were compared to the existing ambient L_{eq} sound levels with respect to the NYSDEC criteria. The calculated background sound level for the Project area at the "critical-case" hub height wind speed of 10 m/s is 44.0 dBA. In order for the Project to meet the suggested 6 dBA cumulative increase threshold recommended in the NYSDEC guidance document, L_{eq} sound levels from the Project should remain at or below 49.4 dBA. A Project level of 49.4 dBA added to a background level of 44.0 dBA would result in a combined level of 50.5 dBA, which is 6 dBA above background, when rounded to the nearest whole decibel.

Maximum L_{eq} sound levels from the Project are predicted to be no greater than 49.0 dBA even under conditions of maximum turbine sound power output. Additionally, future sound levels combining the Project with the existing background are anticipated to remain less than or equal to 50 dBA, well below the suggested 65 dBA threshold recommended in the NYSDEC guidance document.

Based on the modeling results for the GE 2.3-116, operation of the Project would not result in an increase above background greater than the NYSDEC guideline of 6 dBA.

Low Frequency Sound

Table 2.8-7 compares predicted maximum Project-only L_{10} sound levels in the 32, 63 and 125 Hertz (Hz) octave-bands to the equivalent outdoor sound pressure levels corresponding to the NC-30 noise criteria curve recommended for bedrooms and to levels associated with "moderately perceptible vibration and rattle"

(O'Neal 2011). Results indicate that of the 10 residential locations of greatest potential Project impact, predicted sound levels are well below both relevant criteria, indicating that no low-frequency sound impacts are expected.

Table 2.8-7 Predicted Worst-Case Low Frequency Sound Levels

Modeling Receptor ID	Sound Pressure Level (dB) 31.5 Hz (dB)	Sound Pressure Level (dB) 63 Hz (dB)	Sound Pressure Level (dB) 125 Hz (dB)
185	66	63	55
184	65	62	55
117	63	61	55
186	65	62	54
116	63	61	54
164	65	61	54
187	65	62	54
188	65	62	54
190	65	61	54
191	65	61	54
NC-30 Equivalent Outdoor Sound Pressure Levels	74	66	57
Equivalent Outdoor Sound Pressure Levels for Moderately Perceptible Vibration and Rattle	71	79	NA

Key:
dB = decibels
Hz = Hertz

It should be noted that the calculated Project sound levels are conservative, as they are for all turbines operating at the same time under full load. In normal conditions, the turbines would often operate at low speeds, or not at all, and would, therefore, produce less sound. Also, as discussed previously, the model assumes that all receivers are downwind simultaneously. In reality, receivers would be upwind from some turbines, and downwind from others, so actual sound levels are anticipated to be lower.

Vestas V110-2.2

As illustrated in Figure 6-2 in Appendix O, predicted L_{10} sound levels from the Project under conditions of maximum wind turbine sound power output (corresponding to a hub height wind speed of 10 m/s) are less than or equal to the 50 dBA limit specified by the Towns of Hanover and Villenova at all 335 receptors representing the closest structures to the Project. Sound contribution from the substation operation is responsible for the sound levels exceeding 50 dBA at the three receptors south of the station.

Based on the modeling results for the Vestas V110-2.2, the limits specified by the Towns of Hanover and Villenova would not be exceeded at any of the receptor locations.

With regard to "pure tones," as defined in the Hanover and Villenova Town ordinances, an evaluation of the maximum one-third octave-band sound power levels for the Vestas V110-2.26 model, provided by the turbine manufacturer. This analysis indicates that even under conditions of maximum turbine sound power output, corresponding to hub height wind speeds of 10 m/s, no pure tones shall be emitted.

NYSDEC Criteria

The predicted L_{eq} sound levels at the nearest structures were compared to the existing ambient L_{eq} sound levels with respect to NYSDEC criteria. The calculated background sound level for the Project Area at the "critical-case" hub height wind speed of 10 m/s is 43.2 dBA. In order for the Project to meet the suggested 6 dBA cumulative increase threshold recommended in the NYSDEC guidance document, Leq sound levels from the Project should remain at or below 48.6 dBA. A Project level of 48.6 dBA added to a background level of 43.2 dBA would result in a combined level of 49.7 dBA, which is 6 dBA above background, when rounded to the nearest whole decibel.

Maximum L_{eq} sound levels from the Project are predicted to be no greater than 48.6 dBA even under conditions of maximum turbine sound power output. Additionally, future sound levels combining the Project with the existing background are anticipated to remain less than or equal to 50 dBA, well below the suggested 65 dBA threshold recommended in the NYSDEC guidance document.

Based on the modeling results for the Vestas V110-2.26, operation of the Project would not result in an increase above background greater than the NYSDEC guideline of 6 dBA.

Low Frequency Sound

Table 2.8-8 compares predicted maximum Project-only L_{10} sound levels in the 32-, 63-, and 125-Hz octave-bands to the equivalent outdoor sound pressure levels corresponding to the NC-30 noise criteria curve recommended for bedrooms and to levels associated with "moderately perceptible vibration and rattle" (O'Neal 2011). Results indicate that of the 10 residential locations of greatest potential Project impact, predicted sound levels are well below both relevant criteria, indicating that no low-frequency sound impacts are expected.

Table 2.8-8 Predicted Worst-case Low Frequency Sound Levels

Modeling Receptor ID	Sound Pressure Level (dB)		
	31.5 Hz (dB)	63 Hz (dB)	125 Hz (dB)
185	66	63	55
184	65	62	55
117	63	61	55
186	65	62	54
116	63	61	54
164	65	61	54
187	65	62	54
188	65	62	54
190	65	61	54
191	65	61	54
NC-30 Equivalent Outdoor Sound Pressure Levels	74	66	57
Equivalent Outdoor Sound Pressure Levels for Moderately Perceptible Vibration and Rattle	71	79	NA

Key:
dB = decibels
Hz = Hertz
NA = not applicable

It should be noted that the calculated Project sound levels are conservative, as they are for all turbines operating at the same time under full load. In normal conditions, the turbines would often operate at low speeds, or not operate at all, and would, therefore, produce less sound. Also, as discussed previously, the model assumes that all receivers are downwind simultaneously. In reality, receivers would be upwind from some turbines, and downwind from others, so actual sound levels are anticipated to be lower.

Transmission Line

Transmission lines can produce sound via corona discharge, which is ionization of the air surrounding a high-voltage conductor. Corona discharge from moderate voltage transmission lines, even under humid or wet conditions, is generally very low in magnitude and normally only audible directly under the lines or just beyond the ROW boundaries. Moreover, it is usually only noticeable under very calm and still conditions and not when the wind blows and the background sound level is raised by the natural sound of tree rustle. Any complaints as a result of corona discharge would be investigated and addressed as part of the complaint resolution process described in Section 1.1.2. Sound emissions from the substation transformer were also included in the model.

2.8.3 Mitigation

Potential impacts from sound were considered and avoided to the extent possible during the Project design and turbine site selection processes and through the development of responsible construction schedules. The Project Site was selected through a systematic process that considered the presence of environmental constraints including sound impacts. During the consideration of alternative Project designs (discussed in more detail in Section 1.3, Project Alternatives), areas were eliminated from consideration as turbine sites if they were located too close to a residence to comply with Town sound requirements. The final proposed location of turbines and associated facilities reflects input and guidance received from landowners and Project consultants focusing on sound impacts.

Prior to development of this SDEIS, alternative layouts were analyzed for construction and environmental constraints (see Section 1.3, Project Alternatives). Due to Ball Hill's policy of a 1,642-foot setback from all residences, sound impacts are generally minimized. In addition, differing layouts were analyzed by Ball Hill in in order to minimize sound impacts while maximizing energy output, and taking into account guidance received from landowners and Project consultants focusing on sound, land use, and ecological impacts. This proposed layout presented in the SDEIS results in a balance of energy production, environmental protection, and landowner involvement.

In advance of construction start-up, Ball Hill would place public notification as required by the Towns no later than 10 days prior to the start of construction. Construction activities would be confined to normal daytime hours (between 7:00 a.m. and 7:00 p.m.) to minimize and avoid unnecessary impacts to the community from construction sound. If any construction activity is required outside of these hours, Ball Hill would coordinate with the Towns prior to conducting such activities.

For the duration of the Project, an on-site contact person would be identified to address and resolve landowner complaints related to Project construction or operation, including any issues involving impacts from sound. Ball Hill would work with a specialist, as required, to address and remediate any problems which would be documented through the complaint resolution process (see Section 1.2.2).

In order to ensure that a Project-only sound level of L_{10} 50 dBA would not be exceeded at any non-participating homes within the Project Area as required by the Town of Villenova and Town of Hanover wind energy laws, Ball Hill would fund periodic post-construction sound testing by a qualified independent third-party acoustical measurement consultant. The scope for post-construction noise monitoring will be developed in coordination with the Towns, but will include a minimum of six representative monitoring locations selected to evaluate the pre-construction modeling results over a representative range of wind speeds and atmospheric conditions. While exceedance of sound levels in the Town Laws are not anticipated to occur, if post-construction monitoring shows an exceedance then Ball Hill will work with the Town and the effected landowner(s) to mitigate the issue.

2.9 Air Quality

The Clean Air Act (CAA) of 1970, and amended in 1977 and 1990, is the primary federal statute governing air pollution. The CAA designates six pollutants as criteria pollutants, for which National Ambient Air Quality Standards (NAAQS) have been promulgated to protect public health and welfare. The six criteria pollutants are: particulate matter (particulate matter of 10 microns or less [PM_{10}] and particulate matter of 2.5 microns or less [$PM_{2.5}$]), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead, and ozone (O_3).

Air quality in Chautauqua County as a whole is below the NAAQS thresholds, with the exception of O_3. Chautauqua County is designated as non-attainment for the 2008 O_3 standard (EPA 2015a). The design value (the air quality measurement used to define attainment, representing a three-year average of the fourth highest recorded 8-hour period per year) at Dunkirk, New York, is 0.077, the highest value outside of the New York City metropolitan area (NYSDEC 2011). There is a 75-MW coal burning electric power plant in Dunkirk, approximately 10 miles west of the Project Area (NYSDEC 2015). This plant originally operated at a 600-MW capacity, but will be closed completely in 2016 (Waldman 2015). In 2013, the Dunkirk plant was responsible for 95% of total SO_2 emissions from major stationary sources in the county, 94% of hazardous air pollutants, 65% of $PM_{2.5}$ emissions, and 59% of nitrogen oxides (NO_x) emissions (NYSDEC 2015). In 2013, the largest source of emissions in the county was Dunkirk Power LLC; closing the plant will result in a significant drop in stationary source emissions in the county. For additional information about existing air quality conditions in Chautauqua County, see Section 2.17 of the 2008 DEIS, which is attached in full as Appendix A.

2.9.1 Construction Impacts

Minor, temporary, and reversible adverse impacts on local air quality are anticipated during site preparation and construction, which may last up to 18 months. The operation of construction equipment and vehicles will produce emissions from engine exhaust and fugitive dust generation during travel on unpaved roads and other construction activities. Transportation of the wind turbine components and other construction equipment and Project components, as well as the commuting of construction employees, may result in a temporary increase in vehicle emissions. The clearing and grading of roadways, ROWs, temporary and permanent lay-down areas and crane and turbine platforms is also likely to result in temporary emissions from bulldozers, grading equipment, and haul trucks. Placement of turbines, aboveground lines and poles, and below ground lines will require cranes, bucket trucks, and trenching equipment.

Gravel and cement or cement materials for the Project will be trucked onto the Project Site. Cement may be mixed in a temporary cement plant on site, which will be required to meet all applicable state and federal air quality permitting and regulatory requirements for operation to minimize emissions to acceptable levels. Under NYS Air Quality regulations, the cement weigh hopper and all bulk storage silos on the concrete batch plant are exhausted through fabric filters, the batch drop point is controlled by a shroud or other emission control device, and cement storage operations where materials are transported by screw or bucket conveyors are exempt from permitting requirements (NYSDEC Regulations [6 NYCRR Part 201.3(c)(37-38)-Chapter III, Subpart 201-3, 37 and 38]).

The emissions from construction activities would be minor, temporary, and distributed throughout the Project Area over the construction period and, therefore, will not result in significant adverse impacts on local air quality.

2.9.2 Operational Impacts

Operation of the Project is not expected to have any significant adverse impacts on local air quality. Electric generation by fossil fuel-fired facilities contributes to serious environmental and health problems from carbon dioxide (CO_2), SO_2, NO_x, particulate matter, and mercury (Hg) emissions resulting from the combustion of the fuel. However, the Project will operate without combustion of any fossil fuels and thus will not generate these pollutants. As a result, the additional electricity generated will not create any significant negative impacts on the attainment of regional air quality standards.

Tables 2.9-1 and 2.9-2 summarize the range of annual emissions that would be produced by fossil fuel plants of various technologies generating 79 to 100 MW of electricity, an equivalent amount as projected for the Project, as well as the potential for avoided emissions based on state average 2012 emissions as reported by EPA's eGRID (EPA 2015b). This estimation only considers emissions from the power source and does not consider the full life cycle analysis of the equipment and fuel source. However, since wind turbines do not require the extraction, continuous delivery or input of fuel or operation of treatment technology, these impacts (including the extraction, transport, and waste handling) commonly associated with fossil fuels would be completely avoided throughout the life of the Project.

In the year 2012, about 162,842 gigawatt hours (GWhs; 1 GWh equals 1 million kilowatt hours) of electricity were generated in NYS. Thirty-nine percent (39%) of that electricity was produced by fossil fuel-fired generating plants in the state: 36.5% came from natural gas, 2.8% from coal, and 0.4% from oil (NYSERDA 2014). Wind power provided 1.8%, or 2,992 GWhs of New York's power in 2012 – over 29 times the 103 GWhs it provided in 2005.

In the 2015 New York State Energy Plan, the immediate and long-term impacts from energy systems based on fossil fuels are acknowledged: "New York's energy system is the source of many benefits for New Yorkers. It also causes significant impacts on the State's natural resources and public health, principally because of emissions to air of a variety of substances, some of which find their way into water and other resources. Combustion of fossil fuels is the dominant source of energy-related emissions" (NYSERDA 2015b). By prioritizing energy efficiency and renewable energy sources, NYS can continue to improve air quality in the state and address the long-term impacts of climate change.

Table 2.9-1 Comparison of Annual Emissions between the Project at 100 MW and Equivalent Fossil Fuel Plants

	Annual Emissions, TPY (Except Mercury, lbs)[1]			
	SO_2	NO_X	CO_2	Hg (lbs)
100-MW Ball Hill Wind Project (228,460 MWh per year)[2]	0	0	0	0
Equivalent Fossil Fuel Plants (228,460 MWh per year)				
Existing Upstate Coal Plant (2007 average)	685	251	243,767	18
Existing New York Dual-Fuel Oil/Gas Steam Plant (2005 average)	343	171	165,063	0
New Advanced Coal: CFB	184	69	218,408	2
IGCC	11	46	200,474	1
New Pulverized Coal (PC) – subcritical	85	70	215,438	2
Natural Gas Combined-Cycle	-	7	91,041	0
Oxycombustion - PC/SC with CCS (96.9% carbon capture efficiency)	4	93	6,740	0
Oxycombustion - PC/SC with CCS (85.5% carbon capture efficiency)	11	93	19,191	0
eGRID 2012 average total output emission rates, Upstate New York Region[3]	74	32	46,697	n/a

Notes:
[1] Based on Emission Factor Data from NYS generation where noted or the U.S. Department of Energy estimates using Best Available Control Technologies (BACT) as of 2007 (NYSERDA 2009).
[2] Based on capacity factor of 26% (2014 NYS Wind generation average) for 100 MW capacity (EIA 2015).
[3] eGRID 2012 Total Output Emission Rates (EPA 2015b).

Key:
CCS = carbon capture system
CFB = Circulating Fluidized Bed
CO_2 = carbon dioxide
Hg = mercury
IGCC = Integrated Gasification Combined Cycle
MWh = megawatt hours
n/a = not available
NOx = nitrogen oxide
PC/SC = pulverized coal/supercritical
SO_2 = sulfur dioxide
TPY = tons per year

Table 2.9-2 Comparison of Annual Emissions between the Project at 79 MW and Equivalent Fossil Fuel Plants

	Annual Emissions, TPY (Except Mercury, lbs)[1]			
	SO_2	NO_X	CO_2	Hg (lbs)
79 MW Ball Hill Wind Project (180,484 MWh per year)[2]	0	0	0	0
Equivalent Fossil Fuel Plants (180,484 MWh per year)				
Existing Upstate Coal Plant (2007 average)	541	199	192,576	14
Existing New York Dual-Fuel Oil/Gas Steam Plant (2005 average)	271	135	130,400	0
New Advanced Coal: CFB	145	54	172,542	2
New Advanced Coal: IGCC	8	37	158,375	1
New Pulverized Coal (PC) – subcritical	67	55	170,196	2
Natural Gas Combined-Cycle	-	5	71,923	0
Oxycombustion - PC/SC with CCS (96.9% carbon capture efficiency)	3	74	5,324	0
Oxycombustion - PC/SC with CCS (85.5% carbon capture efficiency)	9	74	15,161	0
eGRID 2012 average total output emission rates, Upstate New York Region[3]	59	25	36,891	n/a

Notes:
1 Based on Emission Factor Data from NYS generation where noted or the U.S. Department of Energy estimates using Best Available Control Technologies (BACT) as of 2007 (NYSERDA 2009).
2 Based on capacity factor of 26% (2014 NYS Wind generation average) for 79 MW capacity (EIA 2015).
3 eGRID 2012 Total Output Emission Rates (EPA 2015b).

Key:
CCS = carbon capture system
CFB = Circulating Fluidized Bed
CO_2 = carbon dioxide
Hg = mercury
IGCC = Integrated Gasification Combined Cycle
MWh = megawatt hours
n/a = not available
NOx = nitrogen oxide
PC/SC = pulverized coal/supercritical
SO_2 = sulfur dioxide
TPY = tons per year

The adverse environmental and health effects of air emissions from combustion of fossil fuels 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 (Price and Glick 2004; National Audubon Society 2013, 2015). Wind energy's most important environmental benefit is its complete lack of the emissions of both air pollutants and greenhouse gases that are associated with conventional fuel-based methods of generating electricity. Moreover, the development of wind-generated electricity to meet ever increasing consumer demand can reduce the need for additional fossil fuel-based sources and thus avoid additional associated emissions.

2.9.3 Mitigation

To minimize the temporary impacts of construction, the Project will establish and follow BMPs during site preparation and construction to control fugitive dust emissions. Construction activities will be monitored by an environmental supervisor hired by Ball Hill to ensure compliance with BMPs and all applicable permits and related conditions and agreements. Ball Hill will stabilize exposed stockpiles and wet down open soil surfaces as necessary to prevent significant off-site dust impacts. To further control fugitive dust emissions and for safety reasons, the travel speed of vehicles will be reduced to a maximum of 20 mph on unpaved surfaces during construction and subsequent operation of the facility. Water trucks will be used to control dust on private access roads and public roadways within the Project Area during dry periods, and construction equipment will arrive at the site clean.

2.10 Communication Signal Study

Wind turbines, if not properly sited, have the potential to cause interference, such as signal obstruction, attenuation, or other signal alteration, to some types of communication systems. To evaluate the potential for the Project to impact existing communication signals, Comsearch was contracted on multiple occasions to conduct an analysis of the existing communications signals in and near the Project Area and the potential impacts on those signals. In 2012, these studies included an amplitude modulation (AM) and frequency modulation (FM) radio report, off-air TV analysis, a licensed microwave report, and a land mobile and emergency services report (see Appendix P). In 2015, Comsearch was contracted again to perform an updated microwave 3-D GeoPlanner study, TV Report, and AM/FM Report. The following is a discussion of existing communication resources in and around the Project Area. Sections 2.10.1, Construction Impacts, and 2.10.2, Operational Impacts, discuss the impacts on communication signals from construction and operation of the Project, respectively, and Section 2.10.3, Mitigation, discuses mitigation.

Licensed Microwaves

Comsearch identified Federal Communications Commission (FCC)-licensed transmitters and repeaters whose definable paths crossed through the area planned for wind turbine development. In 2012, six microwave paths were identified that intersect the Project Area. In 2015, there was only one path (Faith Broadcasting Network, Inc.) that intersected the Project Area. Based on the Comsearch reports, there will be no significant adverse impact on these transmitters or repeaters as there is no obstruction interference (see Appendix P).

The Comsearch reports do not address narrow beam microwaves associated with existing transmitters operated by departments of the United States government as these transmitters are not subject to FCC licensing and, therefore, are not visible in the public record. The potential for interference with or obstruction of non-licensed transmitters will be addressed by the FAA and National Telecommunications and Information Administration (NTIA) in their evaluation of the Project.

The FAA conducts its own review of radar obstruction when wind turbines are registered with them in the process of seeking a "Determination of No Hazard." As required, Ball Hill submitted a Notice of Proposed Construction to the FAA for review on November 23, 2015 (see Appendix Q). During the review process, the FAA also circulates the application data to the U.S. Department of Defense (DOD) and the DHS, which will have an opportunity to provide determination of potential interference or obstruction prior to construction. The FAA has not yet responded to Ball Hill's application. The response and agency correspondence will be provided in the FEIS.

The Interdepartment Radio Advisory Committee (IRAC) of the NTIA was notified of the Project on November 19, 2015, in order to allow government operators of communication devices to comment on the Project (see Appendix Q). The

NTIA has not yet responded. The response and agency correspondence will be provided in the FEIS.

Broadcast Microwaves

Because of the spreading or omnidirectional nature of broadcast microwaves, it is not possible to select wind turbine locations that avoid their paths. However, the spreading nature of broadcast microwaves also means that the influence of potential obstructions is diminished. Specific types of broadcast communication signals in the vicinity of the Project are discussed below.

AM/FM Radio

Since the 2008 DEIS, AM/FM radio coverage has changed slightly in the Project Area. In 2012 and 2015, two licensed AM radio broadcast transmitters were identified within a 30-kilometer (km) search radius of the center of the Project Area. Both entries were for the same station (WDOE) that operates at two different transmission powers (1 kilowatts [kW] for daytime and 500 watts [W] for nighttime operations). Comsearch identified 19 FM radio transmitters in 2012 and 12 in 2015 within the 30-km search radius. Of these 12, only 11 are currently licensed and operating, five of which are translator stations that operate with a limited range. The stations are listed in Comsearch's report included in Appendix P. None of the FM stations are considered full-power stations (greater than 10 kW); four are medium-power stations (1 kW to 10 kW); five are low-power FM stations (100 W to 1 kW); and the remaining stations are all very low-power (less than 100 W).

Off-Air Television

Since the 2008 DEIS, television coverage has changed slightly. The stations that will most likely produce broadcast coverage to the Chautauqua County area, including the Project Area, will be those stations at a distance of 75 km or less. In this range, as of 2015, there were 29 database records for stations. Of these 29, 16 are currently licensed and operating. Nine of the stations are full-power digital stations and are licensed under call signs WNYB, WBBZ-TV, WKBW-TV, WIVB-TV, WGRZ, WNYO-TV, WUTV, WNLO, and WNED-TV. There are seven low-power translators broadcasting that operate on a special transmit authority and operate with limited coverage.

As of 2012, the number of off-air television broadcasts available to local communities is limited since there are only four full-power analog and digital United States channels available and one Canadian full power analog channel. There are 12 translators available, but they are low power stations with limited coverage and programming. Based on the low number of United States stations in the area, it is not expected that the off-air television stations available in the area are the primary mode of television services for the local communities. Because of this, television cable service, where available, and/or direct satellite broadcast are probably the dominant delivery mode of television service to the proposed wind facility's surrounding communities.

The full 2012 and 2015 Comsearch reports on Villenova and Hanover area television coverage is included in Appendix P.

Land Mobile Radio (LMR) and Mobile Phones

In 2012, Comsearch identified 65 land mobile radio (LMR) licenses in and around the Project Area. Comsearch also identified 34 area-wide site licenses surrounding the Project Area. These sites are listed in the Comsearch report shown in Appendix P.

In 2012, seven cellular operating licenses were identified in the Project Area (see Appendix P). The details regarding coverage areas of these systems are proprietary and not available in the public record.

2.10.1 Construction Impacts

Although construction cranes are roughly 75 feet higher than the tower hub height, they are considerably lower than the maximum tip height of the completed turbines. The construction cranes move around the Project Site during construction and do not remain in the same location for a long period of time and are typically only fully raised when installing a turbine at its permitted location. In the case of unexpected interference, any interference would be minimal and temporary. Therefore, impacts from construction of the Project would not result in significant adverse impacts on communication signals in the Project Area.

2.10.2 Operational Impacts

The full power digital stations (WNYB, WBBZ-TV, WKBW-TV, WIVB-TV, WGRZ, WNYO-TV, WUTV, WNLO, and WNED-TV) may have disruption in reception in and around the Project. The areas primarily affected would include TV service locations within 10 km of the Project and that have clear line-of-sight to a proposed wind turbine but not the respective station. Communities and homes located in these areas may have degraded reception of the following stations: WNYB, Channel 26. This is due to the multipath interference caused by signal scattering as TV signals are reflected by the rotating wind turbine blade and mast. Mitigation of these potential impacts is discussed in Section 2.10.3, Mitigation.

According to the 2015 Comsearch Communication Signal Studies in Appendix P, there are 12 FM stations within 30 km of the center of the Project Area. All of the FM stations are located at distances greater than 9.01 km (5.59 miles) from the nearest turbine. At these distances, according to Comsearch, the wind turbine effects on the FM coverage for all of these stations will be very minimal to non-existent. No problems are expected for the coverage of the full-power and medium-power FM stations near the Project Area because the separation distances from the proposed wind turbines are so great. Audio signals from AM broadcast can interact with wind turbines at close range (1 to 3 km [0.62 to 1.86 miles]). However, the two AM transmitters (same station) identified by Comsearch were approximately 10 miles from the center of the Project Area.

The frequencies of operation of LMR repeaters are generally unaffected by the presence of wind turbines. Very little, if any, change in the coverage of the repeaters will occur when the wind turbines are installed. Each LMR/emergency service network is designed to operate reliably in a non-line-of-site environment. Many of the systems are designed with multiple base transmitter stations covering a large geographic area with overlap between the adjacent sites in order to provide handoff between cells. Any signal blockage caused by the Project does not materially degrade the reception because the end user is likely to receive signals from multiple transmitter locations. In addition, the frequencies of operation for these services have characteristics that allow the signal to propagate through the Project.

Telephone communications in the cellular and personal communication system (PCS) frequency bands are unaffected by the presence of wind turbines. This is not only because of the frequencies used, but because cell communications are designed to function as a system, passing the signal to a different cell if it is weakened at the first. Cellular and PCS frequency bands are unaffected by the presence of wind turbines because the blockage caused by wind turbines is not destructive to the propagation of signals in these frequency bands. Local obstacles are also generally not a limiting factor for cellular communication frequencies because other cellular sites provide an alternative signal.

Transmitters operated by some departments of the United States government are not visible in the public record. Because obstruction or interference with government-operated radar may compromise homeland defense and security, the FAA circulates an applicant's Notice of Proposed Construction to the DHS and DOD for review prior to approval. As required, Ball Hill submitted a Notice of Proposed Construction to the FAA for review on November 23, 2015. The FAA has not yet responded. The response and agency correspondence will be provided in the FEIS.

In addition, the IRAC of the NTIA was notified of the Project on November 19, 2015, in order to allow government operators of communication devices to comment on the project. The NTIA has not yet responded. The response and agency correspondence will be provided in the FEIS.

2.10.3 Mitigation

Ball Hill will be able to avoid interference with most communication signals for the following reasons:

- The careful positioning of the turbine towers with respect to the beam patterns of microwave links avoids interference with narrow beam microwave transmissions;
- The separation distance between planned turbine towers and AM and FM radio transmission antennas is great enough so that no alteration of radio coverage in the area will occur;

- No discernible change in operation will occur to LMR, cellular and/or PCSs because of the nature of their operation and the frequency bands of operation; and
- Turbines will be sited farther than 77.5 meters away from land mobile fixed-based stations. This distance is based on the FCC interference emissions from electrical devices. As long as the turbines are located more than 77.5 meters from the stations, they will meet the FCC setback criteria for interference emissions on land mobile bands.

However, if there is a reported change in LMR coverage, the change can be easily corrected by repositioning the affected repeater, or by adding a repeater to the LMR system locations within the wind facility. Repeater antennas can be installed on utility, meteorological, or turbine towers in the wind facility, if needed.

If a cellular system or PCS operator finds that their coverage has been compromised by the presence of wind turbines, coverage can be restored by adding an additional cell or an additional sector antenna to an existing cell. Submission of claims for signal interference by turbines will be accepted up to one year after tower commissioning, utilizing the complaint resolution procedure. The initial validity of claims will be evaluated by line of sight analysis of the communication tower, turbine tower, and receptor.

After construction, Ball Hill will confirm and address on-site television reception interference issues on a case-by-case basis. Any complaints would be received by the environmental supervisor, who would follow a complaint resolution process to be developed in consultation with officials in the host communities and described in the Complaint Resolution Plan to be included in the FEIS, as noted in Section 1.2.2. Television reception from cable and satellite providers may be offered as an alternative for those homes whose off-air television reception is found to be degraded.

2.11 Traffic and Transportation

This section of the SDEIS summarizes potential impacts on existing roadways and networks for the construction and operation of the Project. Background information on ground and air transportation is provided below. Potential impacts on the primary ground and air travel routes during construction of the Project are identified and evaluated in Section 2.11.1, Construction Impacts. Section 2.11.1 evaluates potential routing for delivering construction materials and wind turbine components (i.e., blades, tower sections, hubs, nacelles, and transformers) to the Project Area. Specific points of origin for wind turbine components will not be known until approximately six months prior to construction, but those are anticipated to be from Albany to the east or Buffalo to the north.

Potential impacts on transportation, both ground and air, during operation of the Project are identified and evaluated in Section 2.11.2, Operational Impacts. Measures to minimize or mitigate these impacts are discussed in Section 2.11.3, Mitigation.

In 2008, ESS Group, Inc., conducted a Transportation Haul Route Study to identify potential impacts on highway transportation and Aviation Systems, Inc., conducted an Area Study Report to help identify and avoid potential impacts on air transportation (see Appendix N of the 2008 DEIS, attached hereto as Appendix A). Since the Project Area remains unchanged, many of the same roads would be utilized to gain access to the Project Area with large construction and turbine equipment deliveries. These studies identify and discuss the existing road network and air travel routes relevant to the Project Area.

In December 2015, Vestas Wind Systems (turbine manufacturer) had American Transport, Inc., conduct a preliminary Site Survey for the Project (American Transport, Inc. 2015). The purpose of this preliminary route survey was to evaluate the transport of wind components within the Project Area in Chautauqua County, New York, and temporarily supplement the 2008 ESS Group, Inc., study. Wind components include base, mid, and top tower sections, blades, and the nacelle of the wind turbine. This preliminary study, included as Appendix D of this SDEIS and further summarized below, evaluated a proposed haul route to the Project Site and found no impediments to or anticipated significant adverse impacts associated with transport of Project components and materials.

A full update to the 2008 ESS Group, Inc., Transportation Haul Route Study, including road improvements, will be included in the FEIS. This study will identify: transportation fleet requirements; gravel and cement truck requirements; off-site haul route alternatives; on-site haul route alternatives; traffic safety, traffic capacity, and structural capacity data; where temporary roadway widening may be required at intersections; where temporary or permanent drainage improvements may be required; and where exiting bridge structures may need to be reinforced.

Ground Transportation

This section of the SDEIS evaluates Project impacts on ground transportation that would occur during its construction phase.

Chautauqua County is served by an extensive transportation network that contains federal, state, county, and town roads. The major transportation route in the area is Interstate 90, which is a high volume northeast-southwest, limited access highway crossing the northern portion of the county, while Interstate 86 crosses the southern portion of the county in an east-west direction. The 2008 DEIS listed the following as the primary roadways in the vicinity of the Project Area that could potentially be used to access the Project Area: U.S. Route 20, U.S. Route 62, NYS Route 39, NYS Route 60, and NYS Route 83. These major roadways are typically two-lane paved roadways. The 2015 American Transport, Inc., study identified the following as the straightest way into the Project Site for all loads via I-86: NYS Route 394, Waterboro Road, U.S. Route 62, NYS Route 83, County Route 87, Danker Road, and Ball Hill Road.

The Transportation Haul Route Study produced for the 2008 DEIS makes observations and recommendations about the structural capacity of state and local roadways in the Project Area, though these must be verified by the New York State Department of Transportation (NYSDOT) and surveyors. Off-site haul routes were observed to generally be of sufficient width and condition, and the number of drainage structures, railroad crossings, bridges (over-and underpasses), and deficient intersection geometry and roadway alignment were identified. On-site haul routes were observed to have sufficient capacity and varying condition. One location with a steep grade was identified within the on-site haul route. Steep grades are road grades steeper than 10%, which make turbine transport difficult without another vehicle to assist in the move. North Hill Road, 0.45 miles north of Villenova Road, in the town of Villenova has a grade of -11.4% in the northbound direction.

Air Transportation

No significant adverse impacts are expected on air transportation during the construction or operations phases.

In 2008, Aviation Systems, Inc., was commissioned to conduct an Area Study Report of the air space in the Project Area, see Appendix N of the 2008 DEIS, attached hereto as Appendix A. In 2015, Ball Hill contracted Capitol Airspace Group (CAG) to conduct an airspace and obstruction evaluation screening for the Project. The purpose of this study was to identify obstacle clearance surfaces established by the FAA that could limit the height or location of proposed wind turbines. At the time of the study, 54 proposed wind turbine locations had been determined. Additionally, this study assessed height constraints overlying an approximately 28-square-mile study area to aid in locating optimal wind turbine sites (CAG 2015).

CAG concluded that height constraints overlying the study area range from 1,400 to 2,552 feet above mean sea level and are associated with the instrument departure and approach procedures at Chautauqua County/Dunkirk Airport as well as low altitude en route airways. Proposed wind turbines that exceed these obstacle clearance surfaces would require an increase to departure minimum climb gradients, instrument approach procedure minimum altitudes, and/or en route airway minimum altitudes. If the FAA determines either of these impacts to constitute a substantial adverse effect, it could be used as the basis for the issuance of determinations of hazard. Ball Hill submitted a Notice of Proposed Construction to the FAA for review on November 23, 2015 (see Appendix Q). USGS elevation data indicates that these surfaces would limit typical wind development in northern and western sections of the study area, as well as in areas of higher terrain. As a result of CAG's preliminary findings, the initial potential number of 54 turbine locations has been reduced to the current 36 to minimize any adverse navigational impacts.

The Project is located within the lateral boundaries of the Dunkirk VORTAC 0.75° screening surface. Thirty-five of the proposed wind turbine locations are located within this screening surface and would likely exceed this screening surface. Proposed structures that have a substantial adverse effect on navigational aids may receive FAA determinations of hazard regardless of impact on other resources defined in this SDEIS. Wind turbines may still have an impact on a navigational aid even though they do not exceed either of the screening surfaces.

Currently the Dunkirk VORTAC is in the process of being decommissioned by the FAA. Any adverse air navigational impacts associated with the current proposed Project configuration will be identified by the FAA and mitigated accordingly.

The Project is located in an area designed as "Yellow" by the FAA/DOD long-range radar screening tool. Impact on surveillance systems can result in determinations of hazard regardless of the lack of impact on the physical airspace surfaces described in this SDEIS.

The AGL Clearance Map is based on USGS National Elevation Dataset 1/3 Arc Second data which has a vertical accuracy of generally +/- 7 meters. Therefore, the AGL Clearance Map should only be used for general planning purposes and not exact wind turbine siting (see Figure 10b in Appendix R). In order to avoid the likelihood of a determination of hazard, proposed wind turbine heights must adhere to the height constraints depicted in the Composite Map (see Figure 10a in Appendix R). Ball Hill utilized the results from the CAG's study to aid in the turbine locations analyzed in this SDEIS and will continue to utilize the results as micro-siting for other environmental constraints occurs. The Project turbine locations were also submitted to the FAA for review. Turbine locations were selected in order to avoid impacts on all published and unpublished air approaches as identified by Aviation Systems and the FAA. The FAA has not yet responded. The response will be provided in the FEIS. The 2015 CAG Report is included in Appendix R of this SDEIS.

2.11.1 Construction Impacts

Ground Transportation

Within the Project Area, construction and delivery vehicles are anticipated to travel over select public roadways, as well as the new private access roads constructed specifically as part of the Project to access turbine sites. As part of the Transportation Haul Route Study in the 2008 DEIS, the local area road network was inspected to determine suitability for oversize/overweight (OS/OW) special hauling vehicles that would be needed to transport wind turbine components to the turbine sites and determine the best access routes within the Project Area. Because the points of origin of the turbine components would not be determined until about six months prior to construction, it became necessary to study off-site haul routes from the north, east, south, and west. Preferred haul routes from each direction were identified and transportation constraints and construction upgrades associated with each preferred alternative were identified. These were updated with the 2015 American Transport, Inc. preliminary site survey, which indicated that no major transport obstacles or obstructions were noted on the route from I-86. Figures 2.11-1 and 2.11-2 illustrate the potential off-site haul routes to the Project Area.

In general, the traffic volume on the identified haul routes that provide access to the Project Area is less than other major roadways in the area. The increase in traffic due to construction-related activities is not expected to significantly impact the overall usage of major public roads in the areas and, as such, only limited duration delays to local traffic are expected during construction of the Project.

Traffic associated with the construction of the Project would consist of delivery vehicles for turbine components, materials associated with turbine site construction and assembly, and personal vehicles for workers. Delivery vehicles would range in size from oversized load tractor-trailers (used to deliver tower sections, turbine nacelle, rotor blades, and cranes) to smaller vehicles, such as dump trucks, concrete trucks, fuel delivery trucks, vans, and pickup trucks. Personnel vehicles would consist of automobiles and light trucks.

Inbound OS/OW loads would be required to deliver turbine components to the Project Area. Many of the trailer configurations can be reduced in length after delivery is made so that when leaving the Project Area, their length and weight would be greatly reduced making it easier and quicker to exit. Some improvements to local roads and expansion of intersection turns would be required to facilitate the use of OS/OW vehicles. Details on types of OS/OW vehicles to be utilized and estimated numbers of OS/OW inbound loads will be provided in the Transportation Haul Route Study update to be provided in the FEIS.

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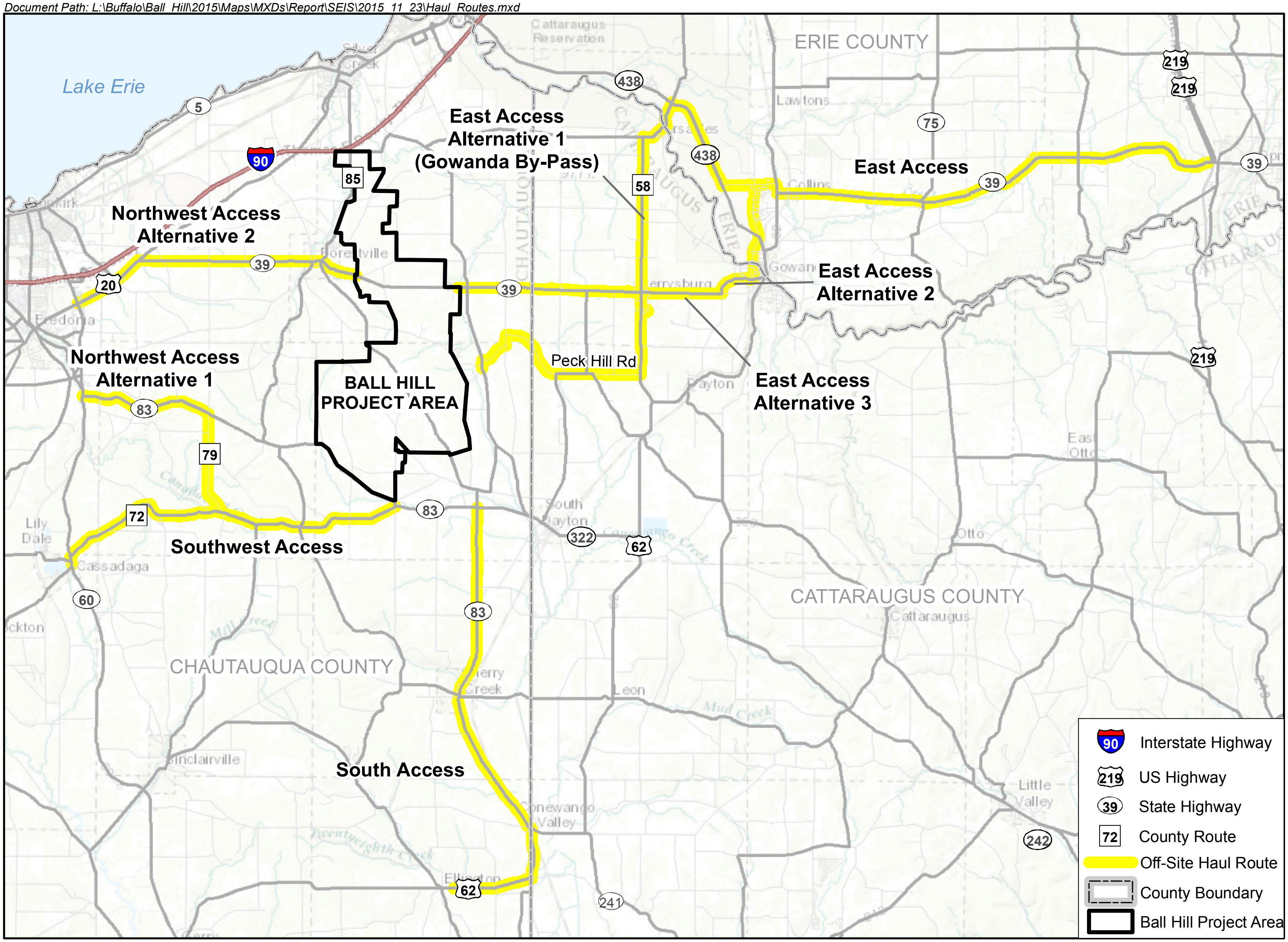

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Figure 2.11-1
Potential Off-Site Haul Route Roadways
To be Utilized During Construction
Chautauqua County, New York
Ball Hill Wind Energy, LLC

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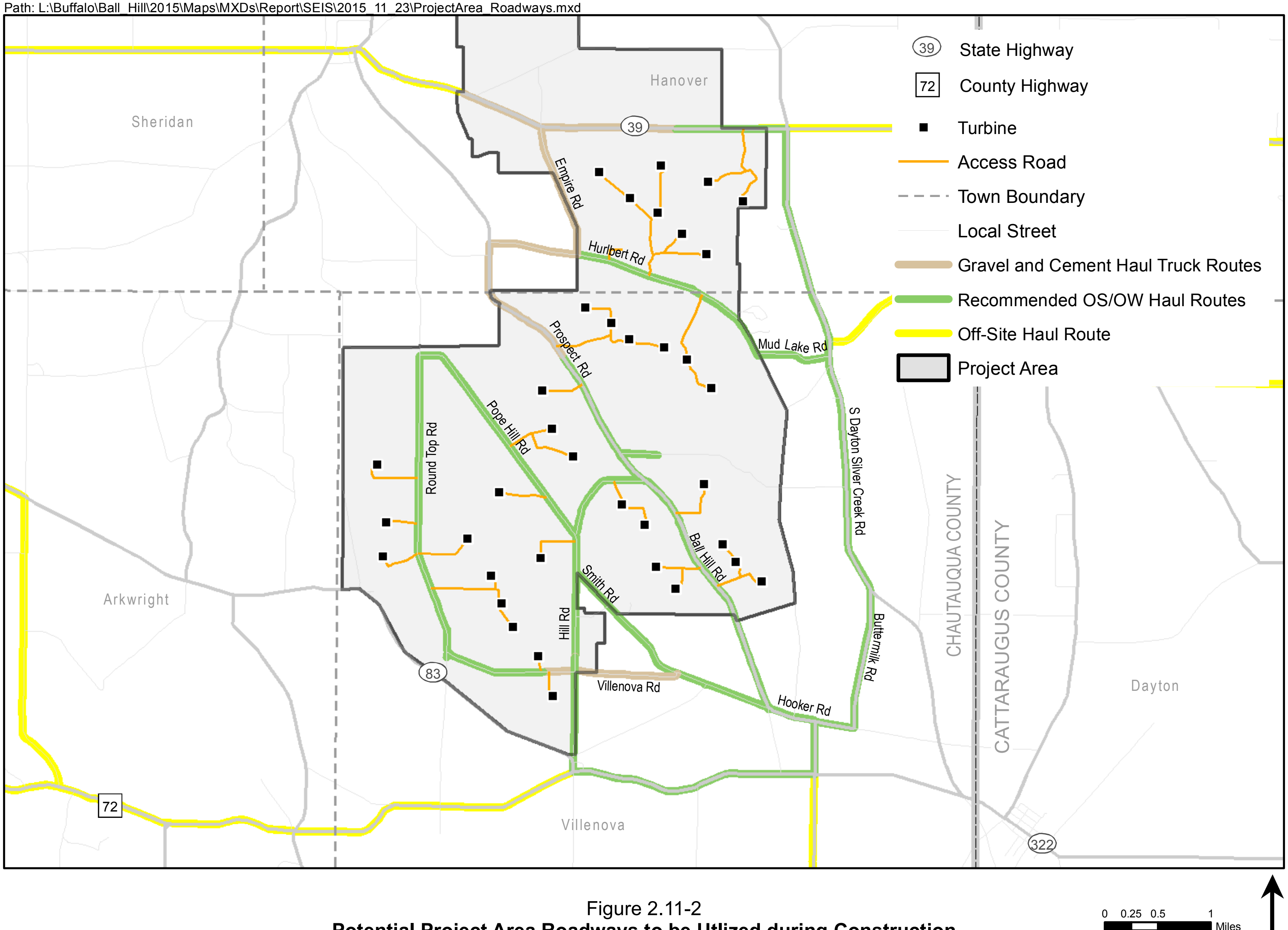

Figure 2.11-2

Potential Project Area Roadways to be Utlized during Construction

Ball Hill Wind Project

Chautauqua County, New York

Ball Hill Wind Energy, LLC

Typical intersection improvements may include traffic sign removal, compacted gravel widening, drainage ditch filling, and/or drainage pipe culvert extensions. Once the gravel widening has been constructed, traffic signs are reset to their original location on portable or removable posts to they can be easily moved when oversize loads pass through the intersection.

Standard construction vehicles, such as pickup trucks, concrete trucks, dump trucks and work vans, would be used on a regular basis during the construction period to deliver supplies, personnel, and other Project necessities. Suppliers for the Project would use the most direct feasible route to the Project Site, based on the roads identified in the American Transport, Inc., preliminary site survey (see Appendix D) and Figures 2.11-1 and 2.11-2. The route would be dependent on location of construction activities. Construction vehicles would not have difficulty reaching the Project Site using any local roads and would comply with all town, county, and state ordinances; however, the increased volume of dump trucks and concrete trucks that would be experienced during construction may slow traffic on some routes during work hours and may result in some damage to road surfaces. Concrete trucks are expected to be the heaviest of these small construction vehicles, requiring a road capable of safely handling a vehicle with a gross weight of approximately 80,000 pounds (40 tons).

Impacts on the local traffic and transportation during construction may include:

- Temporary delays associated with construction at some intersections to facilitate the turning radius of OS/OW vehicle;
- Temporary traffic delays at intersections and on small roads (behind slow-moving or parked trucks);
- Temporary traffic delays at intersections resulting from increased stopping distances required for trucks to safely negotiate turns;
- Damage to road surface, structure, and culverts, especially during rainy periods in the spring and fall;
- Creation of noise and dust from the passage of large construction vehicles; and
- General safety concerns of more larger vehicles on the local road network.

As part of the Project approval process, Ball Hill will perform inspections of all roads that will be used for transportation and equipment delivery for the Project. The inspection will result in an existing conditions survey to be undertaken in cooperation with road and transport officials prior to commencement of construction. This report will likely include a video survey and evaluate road features, such as embankments, guard rails, and culvert pipe conditions and a detailed photographic survey of the haul route network as it currently exists and again immediately prior to construction. It will also identify utility lines that need to be raised to accommodate passage of the delivery vehicles and their loads.

In the 2008 DEIS, the only intersection that was identified within the Project Area where the horizontal sight distance (at 50 to 60 mph) may be less than 525 feet is East Lake Road at CR 93. Just south of this intersection is a 1,300-foot horizontal curve. For vehicles traveling north on CR 93, the sight distance to the East Lake Road intersection is approximately 530 feet (the distance required to stop under normal conditions traveling 50 to 60 mph is 525 to 650 feet).

NYSDOT Special Haul Permits

Because Ball Hill will use public highways under the jurisdiction of NYSDOT for OS/OW vehicles transporting wind turbine components, Special Hauling Permits from that agency will be required for each OS/OW load. Additional mitigation may also be required by NYSDOT concerning equipment movements on roads under NYSDOT jurisdiction. In the NYSDOT permitting process, a final route survey will be developed prior to construction that identifies road improvements necessary to accommodate delivery and construction vehicles when rerouting is impractical. These improvements commonly include widening of narrow roads, rounding of corners at intersections, and reinforcing crossings at culverts and bridges. Route structural conditions, including road bearing capacity, bridge crossings/bridge conditions, and culvert crossings/culvert conditions, will be assessed by NYSDOT as well as a qualified transportation logistical planner as transport details are developed. This assessment will include an inventory of the number of bridge and culvert crossings, including those represented in access roads, and will identify appropriate mitigation measures. Additionally, there may be a need for the installation of temporary culvert extensions for use during construction to accommodate road widening.

Overhead wires, such as telephone, electric, Internet, and fiber optic cables will be evaluated by an experienced NYS surveyor to verify the vertical clearance of overhead wires along the off-site routes during the Special Hauling Permit application process.

Physical characteristics of bridges, such as allowable weight loads, bridge type, and condition will be determined by the NYSDOT Structures Division during the actual Special Hauling Permit application process. The route surveyor will submit a route plan to NYSDOT for review and NYSDOT will query the NYSDOT GIS database for a bridge report to identify potential bridge-related problems along the route.

Air Transportation

Ball Hill utilized recommendations from CAG in their layout design for this SDEIS. Therefore, construction of the Project is not expected to have significant impact on air transportation in the area. Ball Hill submitted the Project turbine locations to the FAA for review. Turbine locations were selected in order to avoid impacts on all published and unpublished air approaches as identified by Aviation Systems and the FAA. The FAA has not yet responded with their Determination of No Hazard. FAA response will be provided in the FEIS.

2.11.2 Operational Impacts

Ground Transportation

No road traffic impacts are expected once the Project becomes operational. A limited number of light trucks would occasionally access the Project Site for service and maintenance of the facilities (estimated two truck trips per day); however, existing road traffic would be light.

Air Transportation

The FAA has not yet responded to a request to determine impacts of operating turbines on air traffic, but is expected to issue "Determination of No Hazard" letters for each proposed turbine. The determinations will be provided in the FEIS. The Chautauqua County/Dunkirk Airport (DKK) is the closest airport to the Project and impacts are not anticipated on published and unpublished air approaches for this airport. The Project will not impact low altitude en route airways or minimum vectoring altitudes on any regional airport surveillance radars. The Project is located outside the boundaries of all Military Special Use Airspace. Impact to long-range radars was determined to be unlikely. A proposed FAA Lighting Plan has been prepared for the Project and is provided as part of Appendix M of this SDEIS. In addition, based on FAA guidelines, it is estimated that 22 of the proposed turbines will be illuminated at night for aviation safety. Consequently, the operating Project will not have an adverse impact on air transportation.

2.11.3 Mitigation

Ground Transportation

Construction vehicle traffic, with the exception of commuting vehicles carrying Project personnel to and from the job site, will be limited to the hours of 7:00 a.m. to 7:00 p.m. Deliveries of equipment along school bus routes will be coordinated with the school districts to avoid disruption of bus services or potential safety concerns.

If circumstances require that oversized construction vehicles utilize the complete road width, appropriate measures will be taken (e.g., flagging) to safely stop traffic temporarily (typically less than 5 minutes) on affected roads. Ball Hill will coordinate traffic safety measures with the Towns, county, and NYSDOT.

Additional mitigation techniques will be implemented to minimize impacts on homes, schools, and businesses:

- To the extent practicable, planned haul routes will avoid more densely occupied locales;
- Scheduled transport vehicles will be confined to the approved travel routes;
- To the extent practicable, equipment transport and heavy construction traffic will be set up on a one-way travel pattern through the Project Area to minimize the possibility of two-way construction traffic interferences;

- Parking at the turbine construction sites will be restricted to company vehicles. Centralized parking for personal vehicles will be provided at the laydown areas identified in Figure 1.1-2 and at other sites to be determined and provided by the individual contractors. A shuttle service for laborers and contractors will connect these parking areas with the active turbine sites. In addition, limited parking will be available on the individual access roads constructed as part of the Project;
- Gravel drive-offs from site access roads will serve to remove much of the tire mud from vehicles leaving the construction areas. Mechanical street sweepers will be deployed as required to remove mud from local streets when it accumulates. The environmental compliance officer will have a direct line of communication with Town representatives to address any complaints in a reasonable but prompt manner, according to the complaint resolution process (see Section 1.2.2);
- Water trucks will be used to control dust during dry periods;
- Local emergency response units will be updated weekly with the location of construction activities and with the schedule/routing for relocating equipment (cranes) that might block travel on local roads;
- Mandatory safety orientation for contractors and employees will include discussion of vehicle safety concerns;
- Flags, signs, and flagmen will be used during construction where necessary for safe travel. In addition, site-specific traffic safety plans will be developed as part of the Highway Occupancy Permit and submitted to the appropriate parties with the NYSDOT and Chautauqua County for access roads within their respective jurisdiction, and described in the Safety Program File (see Appendix G); and
- Police or pilot cars will be used to safely warn motorists in advance of an intersection with a bad horizontal site distance while OS/OW equipment delivery vehicles are moving through the intersection.

A road use agreement will be negotiated with state, county and/or local highway departments. The road use agreement will designate approved routes and commit the cost of both improvements and repairs to Ball Hill's account. Details of road use agreements will be determined and negotiated with appropriate counterparties. General types of improvement and repairs may include repaving, patching, shoulder repair, and culvert repair. Ball Hill will have an obligation to perform any upgrades to the roadways and permanent structures that will be required to allow passage of construction vehicles and will have an obligation to maintain the roads in a safe and passable condition throughout the construction period. At the completion of construction Ball Hill will return the roadways used for construction of the Project to pre-construction conditions or better. Ball Hill and the Towns will enter into the road use agreement before construction, in accordance with the Villenova Town Law and the Wind Energy Conversion Systems (WECS) Law of the Town of Hanover (2008), to ensure the surveys are complete and mitigation measures are properly identified and installed prior to construction. To comply with Villenova Town Law, traffic routes will be established in conformance with criteria set for in section 690.11 A. Thereof, a public improvement bond will be posted prior to the issuance of any building permit in an amount, determined by the Town Board, sufficient to compensate the Town for any damage to local roads, and Ball Hill will undertake snow plowing on any seasonal use highway that may be utilized for Project construction. Ball Hill will also include a plan for disseminating traffic route information to the public, and all applicable state, county, and municipal highway authorities and superintendents whose roads are included in the route plan. Notification will include the number and type of vehicles and their size, their maximum gross weight, the number of round trips, and the dates and time periods of expected use of designated traffic routes. Given the use of the above-mentioned mitigation measures, there will be no significant adverse impact to the local road system.

For intersections where the horizontal sight distance (at 50 to 60 mph) may be less than 525 feet, care shall be taken to use police and pilot cars to safely warn motorists in advance of the intersection while OS/OW transport vehicles move through the intersection. The Ball Hill environmental supervisor will advise the Town's environmental monitor(s) of intersections that OS/OW transport vehicles will utilize.

When Project construction is complete, the intersections will be restored to their original condition and the disturbed areas will be reseeded as required.

Final equipment routes will be provided to the Towns, associated highway superintendents, and the Towns' engineers prior to completion of the road use agreement to be established between Ball Hill and the Towns of Villenova and Hanover and Chautauqua County.

Agencies and organizations that will provide vehicle routing information will be identified and prior to Project execution, interested parties may obtain vehicle routing information from the following sources:

- The FEIS for the Ball Hill Wind Project Chautauqua County, New York, which upon publication will be available at Villenova and Hanover Town halls; and
- A toll-free hotline will be established for public information and for complaint reporting, as specified by the Complaint Resolution Plan described in Section 1.2.2, to be included in the FEIS. This number will be posted at the Hanover and Villenova Town halls and published in the local newspapers prior to construction.

2.12 Land Use

This section describes the potential impacts that construction and operation of the Project would have on land use within the Project Area and identified mitigation measures to avoid or minimize such impacts to the maximum extent practicable. This section updates the information included in the 2008 DEIS, Sections 2.23 and 2.24, Land Use (attached hereto as Appendix A), although the Regional Land Use Patterns and Community Facilities sections from the 2008 DEIS remain unchanged and have not been repeated here.

Overall, the Project is compatible with local and regional land use, as it will not preclude existing uses or interfere with proposed future uses outside of the established Project Site. The Project would result in site-specific temporary/construction-related impacts as well as permanent operations-related impacts, as discussed in this section. Turbines would also alter the visual landscape in the community (see Section 2.7, Visual Resources). Construction impacts would be temporary, short term and, for the most part, reversible. It is estimated that it would take about two years until temporary access roads and other construction-related land disturbances revert back to preconstruction conditions. Permanent impacts resulting from conversion of natural areas to built facilities and the conversion of one vegetative community to another would exist for the life of the Project (20 years) (i.e., impacts on forested lands), but it is expected that there could be a return to preconstruction conditions after decommissioning.

Since the Lead Agency accepted the 2008 DEIS (see Appendix A), new land cover data from the USGS has been released to the public. Figure 2.12-1 and Table 2.12-1 show the existing land use for the 13,659-acre Project Area.

Table 2.12-1 Existing Land Use, Ball Hill Wind Project (acres)

Land Use/Land Cover	Town of Villenova	Town of Hanover	Total
Agricultural[1]	3,443	2,184	5,627
Forested[2]	4,745	2,884	7,630
Developed[3]	216	178	394
Open Water	5	4	9
Total[4]	**8,409**	**5,250**	**13,659**

Source: Homer et al. 2015.

Notes:

1 Agricultural land use includes the USGS Land Use/Land Cover categories of Pasture/Hay; Grassland/Herbaceous; Cultivated Crops; and Emergent Herbaceous Wetlands. Section 2.4, Wetlands, provides a summary of the acreages of wetlands that were field-delineated within the survey corridor.

2 Forested land use includes the USGS Land Use/Land Cover categories of Deciduous Forest; Evergreen Forest; Mixed Forests; Scrub-Shrub; and Woody Wetlands. Section 2.4, Wetlands, provides a summary of the acreages of wetlands that were field-delineated within the survey corridor.

3 Developed land use includes the USGS Land Use/Land Cover categories of Developed, Open Space; Developed Low Intensity; and Developed High Intensity.

4 Table totals may not add up due to rounding.

As stated in the 2008 DEIS, development in both towns where the Project is located is controlled by zoning laws and regulations. This SDEIS addresses shadow flicker, ice throw, noise, cultural and visual resources, and other requirements of the Villenova Town Law and Hanover Town Law. The Local Law No 1. of 2007: Wind Energy Facilities Law of the Town of Villenova and the WECS Law of the Town of Hanover (2008) are described briefly in the following sections. Copies of these laws are also provided in Appendix O of the 2008 DEIS, attached hereto as Appendix A. The Wind Energy Facilities Law of the Town of Villenova was amended in 2008 and again in 2010. These minor amendments address fees and schedules and would not affect construction and operation of the Project. The Hanover Wind Law has not changed since the 2008 DEIS.

In the town of Villenova, zoning regulations and zoning districts were developed for the municipality. The Zoning Law of the Town of Villenova (1997) divides the town into the following districts: Agricultural and Residential (ARI), Transitional (T), and Industrial Park “Floating” (IP).

On April 11, 2007, the Town Board approved Local Law No. 1 of 2007: Wind Energy Facilities Law of the Town of Villenova (Villenova Town Law). The purpose of this local law is to promote the effective and efficient use of the Town’s wind energy resource. The Town achieves this purpose through regulating the placement of WECSs so that the public health, safety, and welfare are not jeopardized. According to the law, WECS would be permitted in the Wind Overlay/District Zone, which may be created in the ARI, T, or IP districts, upon issuance by the Town Board of a Special Use Permit. Each WECS has to follow the construction standards and transportation and safety measures described in the Villenova Town Law (see Appendix A). These measures are presented in appropriate sections of the SDEIS. For example, a standard stating: Construction of the WECS shall be limited to the hours of 7 a.m. to 7 p.m., is discussed as a mitigation measure within the sound section of this SDEIS (see Section 2.8, Sound). In addition, each WECS in the town of Villenova shall be set back (as measured from the center of the WECS) a minimum distance of:

- 500 feet from the nearest site boundary property line, except the setback shall be 500 feet where the boundary is state, county, Town, or village-owned property (Section 690.12.E.1);
- 500 feet from the nearest public road (Section 690.12.E.2);
- 1,000 feet from the nearest off-site residence existing at the time of application, measured from the exterior of such residence (Section 690.12.E.3);
- 100 feet from state-identified wetlands. This distance may be adjusted to be greater or lesser at the discretion of the reviewing body, based on topography, land cover, land uses, and other factors that influence flight patterns of resident birds (Section 690.12.E.4); and

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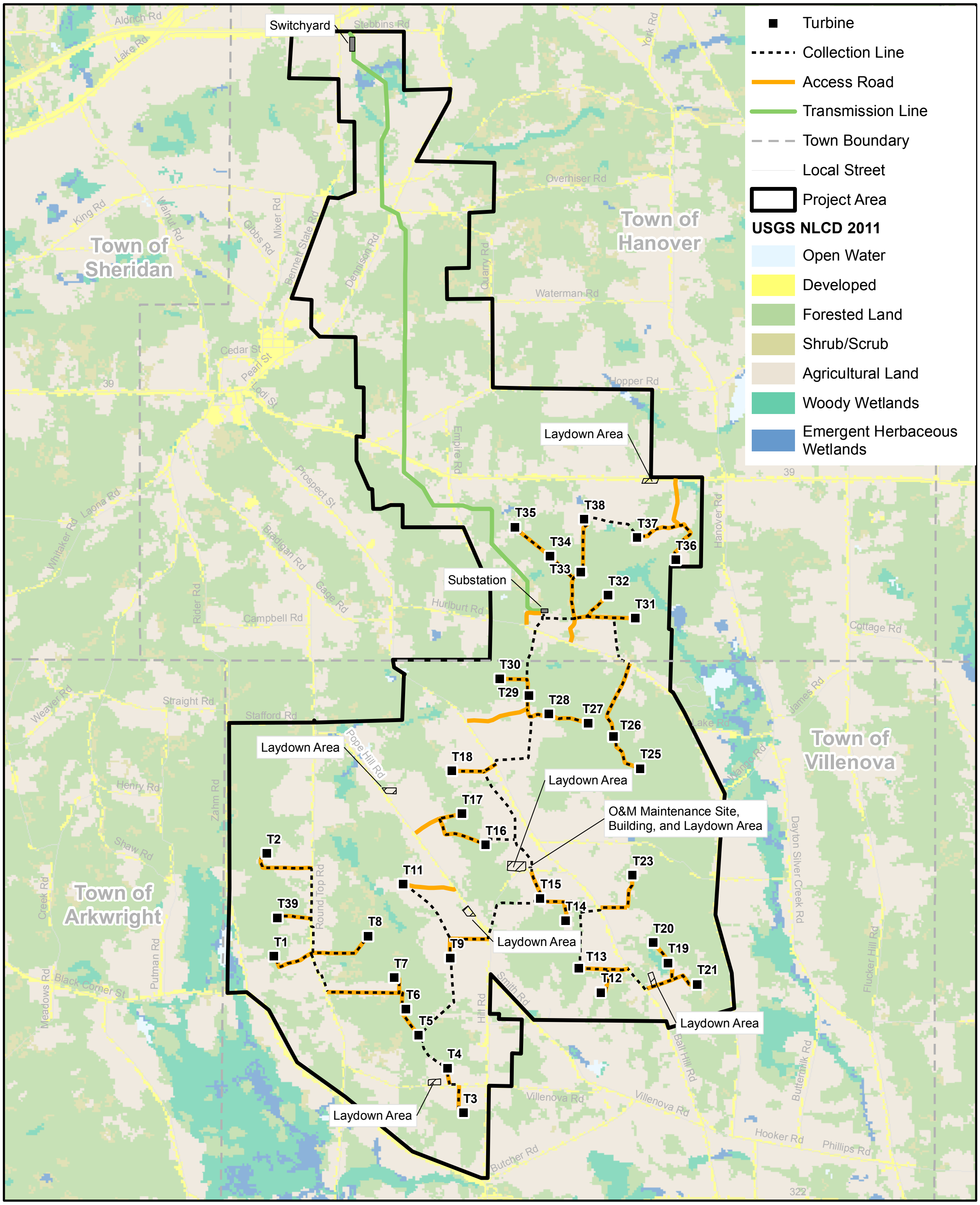


Source: USGS National Land Cover Dataset, 2011.

Figure 2.12-1
Land Use Types
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

- 500 feet from gas wells, unless waived in writing by the property owner (Section 690.12.E.1).

In 1998, the Town of Hanover adopted the "Town of Hanover Zoning Laws." The ordinance divides the town into six zoning districts: A-1 Agricultural and Residential District; R-1 Residential District (Hanford Bay); R-2 Residential and Recreational District (Sunset Bay); R-3 Residential and Recreational District (Hamlet of Irving); B-1 Business District; and I Light Industry District. The portion of the Project Area located in the town of Hanover is located within an A-1 Agricultural and Residential District. The Town of Hanover also has a comprehensive plan (2000). The Hanover Town Board passed a local law in July 2008 to update its regulations for WECSs (Article XIV of Town of Hanover Zoning Laws: Wind Energy Conversion Systems [Hanover Law]) . The intent of the Hanover Law is to accommodate the necessary infrastructure for the provision of utility-scale and small wind-powered electricity generation so that they may be developed in a manner compatible with the general health, welfare, and safety of the public. It is also intended to address the noise, lighting, visual, aesthetic, and land use compatibility aspects of WECS.

According to the Hanover Law, WECS would be permitted in the Wind Overlay/District Zone, which may be created in the Agricultural and Residential (A-1) District, upon issuance by the Town Board of a Special Use Permit. As in the town of Villenova, each WECS has to follow the construction standards and transportation and safety measures as described in the local law, the WECS law (see Appendix A). These measures are presented in appropriate sections of the SDEIS. In addition, each WECS in the town of Hanover shall be set back (as measured from the center of the WECS) a minimum distance of:

- 500 feet from the nearest site boundary property line, ROW, easements, and power lines and 500 feet where the boundary is with state, county, town, or village-owned property (Section 1606.2.a);
- 500 feet from the nearest public road (Section 1606.2.b);
- 1,000 feet from the nearest off-site residence, school, church, or historic structure existing at the time of application, as measured to the exterior of such structure (Section 1606.2.c.);
- 100 feet from state identified wetlands. This distance may be adjusted to be greater at the discretion of the reviewing body, based on topography, land cover, land uses, and other factors that influence flight patterns of resident birds (Section 1606.2.d.); and
- 500 feet from gas wells, electric or gas distribution lines unless waived in writing by the property owner and well owner or applicable utility owner (Section 1606.2.e.).

In addition to meeting the requirements of the Towns' laws with respect to setback, Ball Hill implements corporate safety setbacks to all wind projects. Whenever practicable, Ball Hill policy directs that a wind energy turbine be located at least 500 meters (1,642 feet) from an existing residence. Ball Hill will also follow National Fuel Gas Supply Corporation's Pipeline Encroachment Policy and consult with National Fuel as needed if Project facilities have the potential to encroach on utility lines. Ball Hill will do the same for other utilities as necessary.

Figures 2.12-2 and 2.12-3 show setbacks established in accordance with Villenova and Hanover Town Laws. Table 2.12-2 presents a summary of the construction and operation impacts of the Project on existing land use/land cover at the Project Site.

2.12.1 Construction Impacts

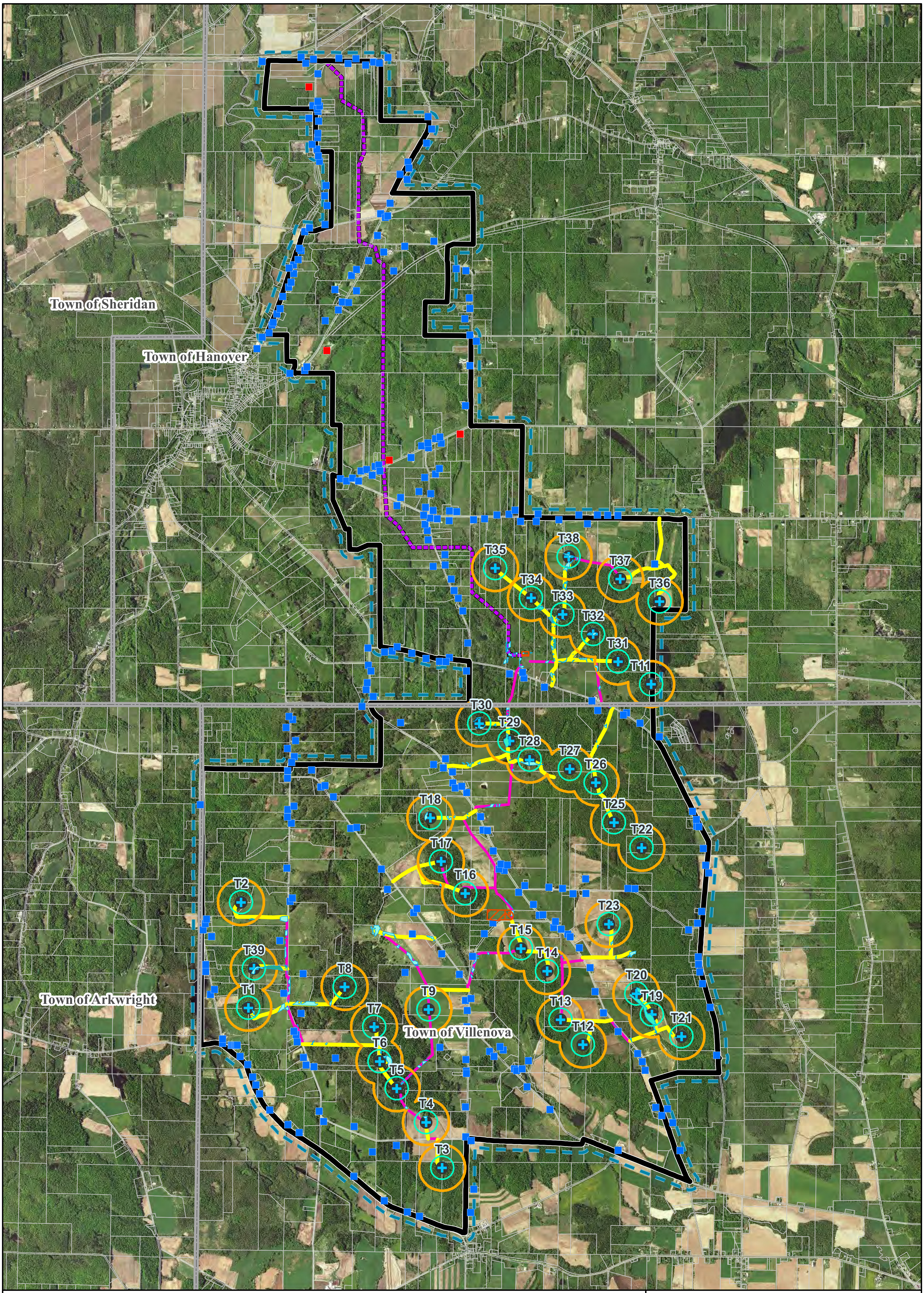
Project Site Land Use

Activities associated with construction of turbines, access roads, electrical collection lines, and the transmission line would result in temporary impacts on agricultural land and open space and permanent impacts on forestland. Impacts on forestland are considered permanent because the clearing and the periodic maintenance to control woody vegetation surrounding the turbines, access roads, and electrical collection lines would result in the permanent conversion of forestland to other vegetative communities (i.e., successional shrubland and old field).

Construction activities (i.e., staging areas, access roads, collection line ROWs, transmission line ROW, substation, and switchyard) would impact a total of 115.6 acres of agricultural land, 68.6 acres of which would be restored to existing conditions post construction. An area of 8.1 acres of developed land would be impacted, of which 5.9 acres would be restored to existing conditions. Construction activities would permanently impact 69.5 acres of forested land (see Table 2.12-2).

Turbines

Construction of the turbines would result in the disturbance of 46.2 acres of agricultural land and the permanent conversion of 90.9 acres of forested lands. A total of 27.4 acres of the disturbed agricultural land would be restored to existing conditions post construction. A maximum 230-foot radius from the turbine pedestal staging area would be utilized at each turbine location for laying out equipment, turbine rotor assembly, and stockpiling topsoil. Within the staging area, an approximate 270- by 240-foot area would be cleared and graded to a slope of 2% or less to facilitate the layout of turbine components. Disturbance outside of this smaller 270- by 240-foot area would generally be limited to tree cutting necessary for rotor assembly and storage for excess topsoil, subsoil, or woody material including roots, logs, and/or wood chips. In some instances the staging area will be reduced to minimize impacts on wetlands.



Wind Overlay District
Wind Overlay District 500' Buffer
Turbine
500' Radius
1000' Radius
Substation
Laydown Area

O & M Building Site
Access Road
Collection
Transmission Line
Uninhabited Building
House
Town Boundary

Wetland
Unknown
Other
PEM
PFO
PFO/PEM
PSS
PSS/PEM

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Feet
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1 inch equals 4,000 feet

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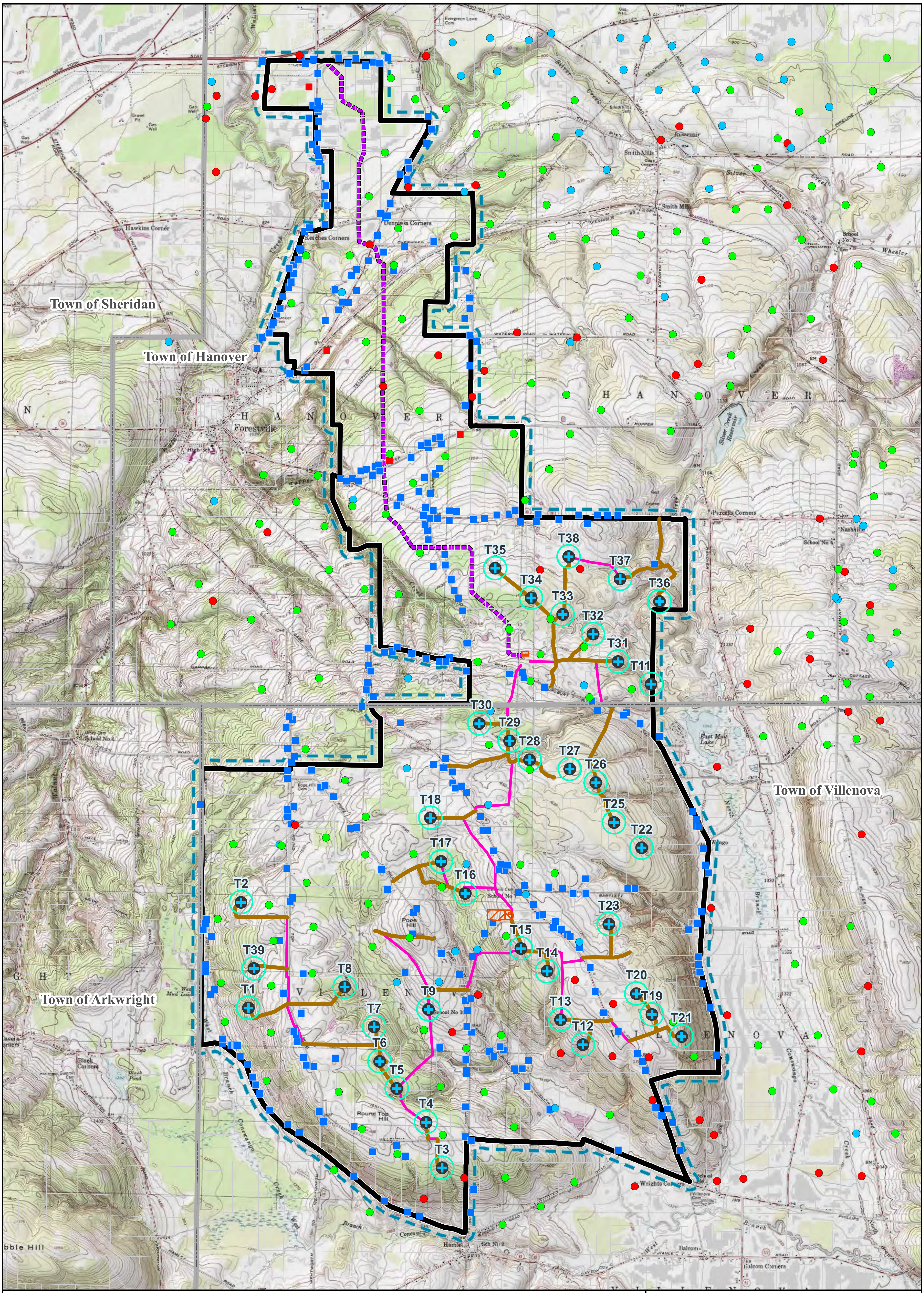
APPROVED BY: DATE:

Figure 2.12-2 Zoning Setback Map, Ball Hill Wind Project



Wind Overlay District
Wind Overlay District 500' Buffer
Turbine
500' Radius
Substation
Laydown Area
O & M Building Site
Access Road
Collection
Transmission Line
Uninhabited Building
House
Town Boundary
Gas Well - Active
Gas Well - Inactive
Gas Well - Unknown

0 4,000
Feet
1:48,000
1 inch equals 4,000 feet

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Figure 2.12-3 Utility Setback Map, Ball Hill Wind Project

Table 2.12-2 Summary of Project Land Use Impacts, Entire Project Site

Land Use/Land Cover	Construction Impacts (Permanent and Temporary Impacts) [acres]			Project Operational Impacts (Permanent Impacts) [acres]			Areas to be Restored to Existing Condition After Construction (Temporary Impacts) [acres]		
	Total[1]	Town of Hanover	Town of Villenova	Total[1]	Town of Hanover	Town of Villenova	Total[1]	Town of Hanover	Town of Villenova
Turbines (including staging area)[2]									
Agricultural[3]	46.2	15.2	31.0	18.8	6.5	12.3	27.4	8.7	18.7
Forested[4]	90.9	15.2	75.6	90.9	15.2	75.6	0.0	0.0	0.0
Developed[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laydown Areas/O&M Facility[6]									
Agricultural	23.3	1.7	21.6	2.6	0.0	2.6	20.7	1.7	19.0
Forested	0.3	0.0	0.3	0.3	0.0	0.3	0.0	0.0	0.0
Developed	2.6	1.4	1.2	0.2	0.0	0.2	2.4	1.4	1.0
Access Roads[7]									
Agricultural	38.0	5.8	32.1	16.9	2.9	14.0	21.0	2.9	18.1
Forested	28.8	11.2	17.6	28.8	11.2	17.6	0.0	0.0	0.0
Developed	1.0	0.1	0.8	0.4	0.1	0.3	0.6	0.1	0.5
Collection System[8]									
Agricultural	23.6	4.7	18.9	0.3	0.3	0.0	23.3	4.4	18.9
Forested	6.9	2.5	4.4	6.9	2.5	4.4	0.0	0.0	0.0
Developed	2.8	0.2	2.6	0.0	0.0	0.0	2.8	0.2	2.6
Transmission Line System[9]									
Agricultural	30.7	30.7	0.0	27.1	27.1	0.0	3.6	3.6	0.0
Forested	33.5	33.5	0.0	33.5	33.5	0.0	0.0	0.0	0.0
Developed	1.7	1.7	0.0	1.6	1.6	0.0	0.1	0.1	0.0

Table 2.12-2 Summary of Project Land Use Impacts, Entire Project Site

Land Use/Land Cover	Construction Impacts (Permanent and Temporary Impacts) [acres]			Project Operational Impacts (Permanent Impacts) [acres]			Areas to be Restored to Existing Condition After Construction (Temporary Impacts) [acres]		
	Total[1]	Town of Hanover	Town of Villenova	Total[1]	Town of Hanover	Town of Villenova	Total[1]	Town of Hanover	Town of Villenova
Total									
Agricultural	161.8	58.1	103.6	65.8	36.9	28.9	96.0	21.2	74.7
Forested	160.3	62.4	97.9	160.3	62.4	97.9	0.0	0.0	0.0
Developed	8.0	3.4	4.6	2.2	1.7	0.5	5.8	1.7	4.1
Total acreage	**330.1**	**124.0**	**206.1**	**228.3**	**101.0**	**127.3**	**101.8**	**22.9**	**78.8**

Notes

1 Individual values may not add up to totals due to rounding.

2 Turbines impacts include turbine pad and staging areas.

3 Agricultural land use includes the USGS Land Use/Land Cover categories of Pasture/Hay; Grassland/Herbaceous; Cultivated Crops; and Emergent Herbaceous Wetlands. Section 2.4, Wetlands, provides a summary of the acreages of wetlands that were field-delineated within the survey corridor.

4 Forested land use includes the USGS Land Use/Land Cover categories of Deciduous Forest; Evergreen Forest; Mixed Forests; Shrub/Scrub; and Woody Wetlands. Section 2.4, Wetlands, provides a summary of the acreages of wetlands that were field-delineated within the survey corridor.

5 Developed land use includes the USGS Land Use/Land Cover categories of Developed Open Space and Developed Low Intensity.

6 Laydown construction impacts include impacts from the construction laydown areas. Operational impacts include the O&M building site and O&M building which will be constructed on top of a construction laydown area.

7 Access Road construction impacts are based on Access Road construction ROW (in some cases including collocated collection lines); operational impacts are based on 18-foot permanent access roads.

8 Collection System construction impacts include collection ROW along existing road, new collection ROW, and the substation; operational impacts include the substation footprint.

9 Construction impacts are based on the 80-foot wide cleared ROW needed for construction and installation of transmission line poles, the 20-foot wide ROW needed for access road associated with the transmission line, and the switchyard. Project operation impacts are associated with the switchyard footprint and the 12-foot wide permanent access roads. Impacts from pole placement are considered negligible.

The reduction in staging area size at certain turbines will be reflected in the impact calculations and shown for each turbine staging area on the site plans attached to the FEIS. There will be no turbines or turbine pads located within a delineated wetland or jurisdictional buffer areas. Other than the turbine pedestals, transformers and the turbine crane pads, disturbed areas within the staging area would be restored with subsoil and stockpiled topsoil.

Laydown Areas

Construction within the laydown areas, would result in the disturbance of 23.3 acres of agricultural land; the permanent conversion of 0.3 acre of forested lands; and the disturbance of 2.6 acres of developed land. Other than the O&M building site and O&M building, disturbed areas would be restored with subsoil and stockpiled topsoil.

The above-mentioned laydown land use impacts include the construction of the O&M building within the town of Villenova. The permanent structure of the O&M building would be sited on 0.1 acre of agricultural land, and the associated laydown area/O&M building site will be located on 10.1 acres of agricultural land, 0.02 acre of forested land, and 0.3 acre of developed land.

Typical O&M Building (front)

Typical O&M Building (back)

Access Roads

Temporary 36-foot access roads would be installed within a varying construction ROW as micro-siting for the Project occurs (i.e., reduced in wetlands), as described in Section 1.2, Detailed Description of the Proposed Action. After construction is complete, the width of these roads would be reduced to 18 feet. Access road construction would result in the impacts on 38.0 acres of agricultural land and the permanent loss of 16.9 acres of agricultural land. Access road construction would result in the permanent loss of 28.8 acres of forested land. The forested land cleared on each side of a temporary access road (15.5 acres total, 9.6 acres in the town of Villenova and 6.0 acres in the town of Hanover) would result in the permanent conversion to other vegetation communities (i.e., successional shrubland, old field). The construction of access roads would also impact 1.0 acre developed land, 0.6 acre of which would be restored to its existing condition after construction.

Collection System

Impacts resulting from construction of the underground sections of the collection system would generally be temporary in nature and would result in the disturbance of 23.6 acres of agricultural land, 6.9 acres of forested land, and 2.8 acres of developed/open space.

Underground collection lines would be used for the main collection system. As currently designed, the system would include 21.3 miles of underground collection lines. Underground collection lines would be installed, to the extent possible, alongside Project access roads within areas of temporary disturbance. In areas where underground collection lines would not be installed adjacent to an access road, the ROW width would range between 25 feet where one circuit is installed and up to 40 feet where two circuits would be installed in parallel. Underground collection lines would be installed via direct burial using either a trenching machine or a track hoe. The cables would generally be buried in a 48-inch-deep trench, with a final depth to the top of the cable of 42 inches consistent with the applicable guidelines from NYSDAM. Where multiple circuits are installed parallel to each other, a separation of approximately 12 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, would be evaluated. Blasting would not proceed until it has been approved by the appropriate authority(ies). Following installation of collection lines within agricultural fields, normal farming operations and practices would continue; therefore, future agricultural usage would not be permanently impacted by construction and operation of the collection line. However, installation of the collection lines would result in some permanent conversion of forest land to other vegetation communities (i.e., successional shrubland, old field). Construction of these underground lines would not result in any permanent significant adverse impacts and would not impede future development on the surrounding land.

The collection system will tie into a new substation to be constructed in the town of Hanover, which would transfer the energy generated by the turbines to the existing transmission line to the north of the Project Area, also located in the town of Hanover. Construction of the substation would impact 1.3 acres of forest and 0.6 acre of agricultural land (these numbers are included in the above calculations [see Table 2.12-2]). From construction of the substation 0.5 acre of forested land will be converted to a different vegetative state.

Transmission Line and Switchyard

A new approximately 6-mile 230-kV overhead transmission line will be constructed from the substation on Hurlbert Road to a new switchyard on Stebbins Road. The entire transmission line, substation and switchyard are all located in the town of Hanover. The new switchyard will connect the power generated by the wind turbines to the existing electrical grid. The impacts associated with the switchyard footprint would be the permanent conversion of 3.2 acres of agricultural land. Construction of the switchyard including required clearing or grading would impact an additional 2.3 acres of agricultural land. This switchyard footprint is located on cultivated agricultural land resulting in the permanent conversion of agricultural land to developed land. Construction of the transmission line, access roads for the transmission line, and switchyard would result in the permanent disturbance of 33.5 acres of forest, 30.7 acres of agricultural lands, and 1.7 acres of developed/open space. The temporary impacts from the transmission line construction come from the temporary access road impacts outside the 80-foot ROW and grading for construction of the switchyard (3.6 acres of agricultural land and 0.1 acre of developed/open space); all other impacts are considered permanent and are located within the 80-foot cleared ROW. Although selective tree clearing will occur within 20 feet either side of the 80-foot cleared ROW, these impacts are not considered significant and are not included in these calculations.

Community Facilities and Services

Construction of the Project would not result in temporary or permanent significant adverse impact on any community facilities or services. Local services, such as emergency response services, utilities, healthcare facilities, school districts, and police services, would not be adversely impacted. Deliveries along school bus routes would be coordinated with school districts to avoid any disruption of bus services. Local emergency response units and police will be updated weekly with the location of construction activities and with the schedule/routing for relocating equipment (cranes) which may delay travel on local roads.

Local Land Use Plans, Zoning and Laws

Construction of the Project would not cause significant adverse impact on the Town of Hanover's local land use plan, Chautauqua County's April 2011 Chautauqua 20/20 Comprehensive Plan, and Hanover and Villenova's zoning and laws. Construction activities would be conducted in accordance with the design and siting requirements of the local wind energy facility laws of each municipality in the Project Area. The necessary approvals would be obtained from each municipality prior to construction. The Project is consistent with the Chautauqua 20/20 Comprehensive Plan, which includes, “encourage local farms to explore… renewable energy opportunities such as wind,” as one of its recommended strategies and actions.

2.12.2 Operational Impacts

Project Site Land Use

Permanent impacts on agricultural lands resulting from the Project facilities would be in the areas of turbine, permanent access roads, substation, switchyard, transmission line, and the O&M building. Any construction impacts occurring within forested areas are considered permanent impacts since the conversion of one vegetative community to another would exist for the life of the Project. A relatively small amount of developed/open space (2.2 acres) would be permanently impacted due to the construction of permanent access roads, collection lines, and transmission line. Project facilities would preclude agricultural production or development only on a small portion of each parcel, and would generally not impact land use in the areas adjacent to the turbines or impede future development on the surrounding land, outside of required setback distances. Occasional maintenance and repair activities would not interfere with ongoing farming and forest operations. Impacts related to the clearing of forested areas are considered permanent because, once cleared, these areas would be maintained in an herbaceous or successional shrubland state for the life of the Project to allow for future maintenance of the facilities and to ensure the integrity of the collection system.

The Project is compatible with land use patterns within the towns of Villenova and Hanover. The Project would be located on private land in rural areas dominated by forest and active agricultural land. Project components would be sited in compliance with local laws and no public or recreational facilities would be impacted. The positive economic impact of the Project on the viability of individual farms may help and preserve the current character of the community as it would provide financial support to farmers who may in turn be less likely to sell off acreage for residential or commercial development.

Turbines

The turbine sites would result in 109.7 acres of permanent disturbance. The turbines would permanently impact 18.8 acres of agricultural land (12.3 acres in Villenova and 6.5 acres in Hanover). The clearing of 90.9 acres of forestland (75.6 acres in Villenova and 15.2 acres in Hanover) for the turbine staging area is considered a permanent impact as the periodic maintenance to control woody vegetation surrounding the turbines would result in the permanent conversion of forest land to other vegetation communities (i.e., successional shrub-land, old field).

As discussed above, the permanent structure of the O&M building would be sited on 0.1 acre of agricultural land. In addition, after construction, 2.7 acres of agricultural land, 0.3 acre of forested land, and 0.2 acre of developed land will remain as a laydown area throughout the lifetime of the Project.

Access Roads
Permanent access roads would impact 16.9 acres of agricultural land, 28.8 acres of forested land, and 0.4 acre of developed/open space. Agricultural production and development would be precluded only in the areas occupied by the 18-foot-wide permanent road, but land use in the areas adjacent to the road would not be impacted and would be restored consistent with the applicable guidelines from NYSDAM. The ROW within forested areas would be periodically maintained to prevent reestablishment of trees or provide adequate overhead clearance for safe access, leaving these corridors in an herbaceous or successional shrubland state.

Collection System
O&M of the collection system would not significantly impact land uses within the Project Area. O&M of the collection system consists primarily of vegetation management and occasional repairs. Maintenance of the collection ROW would result in permanent conversion of 6.9 acres of forestland and 0.3 acre of agricultural land. The ROW would be allowed to naturally revegetate; however, occasional removal of woody vegetation would be required for line safety. These areas would be maintained largely in an herbaceous state. Permanent impacts from the construction of the substation in the town of Hanover include 0.3 acre of agricultural land and 1.3 acres of forested land.

Transmission Line
During Project operation, the overhead transmission line would not significantly impact land uses within the Project Area. O&M activities for the transmission line consists primarily of vegetation management and occasional repairs. Operation of the transmission line, associated access roads, and switchyard in the town of Hanover would result in the permanent disturbance of 33.5 acres of forest, 27.1 acres of agricultural lands, and 1.6 acres of developed/open space. The transmission line ROW is considered a permanent impact as Ball Hill would maintain this land in its converted state. The ROW would be allowed to naturally revegetate; however, occasional removal of tall woody vegetation (i.e., trees) would be required for line safety. These areas would be maintained largely in an herbaceous state. As mentioned above, permanent impacts resulting from conversion of natural areas to built facilities and the conversion of one vegetative community to another would exist for the life of the Project (20 years) (i.e., impacts on forested lands) but it is expected that there would be a return to preconstruction conditions after decommissioning.

Community Facilities
Operation of the Project would provide a significant new revenue source for the Towns of Villenova and Hanover, Chautauqua County, and the local school districts, through PILOT payments and Host Community Agreements. A detailed discussion of the socioeconomic impacts of the Project is provided in Section 2.13, Socioeconomics.

Local Land Use Plans, Zoning, and Laws

Villenova. Twenty-eight turbines would be constructed within the town of Villenova. The Town of Villenova does not have an existing or proposed comprehensive plan, but regulates development through zoning regulations. The Project has been designed in accordance with the requirements of the Villenova Town Law, which allows for development of wind energy conversion devices facilities upon creation of a Wind Overlay District, and issuance of a Special Use Permit from the Town Board. A copy of the local law is provided in Appendix O of the 2008 DEIS and is summarized in Section 2.23, Land Use: Environmental Setting, of the 2008 DEIS attached hereto as Appendix A. Ball Hill will request a modification of the wind law limitations on the maximum height for turbines to accommodate the use of the Vestas V110-2.2 and GE 2.3-116, or similar models, in compliance with all FAA requirements (see Section 2.10, Communication Signal Study) and to avoid unnecessary and significant clearing. As the local law is currently written, WECS shall not exceed a total height of 420 feet including the turbines and the blades. The turbine models proposed for this Project do not exceed a maximum height of 500 feet. The Project has been designed to comply with all other design, setback, and safety standards set forth in this law.

In addition, the Project is compatible with the Town's Zoning Regulations as the Project is proposed in areas that are approved through the Villenova Town Law. By obtaining a special use permit through the Town of Villenova, the Project will be compatible with the zoning. As such, the Project will not cause any significant adverse impacts on the Town of Villenova's zoning and Villenova Town Law.

Hanover. Eight turbines would be constructed within the town of Hanover. The Town of Hanover has an existing comprehensive plan, and regulates development through zoning regulations. The Project has been designed to comply with the Town of Hanover Zoning Ordinance and the requirements of the local law updating the regulations for WECS in the town. The Hanover Law is summarized in Section 2.23, Land Use: Environmental Setting, of the 2008 DEIS attached hereto as Appendix A. Ball Hill will request a modification of the wind law limitations on the maximum height for turbines to accommodate the Vestas V110-2.2 and GE 2.3-116, or similar models, in compliance with all FAA requirements (see Section 2.10, Communication Signal Study) and to avoid unnecessary and significant clearing. As the local law is currently written, WECS shall not exceed a total height of 420 feet including the turbines and the blades. The turbine models proposed for this Project do not exceed a maximum height of 500 feet. The Project has been designed to comply with all other design, setback, and safety standards set forth in this law.

The vision of the Town of Hanover's Comprehensive Plan is to maintain "the quality of life for residents and their neighborhoods and enhances the rural, historic, varied open space and agricultural aspects of life for the community." Additional goals are to preserve the agricultural heritage of Hanover and the open landscapes with continued agriculture use. The Project is compatible with agricultural land uses and aids in preserving agricultural practices as it is not compatible, due to setbacks, with other land uses within the town. In addition, the Project is compatible with the Town's Zoning Regulations as the Project is being proposed in areas that are approved through the Hanover Law. By rightfully obtaining a special use permit through the Town of Hanover, the Project will be compatible with the zoning. As such, the Project will not cause any significant adverse impacts on Hanover land use plans, zoning, and other laws.

Future Land Use

It does not appear that any significant residential, commercial, and industrial development is planned for the Project Area, and the Project would not preclude future development activities outside of the required setbacks and ROWs. Property owners who would have turbines on their properties are aware of the setback requirements of the Project and minimal limitations are imposed on future development activities. The Project would not inhibit future land uses that are similar to current uses.

2.12.3 Mitigation

Locations of Project facilities were chosen in large part to minimize the loss of active agricultural land and the interference with active farm operations and other environmental resources. Since Project components have been sited in accordance with local laws, the Project is compatible with, or would not preclude, existing and potential uses. As discussed in Section 1.3 of the 2008 DEIS, the Project Area was selected through a systematic process that considered availability of sufficient wind resources; the availability of existing roads and utility interconnections; the availability of land with landowners willing to sign easements for their property; community support; the presence or absence of environmental constraints, including visual and noise impacts and impacts on wetlands, streams, agricultural lands and important wildlife areas; and the presence of land use constraints including zoning and building restrictions.

Locations of the Project facilities were chosen to minimize the loss of active agricultural land and the interference with active farm operations and other environmental resources. On agricultural land, all construction activities would be conducted in accordance with NYSDAM Agricultural Mitigation for Windpower Projects to the extent practicable, as required by Town Laws, and the local requirements for agricultural mitigation. Copies of these laws were provided in Appendix B of the 2008 DEIS and are attached for ease of reference in Appendix A of this SDEIS. These guidelines and requirements provide guidance for the avoidance of impacts, the implementation of mitigation, and restoration of agricultural assets. The construction corridors to be used for stockpiling of topsoil, installation of collection system components and 36-foot temporary roadways are consistent with these guidelines and requirements. This road width is compatible with NYSDAM guidelines because it eliminates the need to park construction vehicles on cropland and/or pastures and eliminates the potential for disturbance in areas that would otherwise be undisturbed by construction activities. The extended temporary width of the road and construction ROW would be restored per NYSDAM guidelines to the extent practicable.

At staging areas and laydown areas, all areas other than the turbine foundation and crane pad would be restored with subsoil and stockpiled topsoil and allowed to revegetate naturally. Restoration of all agricultural land and pasture would be in accordance with NYSDAM guidelines and would be coordinated with the affected landowner and would meet or exceed all recognized standards. All other areas would be stabilized and allowed to naturally revegetate.

In addition, the access roads have been located, to the extent practical, along edges of the agricultural fields to further minimize and mitigate impacts on farming activities during construction and operation of the Project. Agricultural land disturbed by temporary access roads would be restored following construction, as a result of the reduction of the temporary road width and restoration of temporary work areas. More detailed mitigation measures for agricultural areas are discussed in Section 2.2, Soils.

For construction of the transmission line, temporary disturbance of soils may occur, however, following installation of transmission structures and conductors, if necessary, top soils would be graded and restored to original contours in the spring, to allow for planting of crops. Ball Hill has negotiated access rights with landowners whose property is included in the turbine ROW. Landowner consent will be secured as needed for actions taken on their land and landowners would be compensated for any unavoidable impacts on soils, lost crops or farming activities that may occur as a result of construction.

Full compliance with the local law requirements for agricultural lands regulating the development of wind power facilities would reduce the impacts on agricultural land use. The local laws regulating wind energy facilities have specific agricultural mitigation measures based on the NYSDAM guidelines, which include locating structures along field edges where possible, locating access roads along ridge tops, avoiding dividing larger fields into smaller fields, and avoiding and maintaining all existing drainage and erosion control structures.

In forested areas, Project components have been sited, to the extent practicable, within previously disturbed areas, such as along existing logging roads and areas where recent logging has occurred. This is intended to minimize the clear cutting of trees. Where the removal of any trees of economic value is necessary, landowners would be compensated based on their individual easement agreements. Road and collection line corridors located within forested areas would be periodically maintained to prevent reestablishment of trees to provide adequate overhead clearance for safe access, leaving these corridors in an herbaceous or successional shrubland state. More detailed mitigation measures for forested areas are discussed in Section 2.5, Biological Resources.

2.13 Socioeconomics

The existing socioeconomic characteristics and general conclusions for the Project Area remain accurate as described in the 2008 DEIS, Section 2.25 (see Appendix A). Since the publication of the 2008 DEIS, however, more recent data has been released for population, property values, household income, unemployment, tax levies (see Table 2.13-1), and Town revenues and expenditures (see Tables 2.13-2 and 2.13-3), which are presented here prior to construction and Project impacts discussion.

Table 2.13-1 Property Tax Rates

2014	Category	Full Value Tax Rate (per $1,000 of full value)
Town of Villenova	Total Town Levy	8.55
	Forestville School District Levy	17.97
	Pine Valley School District Levy	17.72
Town of Hanover	Total Town Levy	5.02
	Forestville School District Levy	17.96
	Gowanda Central School District Levy	17.40
	Silver Creek School District Levy	17.91

Source: State of New York, Office of the State Comptroller 2015a, b.

Note: Total Town Levy includes the general Town levy, the highway levy, the fire protection district levy, other special district levies. It also takes into account sales tax credits that reduce the Town levy.

Table 2.13-2 Revenues for the Towns of Villenova and Hanover

Fiscal Year 2014	Town of Villenova	Town of Hanover
Real Property Taxes	$491,477	$1,685,914
Sales Tax	$192,790	$858,108
State Aid	$158,643	$250,998
Charges for Services	$3,345	$787,814
Use and Sale of Property	$1,339	$78,785
All Other Revenue	$21,024	$190,378
Total Revenues	**$868,618**	**$3,851,997**

Source: State of New York, Office of the State Comptroller 2015c.

Table 2.13-3 Expenditures for the Towns of Villenova and Hanover

Fiscal Year 2010	Town of Villenova	Town of Hanover
General Government	$91,913	$569,113
Employee Benefits	$112,101	$620,154
Transportation	$547,319	$1,334,335
Public Safety	$12,110	$781,841
Community Services	$15,570	$2,046

Table 2.13-3 Expenditures for the Towns of Villenova and Hanover

Fiscal Year 2010	Town of Villenova	Town of Hanover
Utilities/Sanitation	$0	$682,400
Culture/Recreation	$530	$54,215
Debt Service	$21,650	$256,190
Health	$575	$5,730
Total Expenditures	**$801,768**	**$4,306,024**

Source: State of New York, Office of the State Comptroller 2015c.

Population and Housing

The Project Area remains unchanged from that analyzed in 2008. It is located within the towns of Villenova and Hanover in Chautauqua County. According to the *2009-2013 American Community Survey (5-Year Estimates),* Chautauqua County had a total population of 134,156 in 2013, which represents a 0.6% decrease between 2010 and 2013. Chautauqua County, as a whole, had a population density in 2013 of about 127 persons and 63 housing units per square mile. In 2013, the town of Villenova had a population of 932 persons, which is a 16.0% decrease from the 2010 population of 1,110. Town of Villenova census data demonstrates that, in 2013, the town had about 26 persons and 14 housing units per square mile. In 2013, the town of Hanover had a population of 7,076, a 0.7% decrease from the 2010 population of 7,127 persons and had about 144 persons and 71 housing units per square mile (U.S. Census Bureau 2012, n.d.-a).

In 2013, the estimated median value of owner-occupied units in the town of Villenova ($84,900) was comparable to the median values in Chautauqua County ($83,500). Median housing values for the town of Hanover ($95,100) were higher than the town of Villenova and Chautauqua County median values. These median values are considerably lower than the median value for the NYS as a whole, which was $288,200 in 2013 (U.S. Census Bureau n.d.-a).

Municipal Revenues and Expenditures

Tables 2.13-1 through 2.13-3 show the 2014 tax rates (see Table 2.13-1) and revenues and expenditures for Fiscal Year 2014 (see Tables 2.13-2 and 2.13-3) for the towns of Villenova and Hanover. These tables have been updated from the 2008 DEIS.

Local Economy

Median household income for Chautauqua County was estimated in 2013 at $42,429. For the towns of Villenova and Hanover, median household incomes were $48,646 and $46,782, respectively (U.S. Census Bureau n.d.-a).

Employment

Unemployment data is regularly updated by the U.S. Department of Labor, Bureau of Labor Statistics. According to the Local Area Unemployment Statistics, in 2014, Chautauqua County had an average annual unemployment rate of 6.8% (U.S. Bureau of Labor Statistics 2015).

Environmental Justice

According to NYSDEC Commissioner Policy 29 (the "Policy") on Environmental Justice and Permitting, a potential environmental justice area is defined as a minority or low-income community that bears a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies (NYSDEC 2003).

The Policy expands upon Executive Order 12898, issued by President Clinton on February 11, 1994, which requires that impacts on minority or low-income populations be accounted for when preparing environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies.

The Policy defines a minority population as a group of individuals who are identified or recognized as African-American, Asian American/Pacific Islander, American Indian, or Hispanic. Hispanic refers to ethnicity, not race. A minority community exists where a census block group, or multiple census block groups has a minority population equal to or greater than 51.1% of total population in urban areas or 33.8% in rural areas. The Project Area meets NYSDEC's definition of a rural area.

In 2013, the population of Chautauqua County was 6.9% minority and 6.4% Hispanic. For the Project Area, the town of Villenova has approximately 4.3% minority and 1.1% Hispanic populations and the town of Hanover, approximately 1.9% minority and 3.6% Hispanic populations (U.S. Census Bureau n.d.-b). The percentages of Hispanic and minority populations in both towns are below economic justice area thresholds. Therefore, the Project Area is not considered an environmental justice area with respect to race (U.S. Census Bureau n.d.-b).

A low-income population is defined as a group of individuals having an annual income that is less than the poverty level established by the U.S. Census Bureau. In NYS a low-income environmental-justice area is defined as an urban or rural area that has 23.59% or more of its population with household incomes below the federal poverty level. In 2013, 19.1% of the population of Chautauqua County was below the poverty level. The Project Area falls within two Census Tracts (CTs): CT 376 and CT 361. Approximately 23.1% and 11.5% of the population in CTs 376 and 361 had incomes below the poverty level, respectively (U.S. Census Bureau n.d.-a). Therefore, poverty rates of both impacted CTs are below the NYS threshold and the CTs are not considered potential environmental justice communities. Table 2.13-4 shows the change in poverty data from the 2008 DEIS and current census data (U.S. Census Bureau 2012, n.d.-c).

Table 2.13-4 Low-income Populations in the Project Area, 2008 and 2013

Geographic Area	2008	2013
Chautauqua County	13.8%	19.1%
Census Tract Average [1]	10.5%	17.3%
Census Tract 376		23.1%
Census Tract 361		11.5%

Sources: E & E 2008; U.S. Census Bureau n.d.-c

.Notes:

[1] Geographic boundaries changed between the 2000 and 2010 Census. The Census tracts (CT) defined for the 2008 DEIS were CT 352 and CT 361. In 2013, the same geographic area was defined as CT 376 and CT 361. The census tract average shows the average low-income population of the two impacted CTs.

2.13.1 Construction Impacts

Methodology

In order to develop level of magnitude estimates for the construction period economic impact analysis, the Jobs and Economic Development Impact Model (JEDI) designed by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), was used to estimate total construction costs as well as direct, indirect and induced employment, earnings, and economic output impacts associated with the construction of a typical 79- to 100-MW wind project in NYS (NREL n.d.-a, n.d.-b). A summary of the expected impacts is provided in Table 2.13-5.

Table 2.13-5 Summary of Construction Impacts for a Typical 79- to 100-MW Wind Farm in New York State

Activity	79- to 100-MW Facility
Construction Costs[1]	
Total Construction Costs	$147.8 million - $187.1 million
Local Construction Spending	$35.6 million - $44.3 million
Employment Impacts during Construction[2]	
Direct Employment	62 - 64
Indirect and Induced Employment	254 – 320
Total Employment	316 – 384
Earnings Impacts during Construction	
Direct Earnings	$4.9 million - $5.2 million
Indirect and Induced Earnings	$19.1 million - $24.1 million
Total Earnings	$24.0 million - $29.3 million

Table 2.13-5 Summary of Construction Impacts for a Typical 79- to 100-MW Wind Farm in New York State

Activity	79- to 100-MW Facility
Changes in Economic Activity during Construction[3]	
Direct Changes in Economic Activity	$5.2 million - $5.6 million
Indirect and Induced Changes in Economic Activity	$46.1 million - $58.0 million
Total Changes in Economic Activity	$51.3 million - $63.6 million

Source: NREL n.d-a, n.d.-b.

Notes:
1 Construction costs are expressed in constant 2013 dollars.
2 Employment impacts are represented as full-time equivalents (FTE). One FTE for one year is equal to 2,080 hours worked.
3 Changes in Economic Activity are estimated using changes in regional output.

The discussion in the following sections reviews the impacts from Project construction on population and housing, local economy, employment, and environmental justice communities.

Population and Housing

The Project may result in some short-term demand increase for local lodging. It is estimated that during the up to 18-month construction period there would be a temporary influx of construction workers to the area surrounding the Project Site. The exact number of construction workers required for the Project is unknown at this time and is dependent on the total length of the construction period. Approximately 62 to 64 FTE construction workers would be required on site during the construction period. One FTE is equal to 2,080 hours worked. Therefore, it is estimated that approximately 129,000 to 134,000 man-hours will be needed to construct the Project. The number of individuals actually employed on site will depend on how these hours are allocated to positions. More than 62 to 64 actual employees may be hired, since not all positions will be full time for the entire 18-month period. Local contractors and labor would be utilized to the extent practicable. Given the size of the regional labor market, most of the workers are expected to live within commuting distance of the Project. However, some specialty labor may need to be hired from outside the region.

Construction workers who are from outside the Project Area are expected to reside temporarily in motels/hotels in larger population centers in the vicinity of the Project Area, including Dunkirk, Fredonia, Jamestown, and Buffalo. Ball Hill will communicate with local merchants about needs for lodging and other services during construction; however, given the available hotel capacity in the nearby municipalities, this increase in transient workers is expected to have only a negligible impact on the demand for temporary lodging in the region.

Local Economy

The increase in construction spending will directly impact the regional economy by increasing employment, earnings, and economic activity in the construction industry. In addition, these construction expenditures will also have a positive indirect and induced impact on the local economy.

As the new construction workers spend a portion of their payroll in the local area and construction companies purchase materials from local suppliers, the overall demand for local goods and services will expand. Revenues at local retail outlets and service providers will increase. As these local merchants respond to this increase in demand, they may in turn increase employment at their operations and/or purchase more goods and services from their providers. These new workers may then spend a portion of their income in the area, thus "multiplying" the positive economic impacts of the original injection of funds. These "multiplier" effects will continue until all of the original funds have left the regional economy through either taxes, savings, or through purchases from outside the local area.

The positive economic impacts associated with construction spending will be short-term. Since the construction costs are one-time expenditures, once the original funds leave the economy through taxes, savings, and purchases outside the region these short-term positive economic effects will end.

The NREL JEDI model was used to quantify these positive economic impacts associated with the Project. As shown on Table 2.13-5, regional economic output, a measure of economic activity in an area, is expected to directly increase by $5.2 million to $5.6 million as a direct result of construction of the Project. An additional $46.1 million to $58.0 million of economic output is expected to be generated as these funds are "multiplied" or cycle through the local economy (see Table 2.13-5).

Employment

Construction of the Project would result in the direct employment of 62 to 64 FTE of electrical workers, crane operators, equipment operators, carpenters, and other construction workers (with a total estimated payroll of $4.9 million to $5.2 million), and support an estimated 254 to 320 additional, indirect, and induced FTE jobs (with a total estimated payroll $19.1 million to $24.1 million). In total the Project would support 316 to 384 direct, indirect, and induced jobs with an estimated payroll of $24.0 million to $29.3 million (see Table 2.13-5).

Construction workers would be hired from within the local community to the extent that qualified workers are available. Personnel with certain specialty wind farm construction skills would likely have to be hired from outside the region.

Environmental Justice

Environmental justice screening was conducted for the Project Area as described in the 2008 DEIS (Section 2.25, Socioeconomics: Environmental Setting) (see Appendix A) and as presented above in Section 2.13, Socioeconomics.

Since the Project Area is not an environmental justice area, environmental justice impact analysis is not relevant for Project construction.

2.13.2 Operational Impacts

Methodology

In order to develop level of magnitude estimates for the operation period impact analysis, operations costs have been estimated for a typical wind farm in Chautauqua County, New York. Using the JEDI model, total operations costs as well as impacts to employment, earnings, and economic activity were estimated for a typical 79- to 100-MW wind project in the state of New York. A summary of the impacts is provided in Table 2.13-6.

Table 2.13-6 Summary of Annual Operation Impacts for a Typical 79- to 100-MW Wind Farm in New York State

Activity	
Operations and Maintenance Costs[1]	
Labor Costs	$400,000 - $500,000
Materials and Service Costs	$1.1 million - $1.5 million
Employment Impacts during Operations[2]	
Direct Employment	5 - 6
Indirect and Induced Employment	8 - 10
Total Employment	13 - 16
Earnings Impacts during Operations	
Direct Earnings	$400,000 -$500,000
Indirect and Induced Earnings	$700,000 - $800,000
Total Earnings	$1.1 million - $1.3 million
Changes in Economic Activity during Operation[3]	
Direct Changes in Economic Activity	$400,000 - $500,000
Indirect and Induced Changes in Economic Activity	$2.4 million - $3.0 million
Total Change in Economic Activity	$2.8 million - $3.5 million

Source: NREL n.d-a, n.d.-b.

Notes:

1 Costs are expressed in constant 2013 dollars.

2 Employment impacts are represented as full-time equivalents (FTE). One FTE for one year is equal to 2,080 hours worked.

3 Changes in Economic Activity are estimated using changes in regional output.

The following sections review the impacts from operation of the Project on population and housing, local economy, employment, and environmental justice communities.

Population and Housing

The Project is not expected to have a significant long-term impact on housing or population in the towns of Villenova or Hanover. The Project is expected to directly employ five to six permanent employees during the operation phase. While some of these operational employees may be recruited from outside the local area and would relocate to the region, the increase of maximum of five to six households would only negligibly affect local demographics or the demand for housing units in vicinity of the Project Area. Given the size of the existing housing stock and vacancy rates an adequate number of housing units are available for purchase or rent. As such, the operation of the Project will not have any significant adverse impacts on local population or on the local housing market.

Local Economy

During operation, the Project would inject an estimated $1.1 million to $1.5 million annually into the regional economy via O&M expenditures at the site (see Table 2.13-6). These expenditures would occur annually for the life of the Project.

As shown on Table 2.13-6, the Project will directly increase economic activity in the region through payroll expenditures by approximately $400,000 to $500,000 annually. Regional economic activity would be further increased by $2.4 million to $3.0 million as the indirect and induced impacts associated with Project operations are included. The indirect impacts would include the effects on regional economic activity associated with any materials or services purchased by the Project from the regional economy. The induced economic impacts would include the effects of the additional expenditure of funds cycled through the regional economy. In total the direct, indirect, and induced impacts associated with the operation phase of the Project would increase regional economic activity by $2.8 million to $3.5 million per year (see Table 2.13-6).

The Project would utilize local providers of services, supplies, and area manufacturers during operations, to the maximum extent practicable. The utilization of local firms contributes to increased economic activity in the region. This direct contribution to the economy may help to offset the impact of a declining tax base and the resultant pressure to increase tax rates.

The operation of the Project is expected to have minimal impact on tourism in the area, which is largely limited to recreational uses, such as hunting and fishing.

Ball Hill will also enter into lease agreements with some landowners for the use of their property for the Project, which will entail the payment of royalties to the landowners. For farmers, these payments may increase the stability of household income during periods of fluctuating agricultural markets and prices. The value of the royalty payments would be expected to exceed any loss of productivity and revenue stemming from the use of land for the Project rather than another purpose (agricultural or other), and thus would be a further positive contribution to the local economy.

Employment

During operation, the Project would employ approximately five to six on-site FTE workers (or 10,400 to 12,480 man-hours annually) with a total estimated payroll of $400,000 to $500,000, to operate and maintain the Project and to monitor production. Since an FTE worker is an individual who is working full time, more than five or six employees may be hired for O&M work if some of these employees are hired on a part-time basis (see Table 2.13-6).

Local qualified candidates would be utilized to the extent practicable to maximize the benefit to the community. An exception would be any specialized wind energy facility managers necessary to operate the Project who would need to be brought to the Project if no qualified candidates are available within the community.

Operation of the Project would also support an estimated eight to ten indirect and induced FTE jobs throughout the region (with a total estimated payroll of $2.4 million to $3.0 million). The total direct, indirect, and induced impacts of operations of the Project would support approximately 13 to 16 FTE workers with a total annual payroll of approximately $1.1 million to $1.3 million annually (see Table 2.13-6).

Municipal Budgets and Taxes

Operation of the Project would result in a new revenue source for the Towns, Chautauqua County, and the local school districts through PILOT and host community payments. A PILOT payment is a "payment in lieu of taxes," which is a payment made to compensate a local government for some or all of the tax revenue that it loses because of the nature of the ownership or use of a particular piece of real property. A host community payment is developed through a contract between a developer and the local governing body or bodies of the host community. In the contract the developer agrees to provide the community with certain benefits to help mitigate specified impacts of a project.

Ball Hill will negotiate PILOT and host community payments acceptable to its taxing jurisdiction and Town counterparties. The final amount and division between the PILOT and host community payments would be determined during negotiations with the Chautauqua County Industrial Development Agency, the Towns, and other taxing jurisdictions.

Such payments would provide new revenue streams for taxing jurisdictions, while the installed infrastructure would impose limited demand for services.

The Project would not cause any significant adverse impacts and may cause positive impacts on school district budgets as it is unlikely that additional students will enroll as a result of the Project. Since the majority of jobs are related to construction, such workers are likely to leave the area as construction is completed. As described in the 2008 DEIS, the Forestville, Pine Valley, Silver Creek, and Gowanda Central Schools Districts are classified as "high need/resource rural" districts with per pupil expenditures below that of similar districts in the state. As the new revenue would not likely be accompanied by substantial expenditures, it is expected to have a positive impact on school district budgets.

There would be no negative financial impact on the municipal budgets as a result of reviewing the applications or administering permits as the local laws require Ball Hill to pay all associated consultant fees for the review of the Project.

In general, existing emergency response capabilities are adequate to provide any ambulatory, paramedic, or fire response services for Chautauqua County, as described in the County's Comprehensive Emergency Management Plan. Pursuant to applicable laws and regulations, Ball Hill has drafted an ERP (see Section 2.15, Health and Safety, and Appendix G). Site-specific risks will be assessed prior to construction and summarized in the FEIS. The ERP will be refined and further developed as new risks are identified.

Residential Property Values

The potential for negative impacts resulting from the construction and operation of wind turbines on residential property values is often raised by property owners in or near proposed wind energy projects. Isolating the potential impact of a single variable, such as the presence of a local wind farm, is difficult. Besides the current land use and structural integrity, property value is influenced by many external factors, including social trends, economic trends, governmental controls, and regulations and environmental conditions. In the 2008 DEIS, an independent consultant, the KLW Group of Buffalo, New York (KLW) prepared an analysis of the potential impact of wind turbines on property values in the Project Area. The KLW report is attached to the 2008 DEIS in Appendix P and incorporated into this SDEIS as Appendix A.

KLW evaluated residential sales data within an approximate 5-square-mile area surrounding four existing wind farms located in NYS. Two of the wind farms are located in Madison County (central New York) and the other two are located in Wyoming County (western New York). Three of these wind farms had been operational for over five years. Additionally, the Noble Bliss Windpark was analyzed, although at the time of the study (spring 2008) only limited sales data were available. The surrounding land uses at each wind farm in the study are similar to the land use in the Project Area (i.e., predominately agricultural, forested, and interspersed with low-density residential development).

Two analyses were used to determine if wind energy projects were likely to impact local residential real estate values. A "relative comparison qualitative analysis" was used to compare sales five years prior to the construction of the respective wind energy projects to sales five years subsequent to their construction and operation. A "paired sales analysis" was used to compare sales and re-sales of the same property before and after the construction of the respective wind farms.

KLW found no conclusive evidence that would indicate any actual or potential negative impact on residential real estate values in the market area analyzed as a result of proximity to, or in the viewshed of a proposed or operational wind energy project. The sales data and studies performed on the respective comparable wind farms show no evidence indicating that these facilities have had a detrimental effect on real property values. Each of the studies concluded that prices continued to increase within the respective sub markets after construction and the ongoing operation of the facility. Additionally, sales and re-sales of the same property within the respective submarkets indicate that the values of the majority of properties were unaffected by the existence of the wind farm. The sale data indicated increases in property values consistent with typical market fluctuations. This conclusion is consistent with much of the quantitative research available on wind farm effects on property value. It is concluded that no long-term negative property value impacts have occurred in similar market areas where wind farms have been developed (KLW 2008). Although this study was conducted in 2008, the conclusions are still valid to date as new research shows, some of which are summarized below.

Several property valuation studies have been conducted in NYS and nationwide to determine the impacts on property values in the vicinity of recently constructed wind turbines, since the 2008 KLW study. These studies have had similar findings to the KLW report, as they indicate that there are no long-term significant adverse impacts on property values. However, two studies did indicate potential short-term impacts during the siting and construction of wind energy facilities, indicating there are no long-term significant adverse impacts on property values. These studies are summarized below.

A study by B. Hoen, and others, of the Ernest Orlando Lawrence Berkeley National Laboratory entitled *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-site Hedonic Analysis* studied 10 areas throughout the United States that encompassed 24 distinct wind facilities located in New York, Pennsylvania, Illinois, Wisconsin, Iowa, Oklahoma, Texas, Oregon, and Washington (Hoen et al. 2009). This study assessed wind power projects that encompassed nearly 13% of total U.S. wind power capacity installed by 2005. The study evaluated property values based on three categories of concern: Area Stigma, Scenic Vista Stigma, and Nuisance Stigma. The study found no statistical evidence that property values are consistently, measurably, or significantly affected by either the view of wind facilities or the proximity of such facilities to homes.

M. Heintzelman and C. Tuttle's report, *Values in the Wind: A Hedonic Analysis of Wind Power Facilities,* studied 11,369 property transactions in three counties in northern NYS over nine years (Heintzelman and Tuttle 2011). They identified a wind turbine as existing from the moment of the finalization of the FEIS for the wind energy project. According to their study, the existence of a wind turbine in proximity to a property did significantly decrease the value of the property in two of the three counties studied. Within these two counties, wind turbines have been operational since 2008, in the third county where the decrease in property value was not significant, wind turbines have been in operation since 2004. The author suggests that this increased familiarity with turbines has diminished their impact on property values.

The study by J. Hinman titled *Wind Farm Proximity and Property Values: A Pooled Hedonic Regression Analysis of Property Values in Central Illinois* broke down the analysis of property values into construction and operation periods at a wind energy project in Central Illinois (Hinman 2010). This study suggests that the siting and construction of wind turbines may have a negative impact on property values due to the local and tourist populations being wary of wind turbines. However, according to Hinman, after the wind turbine is up and operational, the property values would rebound.

According to the Heinstzelman and Hinman studies, there may be temporary, short-term, minor impacts on property values including certain residents moving out of the area due to the proposed locations of the wind turbines; however, it would be expected that property values would rebound after the local population acquires additional information on the aesthetic impacts on the landscape and actual noise impacts of the wind turbines. After the impacts are experienced, according to the above-mentioned studies, property values would be expected to rebound to pre-wind turbine values.

Environmental Justice

The Project Area does not constitute an environmental justice area.

2.13.3 Mitigation

While no significant adverse impacts on local housing or population are anticipated, the use of local contractors and labor will be utilized to the largest extent practicable. Therefore, new demand for housing or attraction of new population is minimized. In addition, Ball Hill will communicate with local merchants about needs for lodging and other services during construction in order to properly prepare for any periods with a high number of out-of-town workers.

With respect to the local economy, Ball Hill will utilize local services, supplies, and manufacturers to the greatest extent possible during Project construction and operations to pass on the maximum financial benefit to the community.

PILOT and host community payments will be provided to the local municipalities and school districts to mitigate environmental and other related impacts which result from the Project. These payments will be negotiated with the Chautauqua County Industrial Development Agency, the Towns, or other relevant taxing jurisdictions.

2.14 Cultural Resources

This section supplements the 2008 DEIS with regard to cultural resources within the Project Area. In addition, this section analyzes potential impacts from construction and operation of the Project and potential mitigation measures.

As part of the original cultural resources investigations in 2008, Panamerican Consultants, Inc. (Panamerican) conducted a Phase I cultural resources study for the Project's area of potential effect (APE); this study involved archaeological excavations as well as an analysis of historic architectural resources in accordance with the New York State Historic Preservation Office (SHPO) *Guidelines for Wind Farm Development Cultural Resources Survey Work* (SHPO 2006), National Historic Preservation Act (NHPA), New York State Historic Preservation Act, SEQRA, the National Environmental Policy Act, as well as other relevant state and federal legislation. The methodology for these studies was approved by the SHPO prior to commencement of the investigations (see Appendix C, Agency Correspondence, of the 2008 DEIS attached hereto as Appendix A).

To assess modifications to the Project layout, Panamerican performed an archaeological and architectural survey of the Project APE[2] in 2012, which was completed in 2013. This task resulted in the completion of an addendum to the original report. The 2008 design incorporated approximately 375 acres and increased to 401 acres that same year; the 2012 design increased the Project footprint to approximately 416 acres. These reports were submitted to the SHPO and concluded their evaluation of eligible resources and the potential impacts on those resources within the Project (Betsworth 2013[see Appendix Q, Agency Correspondence]).

In 2015, Panamerican reentered the field to account for more changes to the Project layout relative to its previous two configurations. As described in detail below under "Archaeological Resources" the current Project Site falls within the same overall footprint as the 2008 and 2012/2013 project layouts but covers a slightly smaller area (approximately 46.2 fewer acres), leaving 354.8 acres to accommodate 36 wind turbines.

The results of the 2008 cultural resource surveys were submitted to the SHPO; response was received on September 24, 2008, recognizing that 121 resources were identified and determined eligible for listing in the National Register of Historic Places (NRHP). As a result of the submittal of the 2012/2013 addendum, on September 30, 2013, responses were received recognizing a 15-acre increase in the Project Area and the inclusion of eight additional resources and one historic district that were also determined eligible for listing in the NRHP. Both letters

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2 As defined in 36 Code of Federal Regulations Section 800.16(d) the "area of potential effect" means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Therefore, an APE may include any area of direct construction impact as well as access roads, staging areas, utility lines, or any other area that the construction contractor may have access to in association with the Project.

concluded that the Project would have an "adverse impact on cultural resources." On December 10, 2015, the Phase I archaeological survey report for the redefined Project area was submitted to SHPO for review and comments; the Phase I architectural survey report was submitted on December 28, 2015. On January 7, 2016, the SHPO concurred with the findings of the Phase I archaeological survey report, stating that no additional survey was required within the Project APE. To date, no response has been received from the SHPO regarding the Phase I architectural survey report; once received, this information will be included in the FEIS.

The 2008 cultural resources report was included as Appendices S and T of the 2008 DEIS, and is attached hereto as Appendix A. The 2012/2013 and 2015 reports are included in Appendix S of this SDEIS.

On April 4, 2008, in accordance with Section 106 of the NHPA, informal consultation requests highlighting the development process and location of the Project were submitted to three federally recognized tribes known to have cultural ties to region: the Seneca Nation, the Tonawanda Band of Seneca Indians, and the Tuscarora Nation. In August 2008, copies of the Phase I cultural resource reports were also submitted to the respective tribal authorities for review and comments. To date, no responses to these requests have been received. As a follow up to these actions, letters outlining recent changes to the Project and copies of the 2015 cultural resource survey reports will be submitted to each of the three tribal authorities; this information as well as any subsequent responses will be included in the FEIS.

Architectural Resources

The purpose of the architectural studies was to identify properties, districts, and sites that are listed or may be eligible for listing on the NRHP within the Project Area and the ZVI surrounding the Project components. For this investigation, the ZVI is defined as the area from which the proposed undertaking may be visible within a 5-mile radius of each turbine and within 3 miles of the proposed transmission line.

Prior to initiating the architectural survey, NYS and NRHP files were reviewed to identify previously recorded historic and architectural resources within the Project Area and ZVI. A viewshed analysis map was developed to determine where turbines and transmission lines would be visible, based solely on topography. Buildings and districts in the APE and the positive ZVI (i.e., one or more turbines could be viewed from the location) were then reviewed and surveyed to identify properties, sites, or districts that are already listed, or possibly eligible for listing on SHPO and the NRHP. Local sources, references, and historic maps were reviewed in order to establish a historic context of the region in order to supplement National Register Eligible (NRE) evaluations. In some cases, additional information about specific buildings or farm complexes was supplied by the owner of the property or other interested/informed residents of the community during field reconnaissance.

All properties within the ZVI were submitted to the SHPO for review. These locations were compared with data on file with the SHPO showing previously listed NRHP properties and historic properties classified as NRE. In 2008, a total of 132 individual NRE properties and one NRE historic district were identified. In 2012, Panamerican conducted a comparative analysis of the 2008 data to determine the location of 32 additional significant properties within the overlap of the two Project APEs. This information was provided in an addendum report submitted in 2013 (see Appendix S of this SDEIS).

In 2015, Panamerican compared the results of the 2012/2013 addendum with the current visual APE. Slight increases in turbine heights and layouts were found to have only minimal impacts on the surrounding viewshed; those areas that fell outside the 2008 and 2012/2013 study areas were subject to field inspection. A total of 163 previously identified historic architectural resources were re-identified within the 5-mile ZVI study area; portions of two historic districts with an "undetermined" NRHP status were also found within the current ZVI. In summary, no new National Register List (NRL) or NRE properties were identified within the current visual APE. The number of turbines that will be visible from NRL or NRE properties is 19; the average distance from these properties to the nearest turbine in 3.7 miles.

Archaeological Resources

The purpose of the archaeological portion the 2015 addendum was to identify all archaeological and cultural resources in the Project Area. During the 2008 Phase 1A[3] and 1B[4] investigations conducted by Panamerican, in accordance with SHPO guidelines (2006), the APE was broken into environmental zones (*summits, knolls, and ridges*; *saddles between knolls and ridges*; *near stream headwaters, banks, and ridges*; and *near bogs, swamps, ponds at stream headwater on saddles between knolls and ridges*). The number of required shovel tests was divided between these four zones according to the percentage of each topographic type found within the APE. All background research and literature review was conducted as part of the Phase 1A investigation. As a result, any previously identified archaeological site(s) and map-documented structures (MDSs) were evaluated as part of the subsequent Phase IB archaeological field surveys. Shovel tests were conducted within the Project Area at approximately 16-foot (5-meter) intervals to varying depths to assess the depth of the plowzone and other soil characteristics associated with the various landforms present within the APE as well as to determine the presence or absence of cultural remains within the soil matrix.

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[3] This is the initial level of survey and is carried out to evaluate the overall sensitivity of the Project Area for the presence of cultural resources as well as to guide the field investigation that follows.

[4] In the Phase IB survey it is necessary to determine the presence or absence of cultural resources in the probable impact areas. The areas to be subjected to testing are selected on the basis of the data gathered in the Phase IA evaluation and the probable locations of ground-disturbing activities. Subsurface testing is the major component of this level of survey and is required unless the presence or absence of resources can be determined by direct observation or by examination of specific documented references.

The 2012/2013 Project configuration included several areas in the town of Villenova where linear components (access roads and collection lines) extend along roads that were outside the archaeological APE for the 2008 configuration. These areas intersect with three map-documented structures. Panamerican conducted a field investigation of these three areas (arbitrarily labeled A, B, and C) in 2012 and 2013 that included walking reconnaissance, photo documentation, shovel testing, and documentation of the fieldwork. A general summary of the results of the shovel tests are shown in Table 2.14-1 and detailed methodology and documentation are provided in the 2012/2013 cultural resources addendum report in Appendix S.

In both areas A and B, four historical artifacts were found (two in each area), no historical features were identified and no prehistoric remains were found. Panamerican concludes that it is highly unlikely that potential NRE archaeological resources are present within areas A and B and, therefore, the installation of wind farm components would not affect archaeological and cultural resources in this area and no further investigations are recommended.

In Area C, 86 historical artifacts were found. The artifacts were found across the entire study area (many shovel tests) and show indications that they are associated with historical inhabitants previously identified in historical mapping. The remains have been designated as the PCI/Ball Hill-3 archaeological site.

Table 2.14-1 Shovel Testing Results of 2012/2013 Investigation

Area	Number of Shovel Tests	Positive Shovel Tests (historical artifacts found)	Number of Historical Artifacts found
A	24	2	2
B	20	2	2
C	26	14	86[1]

Note:
1 A total of 59 historical artifacts were found in the 14 positive shovel tests; the additional 27 historical artifacts found were on the surface.

A review of archaeological site files conducted during the previous investigations for the Project (2008) revealed that there are 18 previously identified archaeological sites within 5 miles of the Project, but none are in or near its current configuration. The 2008 investigation showed that, at that time, 20 MDS would be crossed by Project access roads or collection lines. Archaeological surveys at these locations in 2008 identified historical sites at defined areas PCI/Ball Hill-1 and PCI/Ball Hill-2. PCI/Ball Hill-1 is roughly 60 meters (200 feet) from one of the current Project laydown areas, but close-interval shovel testing conducted near the site in 2008 indicates it will not be affected by the Project. PCI/Ball Hill-2 is no longer in the archaeological APE (see Appendix S).

While 6,416 shovel tests were dug for the 2008 configuration, new calculations indicated that 240 additional shovel tests were needed to cover the 2012/2013 layout. No potential NRE archaeological sites were identified as a result of these investigations. Since the 2015 APE has 46.2 fewer acres than the area previously surveyed and crosses similar local habitat areas, the results generated by the previous investigations are applicable to assessing the archaeological sensitivity of the current APE.

2.14.1 Construction Impacts

Architectural Resources

Construction of the Project will not directly impact architectural resources (i.e., demolition of any NRE buildings). As presented in Appendix S, no NRL, NRE or potentially eligible structures or buildings will be demolished or physically altered in connection with the Project. There is some potential for visual and noise impacts from construction at structures potentially eligible for NRHP listing; however, these impacts will be insignificant due to their temporary nature (see discussions of visual and sound impacts during construction in Section 2.7, Visual Resources, and Section 2.8, Sound.)

Archaeological Resources

As described above, Area C has been designated as part of the PCI/Ball Hill-3 archaeological site. However, discovery of this archaeological site led to a redesign of the Project footprint in 2012/2013 to avoid any impacts on potentially significant archaeological resources. The current Project layout also avoids this area.

In the event of an unanticipated discovery of archaeological resources during construction, Ball Hill will stop work immediately in the vicinity of the find and contact SHPO. The nature and extent of the resource will be assessed by Ball Hill's archaeological consultant. A Plan for Unanticipated Discoveries is provided in Appendix T of the 2008 DEIS (see Appendix A).

2.14.2 Operational Impacts

Architectural Resources

Operation of the Project will have a visual effect on a number of properties that are NRE or potentially NRE. There are 163 properties located within the visual APE: 142 individual properties and 21 properties within two NRE districts.

Determining the actual impact of the Project on such properties is difficult for a number of reasons. First, modern intrusions may have already compromised the viewshed of some historical settings. Though existing modern visual intrusions such as telephone poles, electrical distribution lines, and silos are relatively small compared with the much taller wind turbines, they have impacted the rural setting in which the rural ostensibly vernacular architecture exists. Second, because the ZVI is topography-based and does not include vegetative cover, it likely overestimates the number of visible turbines and the area from which they can be seen. The actual impacts on these resources will vary with the surrounding topography, distance from the turbines and transmission lines, existing landscaping and vegetation, and surrounding land uses and will not be fully understood until the Project is constructed.

While there may be some screening afforded by structures, mature trees, shrubbery, and other plantings during the growing season, the prominent features of the turbines will be visible or partly visible from listed or NRE properties of concern during the periods of dormancy. The data provided by ZVI analysis and mapping suggest that turbines are likely to be visible from many of these properties.

A Zoned Relative Visibility Assessment has been performed for the Project by Panamerican. The study employs a distance–zone concept, based on procedures developed by the U.S. Forest Service, to assist in evaluating the visual impact of the Project. In this framework, the Project viewshed is divided into zones of relative visibility based on geographical distance: foreground (0 to 0.5 miles); middle ground (0.5 to 3.0 miles); and background (3.0 miles to horizon). Of the identified properties, five are situated such that proposed turbines are in the visual foreground (map points 41, 114, 115, 121, and 125), 65 are at locations where turbines would be in the visual middle ground, and 93 are situated such that proposed turbines are in the visual background (more than 3.0 miles from the structures).

The Project will likely change the visible landscape of the region and create a distinct visual aspect. The largest visual impacts will be on open farming land (rural agricultural landscapes), and any of the following that have open/clear views of the wind farm: historic properties on ridges, cemeteries, historic properties within the towns of Villenova and Hanover, historic properties along major thoroughfares in the area, and at historic crossroads communities. For a more detailed discussion of visual impacts, see Section 2.7, Visual Resources.

Archaeological Resources

As described above, Area C has been designated as part of the PCI/Ball Hill-3 archaeological site; however, this area was outside the 2012/2013 configuration and is also outside the current layout (see Appendix S).

2.14.3 Mitigation

Architectural Resources

Ball Hill will consult with the SHPO pursuant to Section 106 of the NHPA and Article 14 of the New York Parks, Recreation, and Historic Preservation Law. As part of this consultation, Ball Hill may be required to mitigate adverse visual effects on NRE and NRL properties. Because National Register properties are within the ZVI, it is anticipated that mitigation for visual impacts will be required. As part of the consultation process, it is anticipated that the SHPO will approve an appropriate combination of mitigative actions, which Ball Hill will be required to implement. Proposed mitigative strategies are included in the *Architectural Survey for the Ball Hill Wind Project Towns of Villenova and Hanover, Chautauqua County, New York Addendum #2* (see Appendix S), and include the following:

- Professional design and siting;
- Maintenance;
- Surveys;
- Monetary contributions;
- Heritage tourism;
- Educational activities; and
- Historic activities.

Due to the size of the wind turbines and the geographical extent of the Project, direct mitigation through plantings and screenings is generally not considered viable. Most of the inventoried structures that are determined NRE are such because they embody the distinct characteristics of a type, period, or method of construction. They may also be part of a rural landscape or historic district. It is in these contexts where adverse visual impacts are most likely to occur because, in these cases, the environmental setting provides added significance to these resources. At the same time, these entities have generally large geographic extents that result in even greater difficulty when considering direct mitigation measures. In some cases, direct mitigation measures, such as tree planting and screening, may actually be a source of negative visual effects. For example, a rural agricultural landscape may be characterized by open space and cultivated fields. The introduction of rows of tall trees may actually be more intrusive than the background visual impact of the Project itself. In addition, moving tower locations will not significantly minimize impacts due to their general placement throughout the landscape. Based on these conditions, direct mitigation will have little effect toward actually mitigating impacts from the proposed Project. Thus, the Plan proposes a candidate list of “indirect mitigation” projects to address the Town of Villenova’s and the Town of Hanover’s preferences for mitigation. Ball Hill will conduct meetings with Town officials in both Villenova and Hanover to solicit the Towns’ views with regard to indirect mitigation measures. Based on the host communities’ expression of local needs and interest, Ball Hill has developed a list of candidate projects/project types within each type of strategy. More details on these strategies are presented in Appendix S.

Professional Design and Siting. NYSDEC considers a properly designed and sited project the best way to mitigate potential impacts. The Project has been designed to mitigate visual impact where practical.

Maintenance. NYSDEC considers the maintenance of buildings/structures and landscapes and decommissioning to be a mitigation strategy. Proper maintenance prevents “eyesores” and is a part of Ball Hill’s plan for the Project. A decommissioning plan is included as Appendix N of this SDEIS.

Surveys. The completion of various types of surveys can be utilized as an “offset” according to NYSDEC. An “offset” is the correction of an existing aesthetic problem identified within the ZVI as compensation for Project impacts. Elements of these surveys include, but are not limited to, GIS mapping of cultural resources in the affected area, listing NRE resources, and completing a detailed architectural survey of Chautauqua County.

Monetary Contributions. The creation of a pool of funds by a third party can be an effective way of offsetting Project impacts. Some examples include, but are not limited to, establishing a monetary fund, with SHPO oversight to initiate a historic landscape preservation program; establishing a cemetery maintenance program; providing funds towards construction of an "historic center" for storage and display of historic material; donations to libraries; and creation of an Historical Property Visual Mitigation Grant Fund for use by the owners of historic structures affected by the Project.

Heritage Tourism. Heritage Tourism projects fall within the traditional Section 106 mitigation techniques and can be used as an offset. These include but are not limited to video presentations, brochures, posters, driving/walking tours, exhibits, and still presentations, which can be used in schools, civic group meetings, on public access television, in libraries, and other public gathering places within the affected area.

Educational and History Activities. Educational and history activities can have a broad appeal and can target a wide age group. Some examples of activities include but are not limited to grade-appropriate lesson plans, graphic novels, hosting a public history day, popular written histories of the area, historic brochures, oral history projects, and placing historic markers and creating contexts specific to the area, particularly a regional farming context.

The draft mitigation plan will be submitted to the SHPO for review as part of ongoing consultation with that agency. Once a specific project is selected, a final mitigation plan with site-specific construction details will be submitted. The selection of the project and the details of the plan will be based on ongoing consultation and will be approved prior to construction.

Archaeological Resources

No mitigation strategies are necessary for the Project, since no significant adverse impacts on archaeological resources will occur during the construction and operation of the Project. The Project has been designed to avoid impacts on archaeological sites.

2.15 Health and Safety

This section describes emergency services in the vicinity of the Project Area, health and safety planning for the construction, operation, and maintenance of the Project by Ball Hill, and other safety considerations. Appendix G includes draft versions of a Safety Management Plan (SMP), Safety Program File (SPF), Quality Management Plan (QMP), and Emergency Response Plan (ERP) identified collectively as Ball Hill's Health and Safety Plans. Ball Hill's final Project-specific Health and Safety Plan will be prepared and finalized prior to the start of construction and more details will be included in the FEIS.

Ball Hill has a well-established safety culture and strongly believes that employees are the most valuable asset. Ball Hill has extensive documentation on safe work practices and operates according to an established Safety Management System designed to ensure compliance with federal, state, and local regulations governing occupational health and safety. Ball Hill is committed to providing and maintaining a healthy and safe working environment, as well as minimizing any potential risk to the public during construction and operation of the Project. The success of health and safety planning is dependent on implementation at every level throughout the organization and all personnel engaged on the Project.

Prior to construction, an SPF will be established to contain all work instructions and risk assessments, lifting plans, training records, and other safety documentation relating to the Project. Additionally, site-specific Construction Quality Plans will be established defining all quality documentation relating to the Project. Specific accident/incident prevention policies will be developed for these plans to maintain the health and safety of workers and protect private and public property. These plans will be continuously updated with the most current information prior to construction. In addition, Ball Hill will coordinate with utility companies, including National Fuel, to avoid any risk associated with construction near natural gas lines or wells. Whenever practicable, Ball Hill will also follow National Fuel Gas Supply Corporation's Pipeline Encroachment Policy and consult with National Fuel as needed if Project facilities have the potential to encroach on utility lines. The actions to be taken in the event of the discovery of natural gas are outlined below.

2.15.1 Emergency Services

The Chautauqua County Emergency Services Department coordinates the fire, emergency medical, and transportation services for the Project Area in cooperation with local volunteer fire departments. Access to Emergency Services is available 24 hours per day, seven days per week, through the Chautauqua County 9-1-1 Center. Brooks Memorial Hospital is located about 15 miles from the Project Site to the northwest in Dunkirk and the WCA Hospital is located about 25 miles from the Project Site to the south in Jamestown. Fire response for the Project Area is supported by the Hanover Center, Forestville, South Dayton, and Cherry Creek volunteer fire departments. The South Dayton Fire Department is located in Cattaraugus County but provides mutual aid to emergencies in Chautauqua County.

In general, the existing emergency response capabilities are adequate to provide any ambulatory, paramedic, or fire response services for Chautauqua County as described in the County's Comprehensive Emergency Management Plan. Specialized services associated with high-angle rescue will be provided by Ball Hill. Ball Hill will meet with local emergency personnel to provide training and review site-specific risks prior to the start of construction. The Project's site-specific ERP will be fully developed and finalized in accordance with the risks that are identified. A draft ERP is included in Appendix G; additional details will be included as part of the FEIS.

2.15.2 Health and Safety Planning

The development and implementation of plans for the safe design, construction, and operation of all Project facilities is integral to Project operations. The Ball Hill management team is committed to a healthy and safe working environment. The success of the SPF and Construction Quality Plan depends on their implementation at every level throughout the organization by all personnel engaged on the Project. The implementation of the SPF and Construction Quality Plans is an ongoing process. From the first design effort through procurement to construction and operations, the plans will be established to provide awareness and participation by all persons. Maintaining the health and safety of workers and residents as well as the protection of property will be achieved through adherence to the following accident/incident prevention policies:

- Minimizing unsafe conditions;
- Minimizing risk of unsafe acts by providing competent supervision to ensure use of proper techniques and methods;
- Daily tailgate safety meetings, weekly safety meetings, and monthly safety shutdowns;
- Plan of the day meetings, site- and scope-specific planning meetings, weekly conference calls, weekly progress reports, monthly progress reports, monthly Project meetings;
- No unauthorized access;
- Safety orientations;
- Drug and alcohol testing;
- Communication;
- Cardiopulmonary resuscitation, automated external defibrillator, and first aid training; and
- External audits.

The Project will have a full-time RES Site Safety Supervisor. The Safety Supervisor duties include:

- Ensure all on-site work adheres to defined safety requirements;
- Manage all RES subcontractor safety representatives. The safety representatives' duties include:
  - Act as point of contact for safety with the RES Safety Supervisor,
  - Maintain a "safety first" attitude with subcontractor personnel, and
  - Pass along critical information in a timely manner to subcontractor personnel.

While the RES Site Safety Supervisor has assigned responsibilities for safety management, all RES employees in the field — from Project manager to inspector to equipment operator — will be informed of their role as safety stewards and their obligation to watch for, prevent, and report potential hazardous conditions.

A Project-specific ERP will be developed prior to construction that will identify local emergency response contacts and procedures. The ERP will provide policies for pre-emergency planning, employee roles and responsibilities, communication resources, responsible organizations (i.e., emergency response units), internal and external alerting, actions to be taken during an emergency, evacuation, disposal of contaminants and debris, site restoration and remediation, post-incident evaluation, training, and practice drills. The Project-specific ERP will be fully developed and finalized with the most current information prior to construction and provided to the Towns of Villenova and Hanover prior to the start of construction. A draft ERP is included in Appendix G; additional details will be included as part of the FEIS.

2.15.3 Fire Safety Planning

The Project's Health and Safety Plan will incorporate fire-safety planning consistent with Ball Hill standard practices used in other facilities of its parent company to ensure that fire safety planning is incorporated into the design, construction, and operation of all facilities.

Each turbine will be located on a parcel of open land that occupies a maximum of 230-foot radius around the turbine pedestal. The open land will be free of significant vegetative regeneration, thus minimizing the potential spread of a fire should one start. Significant vegetative regeneration will be avoided by regular maintenance, which will consist of trimming of trees and clearing of undesirable vegetation by side trimming, cutting, and mowing.

The fire-protection features of the turbines include components within the nacelle that monitor bearing, oil, and nacelle temperatures. These components will be connected to the turbine supervisory control and data acquisition (SCADA) system. The SCADA system will monitor sensor temperatures and automatically shut the turbine down and send an alarm to the control room if predetermined set points are exceeded. In addition to the monitoring system, each nacelle and each service vehicle will be equipped with a fire extinguisher.

Beyond the physical fire protection components of the facility, the operations staff will develop a site-specific ERP prior to the start of construction. This plan will detail the actions to be taken by the site manager and staff should an emergency or fire occur. The ERP will be coordinated with the local fire departments and emergency response organizations and will establish the lines of communication in the event of a fire or other emergency.

Local fire departments and emergency medical services will be consulted in the development of the Project-specific ERP, and local responders will receive training so the roles of all parties are clearly understood in the event of a fire. The Project-specific ERP will be fully developed and finalized prior to construction of the Project. Specialized services associated with high angle rescue will be coordinated by Ball Hill in cooperation with the local departments.

2.15.4 Combustible Fuel Safety Planning

The Project Site contains several public and private natural gas lines and wells. Prior to final design and construction, Ball Hill will coordinate with "Dig Safely New York" and the respective gas utility companies to determine the locations of all active gas lines and wells within the Project Site. Gas companies will be consulted to allow Ball Hill to establish appropriate setbacks and crossing procedures to effectively minimize risks of interference. Where encroachments are necessary, Ball Hill will coordinate with the applicable company to be consistent with its encroachment polices. During construction, no gas line will be crossed without it first being exposed to confirm its depth.

In addition to natural gas lines and wells, propane and acetylene will be stored and used at the construction site. The SPF will include safety and handling procedures for cylinders and tanks used on site during construction. These measures include appropriate tagging, placement on a solid base eliminating direct contact with the ground, and minimum distances from any buildings and combustible materials (25 feet for 1,000-gallon tanks).

If a gas leak from a utility is reported during construction, access to the area will be restricted and the presence or absence of gas will be confirmed by the appropriate gas company. When necessary, gas-detection instruments will be used to conduct a thorough inspection for the presence of gas, and personnel will take the following actions:

1. Notify the utility and local emergency responders, if applicable; and
2. Continue to restrict access to the area until the origin of the gas is established and it is determined by emergency response authorities to be safe to lift the restriction.

2.15.5 Design Requirements

The electrical power generated by the wind turbines is transformed and collected through a network of mostly underground cables that terminate at the proposed Hanover substation on Hurlbert Road. Power from the turbines is fed through a breaker panel at the turbine base inside the tower and is interconnected to a step-up transformer that steps the voltage up to 34.5 kV. The transformers are interconnected on the high side to underground cables that connect all of the turbines together electrically. The underground cables are installed in a trench that is typically 48 to 60 inches deep. The underground collection cables feed to larger feeder lines that run to the main substation. In locations where two or more sets of underground lines converge, pad-mounted, three-way junction terminals will be used to tie the lines together into one or more sets of larger feeder conductors. Final design and construction of the overall electrical system will be in accordance with the Guidelines of the NEC, the NFPA), and the host utility (NYPA) requirements.

The Town of Villenova local law requires that turbines include the following safety measures:

- Each WECS shall be equipped with both manual and automatic controls to limit the rotational speed of the rotor blade so it does not exceed the design limits of the rotor;
- If the property owner submits a written request that fencing be required, a 6-foot-high fence with a locking portal shall be required to enclose each tower or group of towers. The color and type of fencing for each WECS installation shall be determined on the basis of individual applications as safety needs dictate;
- Appropriate warning signs shall be posted. At least one sign shall be posted at the base of the tower warning of electrical shock or high voltage. A sign shall be posted on the entry area of fence around each tower or group of towers and any building (or on the tower or building if there is no fence), containing emergency contact information, including a local telephone number with 24-hour, seven days per week coverage. The Town Board may require additional signs based on safety needs;
- No climbing pegs or tower ladders shall be located closer than 12 feet to the ground level at the base of the structure for freestanding single pole;
- The minimum distance between the ground and any part of the rotor or blade system shall be 20 feet;
- WECS shall be designed to prevent unauthorized external access to electrical and mechanical components and shall have access doors that are kept securely locked; and
- Accurate maps of the underground facilities shall be filed with the Town and with “Dig Safely New York” or its successor.

The Town of Hanover local law requires that turbines include the following emergency shutdown and safety measures:

- Procedures acceptable to the Hanover Town Board for emergency shutdown of power generation unit shall be established and available with local agencies as required by the Town;
- Applicant shall post an emergency telephone number so that the appropriate people may be contacted should any wind energy-deriving tower need immediate attention;
- No WECS shall be permitted that lack an automatic braking, governing, or feathering system to prevent uncontrolled rotation, over speeding, and excessive pressure on the tower structure, rotor blades, and turbine components;
- The safety of the design of all conversion systems shall be certified by a licensed professional engineer experienced in WECS. The standard for certification shall be good engineering practices and shall conform to NYS's officially adopted building and electrical codes; and
- The minimum distance between the ground and any part of the rotor blade shall be 30 feet.

Ball Hill will comply with all of these requirements.

The wind industry designs wind turbine systems in accordance with International Electrotechnical Commission (IEC) standards. IEC is an internationally recognized organization that prepares and publishes standards for electrical related equipment systems. The Vestas 110-2.2 and GE 2.6-116 or similar wind turbine systems to be used for the Project are designed in accordance with these standards and Vestas and GE have each obtained a Statement of Compliance certifying their designs are in conformance with the IEC standards (IEC 61400-1 ed. 3: 2005, including A1 and IEC 61400-22 concerning design and manufacture). All turbines will be constructed to ensure compliance with all fatigue loading requirements. Prior to financing and construction of the Project, Vestas and GE will produce a Mechanical Loads Analysis that uses site-specific data and loads analyses to confirm that the site-specific conditions do not result in any exceedance of extreme or fatigue loads on the wind turbine that would violate the conditions the turbine was designed to withstand.

2.15.6 Ice Shed

While ice shed has emerged as a public concern associated with wind energy facility safety in cold weather climates, proper siting and adherence to setback requirements and safety procedures minimize any potential risk to the public. Ice shed, or throw, is caused by the buildup of ice on the turbine's blades and can occur under certain conditions. This generally takes place when a stationary blade accumulates ice followed by an increase in temperature, which causes the ice on the rotor blades to thaw. If the blades are stationary, the ice will fall near the turbine base, but once the blades begin to rotate, ice fragments on the blade may be thrown under certain wind speeds and directions.

When temperatures are below or just above freezing, the risk of ice buildup exists and can occur as result of two types of events: creation of rime and freezing rain. The remainder of this section acknowledges this risk and presents the prevention measures to be taken to effectively minimize risks to safety if icing were to occur.

The setbacks included in the Town's wind laws require a 1,000-foot setback from the nearest off-site residence and 500 feet from the nearest public road. Ball Hill adheres to a more stringent 1,640 feet setback from a residence wherever practicable. The Project has been sited in order to protect the public from the potential danger of proximity to turbines. In addition, potential safety concerns as a result of ice shed are considered low because the Project is located on private property and access by the general public is restricted. As a result, incidents from ice shed should be minimal. The operations staff working in and around the turbines may be at risk of ice shed from the blades if they are beneath the blades when icing conditions exist; however, the staff will be trained in recognizing this condition and have specific protocols to follow if they are working when such conditions exist. These protocols include: contacting Ball Hill's operations team to determine if an icing event has occurred based on turbine output and wind speed; visual inspection for ice; restricting individuals from within 300 feet of an operating iced turbine; restricting tower entry (for example, if the rotor is directly over the tower door); mandatory use of hard hats; and parking company vehicles a safe distance away.

In addition, ice buildup slows a turbine's rotation, which can be sensed by the turbine's control system. The plant operators have a standard operating procedure that requires them to closely monitor turbine performance vs. wind speed (anemometers are heated so icing is not an issue for them) when icing conditions could exist based on weather forecasts. If performance is below normal due to the ice buildup, the operators can initiate shutdowns.

Academic research and risk analyses have been conducted on the subject of ice shed and throw, primarily in Europe. The general conclusion is that wind turbines should not cause risks as they are normally set back from residences and roadways and that the hypothetical risk of being struck by ice is small, particularly by large and/or long ice fragments, which experience more drag and will hit the ground closer to the turbine.

Published literature by Seifert et al. (2003) reports typical drag coefficients for ice particles at 1.2 based on wind tunnel testing. In the throw forecast calculations, a conservative 1.0 drag coefficient and a maximum wind speed of 18 meters per second (m/s; 40 mph) is used. The report describes observed ice fragment throws based on data from several test sites at various locations in Europe and wind tunnel simulations, the longest of which was slightly less than 410 feet (125 meters). The comparison between calculations and an inquiry among operators of wind turbines has shown hypothetical calculations to be conservative (Seifert et al. 2003).

In 2007, Garrad Hassan and Partners, Ltd. developed risk assessment recommendations for the Canadian Wind Energy Association. The example calculations were designed to represent a typical wind farm project in rural southern Ontario, a climate similar to that of the Ball Hill Project Area. The calculated risk associated with an ice throw event striking a fixed dwelling located 300 meters (984 feet) from a turbine was calculated to be 0.000002 strikes per year, equivalent to one strike per 500,000 years. The probability of a vehicle being struck while traveling on a public roadway located 200 meters (656 feet) from a turbine is 0.0000038 strikes per year, equivalent to one vehicle strike per 260,000 years. The probability of an individual being struck within 300 meters (984 feet) of a turbine is even smaller, 0.000000007 strikes per year, or one strike in 137,500,000 years (Garrad Hassan Canada, Inc. 2007). In comparison, the average annual per capita lightning strike rate in the United States is approximately one in 600,000, which is significantly higher than the probability of an individual being struck by ice thrown from an operating wind turbine.

2.15.7 Blade Failure/Throw

Blade failure is very rare and can be attributed to improper design or assembly, manufacturing defects, extreme weather events, or the wrong application of technology (Garrad Hassan Canada, Inc. 2007). Proper turbine selection, inspection, maintenance, and operation combined with setbacks from houses, roads, and other structures effectively eliminate the risk to public safety. Some instances of blade failure have been documented in older turbine models, which have resulted in a blade or portion of a blade being thrown from the nacelle while the turbine is operational. This safety concern has been effectively minimized through modern wind technology advances in design and manufacturer quality control. Once constructed, the Project will be constantly monitored through a SCADA system, which can alert staff before most incidents occur.

Additionally, according to Vestas and GE, manufacturers of the turbine models being considered for the Project, of the Vestas and GE models in circulation throughout the world, no cases of blade throw are known to have occurred.

The primary safety measure employed to avoid the risk of damage from a blade failure event is the establishment of safety setbacks from residences, property lines, roads, and other permanent structures as required by the Town of Villenova and Town of Hanover, as well as additional setback requirements imposed by Ball Hill. Also, the Project is located on private property and access by the general public is restricted.

In addition, Ball Hill has incorporated the following strategies to prevent the possibility of blade failure.

Compliance with IEC Testing Standards

Usage of the wind turbines is certified by internationally recognized agencies to comply with international industry (i.e., IEC) standards. IEC testing standards include both fatigue and maximum-strength testing. The fatigue testing typically includes long duration testing of continuously cycling the load on the blade. Similarly the extreme load test is usually a test to failure, and it mimics the specified extreme load.

Regular Inspection and Maintenance Programs

The blade manufacturing industry follows rigorous quality plans and standards that are reinforced by the turbine manufacturer's quality inspection. As with all types of important machinery and components, all components are inspected regularly for safe and reliable operations.

Automatic Blade Pitch Adjustments

Extreme weather events are subject to occur and, as such, blade failure could occur due to an extreme storm, such as tornado or hurricane. In the event of extreme weather, Vestas and GE turbine blade pitch will automatically adjust and the machine will stop. Additionally the mechanical brake will be activated to block the rotor in place minimizing the potential of blade failure. Lastly, the turbine is equipped with vibration sensors capable of detecting and reacting to any imbalance in the blades and shutting down the turbine, if necessary.

Mechanical Load Analysis

Blade failure sometimes occurs when an inappropriate turbine model is selected for a site. In order to avoid this, turbine manufacturers analyze the wind data of the chosen site and confirm that the selected wind turbine model is sufficient. Vestas and GE define the results of this analysis as the Mechanical Load Analysis (MLA). Essentially the MLA is an extreme and fatigue load analysis based on wind data provided to Vestas and GE. Once analyzed, Vestas and GE will confirm whether the selected model is suitable for the site based on IEC standards.

2.15.8 Other Health and Safety Considerations

Stray Voltage

In a 1998 report, the Science Advisors to the Minnesota Public Utilities Commission (Staehle et al. 1998) define stray voltage as "the difference in voltage measured between two surfaces that may be contacted simultaneously by a person or animal (typically less than 10 volts). Sources of AC stray voltage are neutral-to-earth voltages resulting from normal current flow on a resistive neutral system. Stray voltage may be enhanced by poor electrical connections, deteriorated insulation, or faulty equipment."

Effects of stray voltage in livestock have been extensively researched and although conflicting information exists on this topic, scientific studies have failed to show that adverse health effects are directly associated with the low level of currents associated with stray voltage (Staehle et al. 1998). Farm animal exposures and their effects are the main focus of much of the research on the topic; however, some studies on human exposure are also included. Although both humans and animals can experience voltage gradients, livestock have a higher likelihood of stray voltage exposure than humans given their confinement, lack of protective barrier (e.g., boots and gloves) and physiology. Physiologically, dairy cows have a lower resistance to electric current flow than humans (Peterson 2008). According to the Wisconsin Public Service Commission (Wisconsin PSC), stray voltage is often not noticeable to humans (Wisconsin PSC 2004). Under normal conditions, farmers are less likely to be affected by stray voltage than their animals (Hultgren 1990). The electrical distribution system of the Ball Hill Wind Project will be designed and constructed to be in accordance with all applicable electrical codes (i.e., NEC, NFPA, and NYPA requirements). Therefore, the electrical distribution is not anticipated to contribute to or cause stray voltage.

The facility will have a continuous grounding system installed that will tie each turbine independently into the grounding loop which will include grounding transformers thus eliminating any potential hazard that stray voltage created by the Project may pose to persons or livestock. In addition to having a site-specific grounding system, the power distribution system for the Project will be buried with a minimum of 42 inches of cover and the turbine transformers will be adequately grounded. The electrical distribution system and all conductors will be inspected before installation, after installation, and prior to energization of the Project for any faults or potential future problem areas. Underground and overhead electric cables will be designed in accordance with standard utility specifications and will have appropriate shielding and insulation.

Electric and Magnetic Fields

Electric and magnetic fields (EMF) is a term that describes electric and magnetic fields associated with the flow of electricity through power lines, wiring in buildings, and electrical appliances. The electric field is produced by stationary charges, and the magnetic field by moving charges (currents). These physical fields can potentially affect the behavior of charged objects in the vicinity of the field. The strength of EMF falls rapidly as one moves away from the source. At the frequencies used in the electric power industry, the evidence for adverse health effects associated with exposure to EMF is limited. NYS has established informal guidelines for magnetic field strength along the ROWs for overhead power transmission lines. The guideline limits for magnetic field strength are 200 milligauss at the edge of a transmission line ROW. The Project will be engineered to meet or exceed NYS EMF standards.

Implantable medical devices, such as pacemakers, have been associated with electromagnetic interference (EMI) problems. EMI can cause inappropriate triggering of a device or inhibit the device from responding appropriately. Transmission lines are only one of a number of external EMI sources. Other sources of EMI include cellular phones, vehicle security systems, slot machines, car engines, and high-voltage electrical systems and devices. All pacemaker patients are informed of potential problems associated with exposure to EMI and must adjust their behavior accordingly. Moving away from a source is a standard response to the effects of exposure to EMI. Patients can shield themselves from EMI with a vehicle or building (Wisconsin PSC 2004).

Lightning

Lightning, if it strikes a turbine, will dissipate to the ground through the lightning protection system. Each turbine blade is equipped with a small conductor located at the tip of the blade. This sensor is connected to the grounding grid surrounding the turbine foundation. All lightning strikes will travel directly to the ground and will not affect the turbine or the surroundings. In addition, weather conditions including severe thunderstorms and lightning are remotely monitored by Ball Hill operations team, which alerts Ball Hill operations staff of potentially hazardous working conditions. Operations staff will not work “up-tower” if lightning storms are detected in the area.

3 Construction and Decommissioning

3.1 Description of the Proposed Construction Plan

3.1.1 Construction-Related Approvals and Schedule

Construction of the Project is expected to begin in 2017 and end in 2018, although weather and other factors may increase or decrease the length of the anticipated 12-month construction schedule. Ball Hill will obtain all necessary permits and approvals prior to the start of construction. Of note:

- Construction will be monitored by Ball Hill personnel, Ball Hill's environmental supervisor, and the Towns' environmental inspectors to ensure that all construction is conducted in accordance with federal, state, and local permits and conditions, agreements, and regulations.
- All stream and wetland crossings will be performed in accordance with the requirements of permits issued by NYSDEC and the USACE.
- Activities within active agricultural fields will be conducted in accordance with NYSDAM guidelines to the greatest extent practicable and in accordance with Town approvals and landowner input.
- A site-specific SWPPP will be prepared and implemented prior to construction and individual Notices of Intent for construction will be filed in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity requirements. A description of stormwater pollution prevention measures that will serve as a basis for creation of a site-specific SWPPP is provided in Appendix E. The SWPPP will be submitted to the Towns for review prior to the issuance of building permits.
- Ball Hill will enter into Road Use Agreements with the Towns of Villenova and Hanover and Chautauqua County as appropriate, and obtain permits from the NYSDOT to allow improvements and modifications to existing roads and ROWs prior to the start of construction.
- Ball Hill will obtain building permits as required and submit entranceway, roadway, and gate details as a component of this permit application process Final engineering plans that include parcel boundaries and road and utility ROWs verified by licensed surveyors will be provided prior to issuance of building permits.

- Ball Hill, or its contractors, will coordinate with "Dig Safely New York" and the respective gas utility companies to determine the locations of all active gas lines and wells within the Project Site. Appropriate setbacks and crossing procedures will effectively minimize risks of interference. Where encroachments are determined to be necessary during Project engineering, Ball Hill will coordinate with the applicable company to be consistent with its encroachment polices.

3.1.2 Construction-Related Transportation

As described in Section 2.11, Traffic and Transportation, and in Appendix D, the Project construction activities will utilize the existing major transportation network present in the Project Area that includes town, county, and state roads. The state roads planned to be utilized for this Project may include NYS Routes 39, 83, 20, and 62. The county roadways to be utilized for this Project may include County Routes 72, 93, 91, and 87. Local area roads may include Buttermilk Road, Balcom Cross Road, Ball Hill Road, Empire Road, Hurlbert Road, Dye Road, East Lake Road, Smith Road, North Hill Road, Pope Hill Road, Round Top Road, Villenova Road, Bartlett Hill Road, and Prospect Road. All transportation and haul routes will be identified prior to the submittal of the FEIS.

The communities in the Project Area are characterized as rural and agricultural. Tables 7a through 7e of Appendix N of the 2008 DEIS indicate that each state and county highway mentioned above has adequate available capacity for the delivery of turbine components and other construction-related traffic. Available highway capacity is not a limiting factor in the selection of potential haul routes for the Project. The 2008 DEIS is attached to this SDEIS as Appendix A.

During construction, the large turbine components, which include the tower sections, nacelle, and rotor blades, will be transported from turbine manufacturer vendors or directly from a port to specific turbine sites for final quality inspections, staging, and erection. Along the off-site haul route, a laydown area may be used as temporary staging for verification of match marking, a quality receipt inspection, rinsing and any necessary rigging adjustments prior to site delivery. Turbine components will be rinsed with water only and no detergents, solvents, or other additives will be used. The proposed location for this laydown area is depicted on Figure 1.1-2 along NYS Route 39 near the intersection with Hanover Road in the town of Hanover; however, the final location is subject to change based on landowner consent. Materials, such as cable reels, pad mount transformers, overhead collection and transmission line poles, and 34.5-kV junction boxes, may be delivered to support specific scheduled construction activities.

If necessary, any potential off-site storage locations will be identified and investigated prior to and submitted in the FEIS.

3.1.3 Construction of Access Roads

New access roads will be built to a temporary width of up to 36 feet for use during construction. Construction ROWs will be further reduced for wetland and stream crossing areas in the FEIS as micro-siting is completed. The access roads will be constructed to accommodate heavy loads and the movement of equipment to support erection of the turbines. Once construction is completed, the 36-foot width (required for movement of cranes) will be reduced to an approximate 18-foot operational width (necessary for safe passage of opposing vehicles) for the O&M of the Project. All excavated materials will be disposed of at appropriate licensed or registered facilities. All access 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. Where unsuitable soils or high water tables are present the road composition may be altered in order to provide sufficient load bearing capacity. The materials used will meet NYSDOT specifications. The gravel roads will be constructed on suitable native fill. Geotextile fabric, or similar material, will be used to separate the native 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 storm water runoff from the roadways. To identify work areas, promote safety, and limit access by the general public, a temporary construction gate will be installed across access entrance roads near where these entrance roads intersect with public roads, and in other areas as requested by the individual landowners. These temporary gates will be well marked in accordance with established Occupational Safety and Health Administration (OSHA) standards with high-reflective warning signs. Location and type of permanent gating will be coordinated with the individual landowners.

The portion of the access road that interfaces with a municipal (i.e., town, county, state) road will be designed to the standards and criteria set forth by the municipality. The need for and sizing of culverts for access road entrances will be determined in coordination with the applicable agency. Access roads will be designed to minimize adverse effects (e.g., ponding water and increased runoff) to the intersecting roadway.

3.1.4 Installation of Turbines

In preparation for the installation of each turbine, a temporary staging area having a maximum 230-foot radius from the turbine pedestal, will be utilized at each turbine location for laying out equipment, turbine rotor assembly, and temporary stockpile storage of soils or other excavated materials. Within the staging area, a 270- by 240-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 270- by 240-foot square area will generally be limited to tree cutting necessary for rotor assembly and storage of excess topsoil, subsoil, or woody material including roots, logs, and/or wood chips. This disturbance area will be further minimized to avoid impacts on wetlands or other sensitive resources to the extent possible. Roots, logs, and wood chips that are unwanted by the landowner will be removed and disposed of by Ball Hill prior to restoration activities at appropriate, licensed, or registered facilities. In order to preserve its integrity and prevent mixing with subgrade material, topsoil will be stockpiled on topsoil. In areas where subsoil will be stockpiled, either the topsoil will be removed or it will be separated from the topsoil by a layer of geotextile fabric. All such stockpile areas will be restored upon completion.

After site preparation and grading is completed the foundation work commences with excavation of the foundation. Excavation of surface materials will be completed with care to ensure that topsoil and subgrade materials are segregated and stockpiled separately for use in restoring the construction site once turbine erection is completed. At this time, Ball Hill does not expect that blasting will be necessary for the Project. In the unlikely 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 Director, and the Chautauqua County Department of Health for their review. The blasting plan will include, at a minimum, the requirements as set forth in OSHA Standard 1910.109 and other applicable NYS standards. No activities requiring blasting will proceed until full approvals have been obtained.

Upon completion of excavation the process of pouring the foundation will begin. If the native subgrade material is found to be sufficient, the base excavated foundation hole will be compacted to the specification of the turbine foundation design. If the subgrade material is found to be unsuitable, either suitable material will be brought to the site or an alternative foundation design may be used to provide sufficient structural support for the turbine. Dewatering of the excavated hole will be done where necessary to provide dry conditions for pouring the foundation. Details and control measures for excavations and dewatering are discussed generally in this SDEIS and greater detail will be included in the site-specific SWPPPs. Once the foundation hole is, an initial thin layer of concrete, also known as a mud mat, will be poured to provide a solid and level work surface for construction of the foundation. Next the rebar foundation frame will be constructed. Once the rebar has been assembled the concrete will be poured for the foundation. After the foundation concrete has cured, the pedestal, the portion of the foundation that the turbine is bolted to, will be poured. Finally, after the concrete has been given sufficient cure time and has been checked for quality assurance purposes, the entire foundation will be backfilled with native material and proof-rolled to provide the specified compaction over the foundation. Potential impacts of construction traffic are analyzed in Section 2.11, Traffic and Transportation.

To accommodate heavy lift crane stability, a gravel crane pad generally 100 feet by 60 feet will be installed within the turbine staging area. This crane pad will be installed with a slope of 1% or less in all directions utilizing structural fill. After each turbine has been installed, all disturbed areas within the turbine staging area will be restored with subsoil and stockpiled topsoil, with the exception of the crane pad, which may remain in place for future maintenance of the turbine.

All foundations and underground infrastructure will be in place for the life of the Project. The pad-mounted transformers located at each turbine site will be situated so that there is at least 6 feet of clearance between the transformer and any other Project components. Once installed, all Project components will be fixed in place.

3.1.5 Installation of Collection System

The electrical power generated by the turbines in both towns will be transformed and collected through a network of underground and overhead cables (if necessary) terminating at the proposed Hanover substation. If overhead collection were to be required in future site design it would be to reduce wetland impacts or due to topography constraints. Power from each turbine will be fed through a breaker panel inside the turbine base section through cables placed in an engineered duct bank to a pad-mounted transformer, which will be installed in accordance with NEC (NFPA70) standards. The transformers raise the voltage generated by the turbine from 575 volts to 34,500 volts (34.5 kV) to permit efficient transport of the power to the substation. The transformers are interconnected through a collection system consisting of both underground cables and aboveground power lines on wooden poles that will connect all of the turbines together electrically. The underground electrical collection system will be designed and installed such that the main conductors will have a minimum of 42 inches of cover and at least 48 inches of cover in agricultural lands. Where possible, the collection system has been located adjacent to access roads and existing roadways to minimize ground disturbance. However, location of existing utilities and availability of Project participants will necessitate the creation of some new utility corridors. Approximately 21.3 miles of underground collection cables will be installed.

The majority of the collection system, as currently designed, will be installed underground. Depending on the number of parallel circuits, the use of underground lines will necessitate larger ROW widths than overhead lines. The ROW width for the underground collection system will range between 25 feet for areas where one circuit is installed and 40 feet where two circuits are installed in parallel. The lines will be installed by direct burial. At this time, Ball Hill anticipates using open cuts to cross existing roadways. These cuts will be restored in accordance with applicable Town and county regulations and detailed in the appropriate Town or county road use agreement. Installation and backfilling of collection line trenches will take place in one single pass; excavated areas will be backfilled with the native soil on top of approximately 36 inches of select backfill material.

As currently planned, the collection system is entirely underground in compliance with the Towns' local law requirements. Accordingly, overhead collection lines will only be used if necessary in a few select areas to avoid drainage and wetland features or other areas where burial of collection lines is problematic from an engineering standpoint as contemplated by the Towns. The electrical collection system will be constructed in accordance with the Guidelines of the Institute of Electrical and Electronics Engineers, the National Electrical Safety Code, the NFPA, and NYPA requirements.

3.1.6 Installation of Transmission Line

The substation in the town of Hanover will be connected to a switchyard also in the town of Hanover via approximately 6 miles of new overhead 230-kV transmission line. The transmission line will be located in a 120-foot ROW. The line will be centered in an 80-foot cleared area with the remaining 20 feet on each side reserved for selective tree removal as needed to reduce tree conflicts with the line.

The transmission line will consist of a single three-phase circuit designed with aluminum conductor, steel reinforced conductor wire for each phase. These conductors are mounted on three braced line post insulators attached to the tangent structures. Angle structures are expected to have six strain insulators with three additional line post insulators for jumper wire control. The tangent structure conductors are arranged in a “delta” configuration with two conductors on one side and one on the opposite side of the supporting structures. This helps reduce EMF. The angle structure conductors are arranged in line with the pole in a vertical orientation. Fiberglass or porcelain suspension insulators are used to insulate the conductor wires at the attachment points. One optical ground wire (OPGW) will be installed on the top of the structures for shielding and communications. The OPGW will (likely) be a 48-fiber-optic cable within one stainless-steel tube wrapped inside aluminum alloy and aluminum clad steel wires. Vibration dampers and bird flight diverters will be installed as needed on each span of all conductor and OPGW wires.

Except as noted, the engineered support structures consist of freestanding rounded wood or wood-like poles. Heights were established to provide necessary ground clearances in accordance with National Electrical Safety Code requirements. All poles are directly embedded in the ground. To facilitate installation, corrugated steel pipes are used to stabilize the augured holes. The ancillary space between the pole and the corrugated pipe is backfilled with compacted granular fill.

The transmission ROW will be cleared of all forest vegetation. Within jurisdictional wetlands, vegetation will be cleared by hand and either left in place or removed by hand in accordance with final permit conditions. A temporary 20-foot-wide travel corridor will be established within the cleared ROW for construction access. Where the transmission line ROW crosses wetlands or streams, temporary access will be limited to the minimum width necessary and/or timber mats will be used to eliminate the need for fill materials or grading.

Permanent access to the transmission line may be provided by access roads throughout the transmission line (see Figure 3.1-1). During construction, temporary access will be maintained as a 20-foot-wide travel corridor. No access roads will be constructed within wetland areas. Any construction or O&M traffic through wetlands would utilize wetland mats.

Path: L:\Buffalo\Ball_Hill\2015\Maps\MXDs\Report\SEIS\2015_11_23\TransmissionLine.mxd

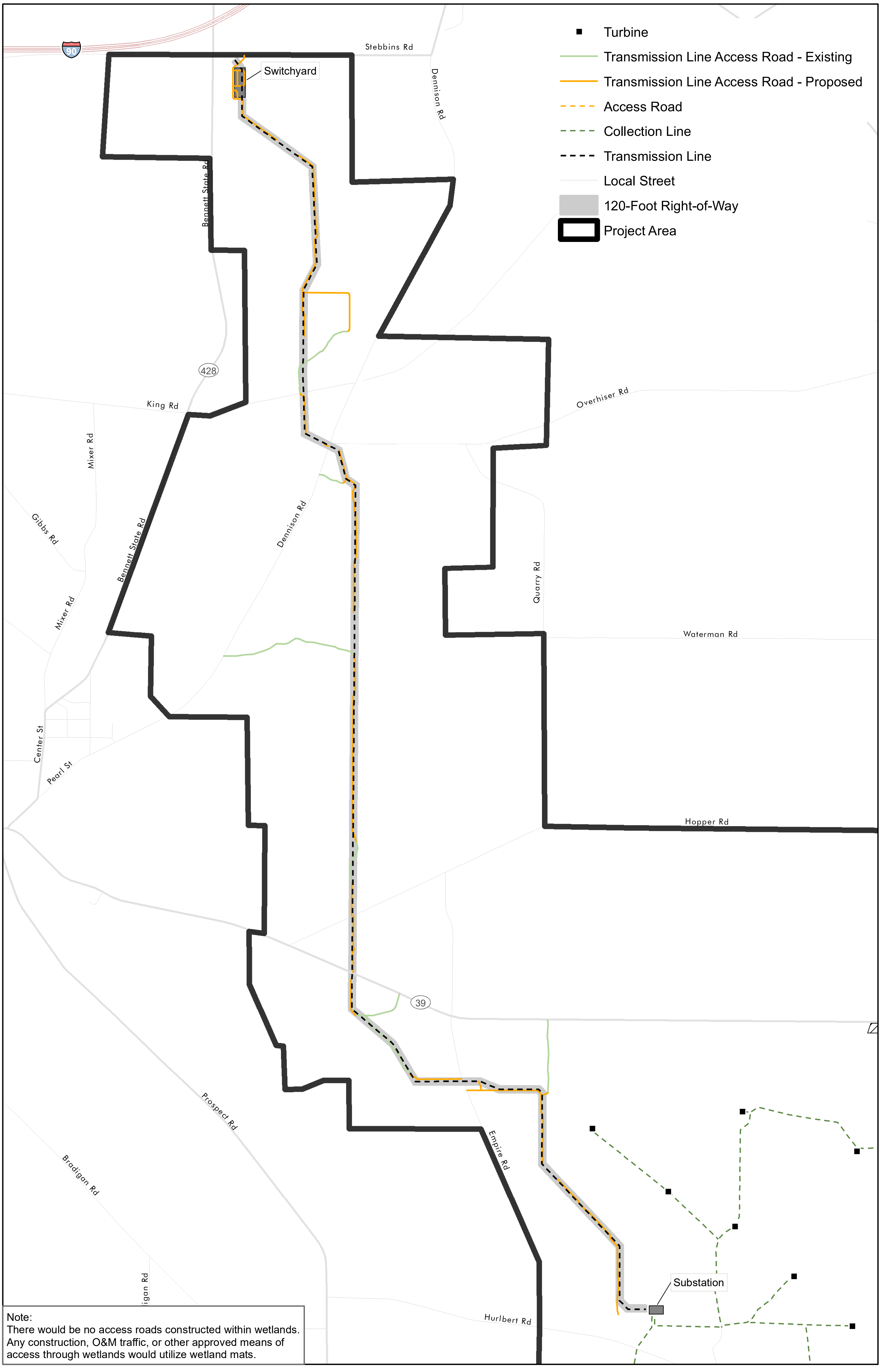

Figure 3.1-1
Permanent Access Roads to the Transmission Line
Ball Hill Wind Project
Chautauqua County, New York
Ball Hill Wind Energy, LLC

Ball Hill will enter into a maintenance contract/agreement with a reputable contractor normally employed in vegetation maintenance to support appropriate clearances from conductors and other sensitive areas associated with electrical collection systems.

3.1.7 Construction Monitoring

Construction activities will be monitored to ensure compliance with applicable regulations, permits and related conditions, agreements, SWPPPs, and BMPs. Ball Hill's EMP (see Appendix I of the 2008 DEIS [within Appendix A of this SDEIS] and Appendix F of this SDEIS) and site-specific construction quality and environmental plans will contain all relevant permit conditions and other commitments made by Ball Hill during SEQRA review and permit review processes and related agreements, including those associated with wetland and stream disturbance, vegetation removal, storm water management, erosion control, threatened and endangered species, and agricultural impacts. Ball Hill will retain an environmental supervisor 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 for submission to the Towns of Villenova and Hanover as well as other involved and interested parties. The environmental supervisor will have full work stop authority. Oversight by Ball Hill's environmental supervisor, along with consultation with NYSDAM, will ensure that all construction proceeds so as to preserve the integrity of the agricultural land. In addition, Ball Hill will invite NYSDAM representatives to all contractor kick-off meetings in order to discuss any issues that may arise during construction.

Ball Hill's construction contractors may establish and use concrete batch plants that will be in compliance with all applicable statues, regulations, and ordinances. Concrete trucks will use approved wash-out basins to clean excess concrete from chutes and exterior portions of the truck prior to traveling on public roads. These wash areas will be located within the disturbed construction ROW and will be designed to prevent runoff from leaving the containment area. Concrete wash-out placement will be approved by the environmental supervisor prior to use to ensure that these operations will comply with the applicable environmental standards. If dewatering is required prior to pouring of concrete, the dewatering and discharge thereof would follow the detailed erosion and sediment control plans included in the site-specific SWPPPs. A description of Stormwater Pollution Prevention Measures to be included in SWPPPs is found in Appendix E.

If construction takes place in habitat suitable for nesting endangered or threatened avian species in the spring to early summer (during breeding season), the work area will be surveyed by an environmental supervisor in advance of construction. If nesting threatened or endangered bird species are found in the immediate proximity of a construction area, Ball Hill will coordinate with the USFWS and/or NYSDEC to develop a mitigation plan to address site-specific occurrences of species of concern. Measures that may be implemented include delaying construction until the young have fledged from the nest or continual monitoring during the initial construction period to ensure that the birds are not impacted. Avoidance of construction in environmentally sensitive areas during specific time frames, such as spawning season in trout streams, will be conducted pursuant to applicable permits and conditions and coordinated with the appropriate agencies.

3.1.8 Post-Construction Restoration

Temporary impacts during construction include clearing of vegetation, grading, and temporary sidecasting of soils and other construction materials. Immediately following the completion of construction activities at each site, restoration activities will begin. In non-agricultural uplands, the ROW will be temporarily stabilized with annual rye seed or mulch and be allowed to naturally revegetate, although it will be subject to periodic removal of woody vegetation to maintain an herbaceous or successional shrub state composed of native species. Natural revegetation of the construction ROW is likely to result in the establishment of naturally occurring native plants, due to existing seed banks and adjacent plant communities. Areas will be monitored by the environmental supervisor to ensure that adequate vegetative growth occurs and if not, supplemental seeding/mulching will take place on an as-needed basis into the following growing season. All plans for revegetation or seeding/mulching will be discussed with individual landowners.

It is recognized that active measures including reseeding or replanting of native species may be required to facilitate the restoration of some wetlands temporarily impacted by construction activities. Specific revegetation measures in wetlands, including invasive species controls, will be monitored in accordance with wetland permit directives and conditions. Ball Hill will adhere to those conditions and its compliance will be monitored by the environmental supervisor.

In areas in or adjacent to agricultural fields, Ball Hill will develop all restoration in accordance with all applicable guidelines. Restoration of all agricultural land and pasture will be in accordance with NYSDAM guidelines and will be coordinated with the affected landowners. Any seed mixes used in these areas will be approved by the landowner and will meet or exceed any recognized standards. In addition, Ball Hill will ensure that only endophyte-free varieties are used within areas used as horse pastures. Additional temporary fencing, as required for coordinating livestock exclusions, will be placed in accordance with landowner requirements. NYSDAM guidelines discourage restoration after October 1; however, favorable weather conditions may allow for restoration to continue after this date. Any restoration of agricultural fields after October 1 will be coordinated with NYSDAM. Oversight by Ball Hill's environmental supervisor, along with consultation with NYSDAM, will ensure that restoration efforts occur in a fashion that re-establishes the integrity of the agricultural land. In addition, Ball Hill will consult with NYSDAM representatives in order to discuss any issues that may arise during restoration.

Roadways damaged during construction of the Project will be restored in accordance with the approved road use agreements.

It is the responsibility of the environmental supervisor to ensure that all environmental restoration activities are properly implemented in accordance with all federal, state, and local conditions. The environmental supervisor will prepare inspection reports that document compliance and noncompliance situations where remediation is required. Upon completion of construction and restoration at the Project Site, the environmental supervisor will be required a complete a Post-Construction Report. This report will be provided to all interested agencies including the Towns, NYSDEC, the USACE, and NYSDAM.

3.2 Decommissioning

The Town of Villenova Local Law No. 1 of 2007: Wind Energy Facilities Law and the WECS Law (2008) of the Town of Hanover require that a decommissioning plan be prepared prior to issuance of a wind energy permit or special use permit. The decommissioning plan facilitates removal of any turbine and associated Ball Hill-owned facilities at the end of a turbine's useful economic life. A decommissioning plan was prepared and accepted as part of the 2008 DEIS (see Appendix Q of the DEIS [submitted as Appendix A of this SDEIS]). As noted in Appendix N: Decommissioning Plan, the 2008 decommissioning plan will be updated in the FEIS in accordance with the host community agreement and to reflect current costs and numbers associated with decommissioning activities.

The expected useful physical life of the primary Project components is approximately 20 years. The wind turbines could conceivable be repaired indefinitely to extend their useful life; however, economic obsolescence resulting from advancements in technology within this period of time may make earlier replacement of turbines desirable. The wind resource is not expected to change much over time and is expected to maintain its value as competing sources of energy continue to be more costly. Thus, the wind turbines will be maintained or replaced as economics dictate. If it were desirable to relocate turbines for any reason, Ball Hill is aware that any affected individual turbine would need to be re-permitted and would obtain any necessary easement agreements that may be required.

Decommissioning work will be performed in accordance with all federal, state, and local requirements and the appropriate permits will be obtained prior to conducting any decommissioning activities. Permitting requirements for decommissioning activities are expected to be similar to those required for construction and operation. In the event that decommissioning activities are not addressed by existing permits, appropriate permits will be obtained. Waste materials will be disposed of at facilities with an emphasis on recycling wherever possible.

The decommissioning plan for the Project will include detailed descriptions and cost estimates for the removal of all turbine components. The decommissioning plan assumes the site will be put back in "green" condition, including removal of aboveground structures (i.e., wind turbine removal, pad mount removal, and overhead collection line removal) and underground features to a depth of 3 to 4 feet. Turbine and substation foundation removal and pad mount removal includes removal of all anchor bolts, rebar, conduits, and concrete in the pedestal to a minimum depth of 48 inches below grade in agricultural lands in accordance with NYSDAM guidelines, and a minimum depth of 36 inches below grade in all other areas. The underground electrical collection system will be designed and installed such that the main conductors will have a minimum of 42 inches of cover and at least 48 inches of cover in agricultural lands. Cables will be cut back in the area of the pad mounts to minimum depth of 48 inches below grade in agricultural land, and a minimum of 36 inches below grade in all other areas. The remaining cabling may be removed for recovery of high-value copper and aluminum conductor material or left in place.

After completion of decommissioning at each turbine site, access road and rigging pad removal will begin. Gravel will be removed and transported to an approved disposal location. Any geo-textile fabric (a tightly woven separation fabric placed during construction on the subgrade under the gravel to keep the gravel from being pushed down into the subgrade during wet periods) will be recovered and hauled off site to an appropriate disposal site. All drainage structures, including culverts, riprap, etc., will be removed, hauled off site to an appropriate disposal site, and these areas will then be backfilled with clean, compatible sub-grade material. All road and other areas compacted during original construction or by equipment used in the decommissioning will be tilled in a manner adequate to restore the subgrade material to the proper density and depth consistent with the surrounding fields. Low areas will be filled with clean, compatible subgrade material. After proper subgrade depth is established, topsoil will be placed to a depth, density, and finished contour consistent with the surrounding field. All restoration activities in agricultural fields will be done in accordance with NYSDAM guidelines. Access security gates will be maintained at all times until the road removal process is complete and the area is ready to be demobilized. The gate shall be removed and all materials recycled to the greatest extent possible. The ditch crossing will be removed if requested by the landowner and approved by the appropriate authorities having jurisdiction over roads and drainage. The area will be thoroughly cleaned and all debris will be removed.

Revegetation of the disturbed portions of the Project Area is part of the decommissioning process. All areas of the Project Site not under cultivation or reserved for some other use by property owners will be revegetated or reseeded, as appropriate. Revegetation of the disturbed areas will be part of the restoration of the area to surrounding land use in the same manner as described for restoring areas temporarily impacted during construction. Reseeding in agricultural areas will be conducted in accordance with NYSDAM. All revegetation activities will be conducted in the same manner as previously described for restoring areas temporarily impacted during construction (see Section 3.1, Description of the Proposed Construction Plan).

Detailed costs of decommissioning Project components, average salvage values for various components, and a net decommissioning cost per turbine will be estimated by a qualified third party and presented in the updated decommissioning plan. In accordance with the local wind energy facilities laws, Ball Hill will establish financial security in an acceptable form and amount. Ball Hill proposes to provide a surety bond or equivalent financial security instrument from a licensed NYS financial institution (Removal Security) in the approximate amount of $30,000 per turbine prior to construction of the Project, according to the estimated decommissioning cost of the Project based on 2015 salvage values and projected labor rates.

Pursuant to applicable local laws, the specific form of security for decommissioning will be determined in consultation with the Towns of Villenova and Hanover as part of the permitting process. The decommissioning costs will be re-estimated annually by a licensed engineer as required by local laws, in order to keep costs current and the amount of security funds shall be adjusted accordingly.

4 Summary of Cumulative Impacts

Consistent with the mandate of the SEQRA, this SDEIS analyzes cumulative impacts where such impacts are "applicable and significant" (6 NYCRR Part 617.9). Cumulative impacts are defined herein as two or more individual environmental effects, which, when taken together, may become environmentally significant or may compound or increase other environmental effects. Cumulative impacts are most likely to occur when a proposed action is related to actions that could occur in the same or an overlapping geographic location and at the same or a similar time.

4.1 Regional Wind Project Development

4.1.1 Operational Wind Farms

The nearest operating wind power facility is Steel Winds, located along the shores of Lake Erie in Lackawanna, Erie County, New York, approximately 25 miles northeast of the Project Area. Steel Winds consists of 14 2.5-MW turbines and is far enough away that it will not contribute to cumulative impacts. There are no wind farms currently operating in Chautauqua County, although there are several individual turbines along the NYS Thruway in Chautauqua County that are used to supply energy for NYS Thruway operations. These smaller, individual turbines are also not considered for cumulative impacts due to their size and location.

4.1.2 Proposed or Future Wind Projects

The closest proposed project is EDP Renewables' (EDPR [previously Horizon Energy]) Arkwright Summit Wind Farm Project (Arkwright Summit), which is under development to the west of the Project Area in the town of Arkwright. Arkwright Summit Wind Farm, LLC (a wholly owned subsidiary of EDPR) submitted a Second Supplemental Environmental Impact Statement (SEIS2) to the Town of Arkwright in October 2015 as a supplement to its Joint Application for a Special Use Permit and Wind Overlay Zone.[5]

The distance between the closest turbine of the Project and the Arkwright Summit Wind Farm is approximately 1.4 miles. According to the SEIS2 prepared for Arkwright Summit, the current project layout consists of up to 36 turbines with a total anticipated nameplate generating capacity of 78.6 MW. Arkwright Summit Wind Farm, LLC, intends to select a turbine that includes both 2.2 and 2.0 MW

[5] The Arkwright Summit SEIS2 is available online at http://www.edprnorthamerica.com/farms/regulatory-permitting-information.

nameplate capacity models; however, it is anticipated that both models will have the same physical dimensions and appearance (EDR 2015a). The wind turbines proposed for Arkwright Summit, Vestas V-110, are similar in height and appearance to the turbines that Ball Hill intends to use at the Project.

The Cassadaga Wind Project is another proposed project located south and southwest of the Project in Chautauqua County. Cassadaga Wind, LLC, a subsidiary of EverPower Wind Holdings, Inc., submitted a Preliminary Scoping Statement (PSS)[6] to the New York State Board on Electric Generation Siting and the Environment in September 2015 for a proposed 126 MW wind-powered electric generating project located within the towns of Charlotte, Cherry Creek, Arkwright, and Stockton in Chautauqua County, New York (EDR 2015b). This proposed project consists of up to 62 wind turbines and associated infrastructure to deliver electricity to the New York State power grid. The distance between the closest turbines of the Project and the nearest edge of the proposed project area for the Cassadaga Wind Project is approximately 12.2 miles.

According to the Queue of Interconnection Requests (Interconnection Queue[7]) maintained by the NYISO, as of December 2015 no other wind power projects are currently proposed in Chautauqua County. Since the release of the 2008 DEIS, several wind power projects proposed for Chautauqua County were withdrawn from the Interconnection Queue, including Ripley-Westfield Wind (Ripley-Westfield Wind, LLC), Ripley-Westfield Wind II (Babcock & Brown, LP), State Line Wind (State Line Wind Power, LLC), Concord Wind (Concord Wind Power, LLC), Pomfret (Horizon Wind Energy, LLC), State Line Wind II (State Line Wind Power, LLC), and Lake Erie Wind (Lake Erie Wind, LLC) (NYISO 2015). Withdrawal from the NYISO queue is not necessarily an indication that pre-development of a project has ended; however, it signals that the potential permitting, construction, and operation of the project is not imminent.

In addition to proposed wind power projects in Chautauqua County, one proposed wind power project is recorded in the Interconnection Queue in neighboring Cattaraugus County: Bone Run Wind project, owned/developed by Atlantic Wind, LLC (NYISO 2015). As information on the status and precise location of the Bone Run Wind project is not available at this time, it is not analyzed as part of this cumulative impact analysis.

4.2 Cumulative Impacts Associated with Regional Wind Farm Development

Construction and operation of all of the proposed projects in the region would have long-term beneficial effects on the environment through the use of renewable energy resources. The construction and operation of the Ball Hill, Arkwright Summit, and Cassadaga projects clearly contributes to New York State's REV initiative, which calls for the state to increase the amount of electricity generated

[6] The Cassadaga Wind Project PSS is available online at http://everpower.com/pss/.
[7] The Interconnection Queue is available on the NYISO Web site at http://www.nyiso.com

from renewable sources to 50% by 2030 (New York State Energy Planning Board 2015b). Collectively, the projects would have a nameplate capacity of approximately 284 to 305 MW of electricity from a renewable resource without any fossil-fuel emissions. Increased production of renewable energy is expected to be part of the solution to reduce the demand for additional polluting sources of energy, thus avoiding the associated negative impacts of global climate change and air emissions on people and wildlife.

Most of the potentially adverse impacts associated with wind projects tend to be localized within a few miles of a project area and thus do not typically accumulate with the development of more wind power facilities in the same broad region. On that basis, this detailed assessment of cumulative impacts from regional wind development provided in the SDEIS focuses on the Arkwright Summit project and, where detailed information is available, on the Cassadaga Wind projects. Cumulative impacts, both positive and negative, associated with these wind power facilities are described briefly in the following subsections.

4.2.1 Wildlife

Except for transient individuals, it would be uncommon for non-bird and non-bat resident wildlife in the region to travel many miles from the Project Area. In addition, because of their distance from the Project, other wind power facilities in the region (see Section 4.1 above) would not result in continuous tracts of habitat alteration with the Project Area. Currently the nearest operating wind power facility is the Steel Winds facility, located along the shores of Lake Erie in the city of Lackawanna, approximately 25 miles northeast of the Project. Steel Winds was built on a brownfield site with limited habitat for wildlife; habitat impacts there or at other, distant sites are expected to be localized and would not pose any cumulative impact on the Project. At Arkwright Summit and Cassadaga Wind it is expected that there would be small areas of localized habitat alteration similar to those at the Project, with much of that habitat restored after the completion of construction. Construction of wind power projects would result in localized habitat alterations; however, neither the individual project impacts nor the cumulative impacts are expected to be significant. During the course of construction of each project, some limited mortality may occur to less mobile species. Indirect impacts on wildlife would also occur as a result of habitat alteration in association with construction of the projects; however, these impacts are not expected to be significant. Construction of the projects would result in a localized reduction in the amount of available habitat.

Approximately 155.6 acres of forest habitat would be impacted by the Ball Hill Wind Project. The largest percentage of forested vegetation impacted by the Project is hemlock-northern hardwood forest (72.5 acres). Other forest communities affected at Ball Hill include successional northern hardwood forest (51.5 acres) and beech maple mesic forest (31.6 acres). Although 74.1 acres of forested land (of the 155.6 acres impacted) will be allowed to naturally revegetate, full revegetation would not occur within the lifetime of the Project (approximately 20 years). Therefore, these impacts are considered permanent forest conversion. The reduction in the amount of forested habitat within the Project Site is minor in comparison with the overall acreage of forested land located in the Project Area (7,550 acres); only 2.1% of the forested communities in the Project Area would be impacted. A total of 329.8 acres of upland communities would be temporarily impacted by the Project facilities, including agricultural land (cropland/field crops, row crops, and pastureland [134.3 acres]) and, to a lesser extent, successional old fields and shrubland (totaling 27.7 acres), and tree farms and vineyards (12.2 acres). These communities are routinely subjected to disturbance or have been subjected to past disturbance and are a result of re-vegetation following disturbance. Wildlife would likely relocate to adjacent suitable habitat during construction or, upon cessation of construction, make use of areas temporarily disturbed, as revegetation takes place. A total of 223.8 acres of upland communities would be permanently impacted, while 106.0 acres of these communities would be allowed to revegetate and would be considered temporarily impacted. As noted above, 74.1 acres of forested land would also be allowed to naturally revegetate, but due to the time revegetation would take in relation to the lifetime of the Project, these impacts are included in the permanent numbers.

Construction of Arkwright Summit will impact approximately 444.3 acres of forestland and 128.5 acres of active agriculture. Of these acres, 53.6 acres of forestland and 12.5 acres of active agriculture would be impacted permanently (EDR 2015a). Relative to the overall Arkwright Summit Project Area, this amounts to less than 1% of available habitat. Cumulative habitat loss would result in an even smaller proportion when considering the percentage of habitat loss within the region.

The corresponding analysis for the Cassadaga Wind Project has not yet been conducted by the developer. It is anticipated that the forested impacts are likely on a similar order to those at the Ball Hill Wind and Arkwright Summit projects (i.e., 1% to 2% of total forested area). Table 4.2-1 shows the estimated cumulative acreage habitat impacts of Ball Hill, Arkwright Summit, and Cassadaga Wind projects. Assumptions are used to estimate amounts for Cassadaga Wind since they are not currently publicly available; there is a likelihood that impacts for some or all of the three projects will be less than what is shown here as the site designs are further refined.

Cumulatively, the three wind power projects would be anticipated to result in minimal loss of habitat within the respective project areas as well as compared with available habitat within the region. In addition, the impacts on habitat are consistent with activities and conditions that regularly occur throughout the region as a result of normal farming and timber activities. It is anticipated that wildlife in the vicinity of the proposed projects would relocate to other adjacent suitable habitat. Once the projects are in operation, it is anticipated that wildlife would make use of areas that were temporarily disturbed during construction.

Table 4.2-1 Estimated Cumulative Habitat Impacts

Project	Construction Impacts[1] on Forestland (acres)	Permanent Impacts on Forestland (acres)	Construction Impacts on Agricultural Land (acres)	Permanent Impacts on Agricultural Land (acres)
Ball Hill Wind	156	82	134	45
Arkwright Summit[2]	444	54	129	13
Cassadaga Wind[3]	415	218	350	117
Total	**1,015**	**354**	**613**	**175**

Notes:
1 Construction impacts include temporary impacts and permanent impacts.
2 Totals are from Arkwright Summit Wind Farm SEIS2 (EDR 2015a).
3 Cassadaga Wind Project totals are estimated using the project area of 35,365 acres (EDR 2015b) and assuming Cassadaga has the same percentages of forestland and agricultural land impacts as Ball Hill (2.1% of forested communities impacted and 2.4% of agricultural land impacted). These impact estimates are likely conservatively high.

4.2.2 Avian and Bat Species

There is a potential for bird and bat impacts from other wind projects in the region to be cumulative if multiple projects are located within the same migratory corridor or within a common local movement area. As such, cumulative impacts associated with the proposed Arkwright Summit and Cassadaga projects were evaluated as they relate to birds and bats.

Construction-related activities at each project (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. Because these impacts are generally temporary and would be limited at any one location, potential cumulative construction impacts on bird and bat populations are not expected to be significant.

The potential cumulative impacts of the operation of the proposed Arkwright Summit project and the Cassadaga project were assessed using approximate fatality rates from post-construction studies conducted at New York State wind energy facilities (see Table 4.2-2). There is an order of magnitude difference between the lowest and highest fatality rates used here, which makes for a wide range in approximate fatalities. In particular, the highest rate used for bats comes from a site that did not include the operational minimization measures that Ball Hill would implement to greatly reduce bat mortality (see Section 2.6). The following approximate ranges of cumulative annual bird fatalities for the Ball Hill, Arkwright, and Cassadaga projects were identified.

- Between 94 and 1,318 birds (based on number of turbines); and
- Between 134 and 1,717 birds (based on the number of megawatts).

Table 4.2-2 Approximate Regional Number of Bird Fatalities

Project	Number of Turbines	Number of Megawatts (MW)	Approximate Minimum Bird Fatalities/ Turbine/[1]	Approximate Minimum Bird Fatalities/ MW[2]	Approximate Maximum Bird Fatalities/ Turbine[3]	Approximate Maximum Bird Fatalities/ MW[4]
Ball Hill Wind	36	100	24	44	334	563
Arkwright Summit	36	79	24	35	334	445
Cassadaga Wind	70	126	46	55	650	709
Total	**142**	**305**	**94**	**134**	**1,318**	**1,717**

Notes:

1 0.66 birds/turbine/survey period (Jain et al. 2009e). Survey Period Based on 2008 Noble Bliss three-day Survey Rate.

2. 0.44 birds/MW/survey period (Jain et al. 2009e). Survey Period Based on 2008 Noble Bliss three-day Survey Rate.

3 9.29 birds/turbine/survey period (Jain et al. 2007). Survey Period Based on 2006 Maple Ridge Daily Survey Rate.

4 5.63 birds/MW/survey period (Jain et al. 2007). Survey Period based on 2006 Maple Ridge Daily Survey Rate.

5 Proposed MW are between 79 and 100, but the higher number included here for conservatism.

Table 4.2-3 Approximate Regional Number of Bat Fatalities

Project	Number of Turbines	Number of Megawatts	Approximate Minimum Bat Fatalities/ Turbine/[1]	Approximate Minimum Bat Fatalities/ MW/[2]	Approximate Maximum Bat Fatalities/ Turbine/[3]	Approximate Maximum Bat Fatalities/ MW/[4]
Ball Hill Wind	36	100	25	46	1,440	1,630
Arkwright Summit	36	79	25	36	1,440	1,288
Cassadaga Wind	70	126	49	58	2,800	2,054
Total	**142**	**305**	**99**	**140**	**5,680**	**4,972**

Notes:

1 0.7 bats/turbine/survey period (Stantec Consulting 2009). Survey Period Based on 2008 Munnsville Weekly Survey Rate.

2 0.46 bats/MW/survey period (Stantec Consulting 2009). Survey Period Based on 2008 Munnsville Weekly Survey Rate.

3 40 bats/turbine/survey period (Stantec Consulting 2011). Survey Period Based on 2009 Cohocton and Dutch Hill Daily Survey Rate. Note that this Project did not implement operational minimizations to reduce bat mortality that Ball Hill would employ.

4 16.3 bats/MW/survey period (Jain et al. 2011a). Survey Period based on 2010 Noble Wethersfield Weekly Survey Rate. Note that this Project did not implement operational minimizations to reduce bat mortality that Ball Hill would employ.

5 Proposed MW are between 79 and 100, but the higher number included here for conservatism.

Likewise, the following approximate numbers of bat fatalities for the three projects were identified (see Table 4.2-3):

- Between 99 and 5,680 bats (based on number of turbines); and
- Between 140 and 4,972 bats (based on the number of megawatts).

Tables 4.2-2 and 4.2-3 present estimates of fatalities based on surveys conducted at operating wind energy facilities in upstate New York. Furthermore, the available data indicate that there can be considerable variation in fatality rates, especially for bats, from turbine to turbine and project to project. More information on available data and variation in fatality rates is discussed in this SDEIS in Section 2.6 above. The number of bird and bat fatalities for a particular facility would be determined with post-construction mortality studies; however, this estimate allows an evaluation of potential extremes for cumulative impacts.

The cumulative loss of approximately 94 to 1,599 birds per year is not considered to be biologically significant, considering the size of the populations and losses due to other sources of bird mortality: the USFWS estimates that a minimum of 10 billion birds breed in North America (USFWS 2002). There are many widespread sources of bird mortality. However, it is challenging to compare predicted mortality from a proposed wind site to other sources of mortality because local mortality rates from other sources are rarely quantified to allow comparison. On a national scale, the annual bird mortality associated with wind energy facilities is low compared with other sources of mortality but would likely increase with an increase in the number of wind power facilities (AWWI 2015). Other sources that cause much higher numbers of bird mortality than those associated with wind energy facilities include the following:

- Vehicles (60 million or more deaths per year);
- Building windows (97 million to 976 million deaths per year);
- Power and transmission lines (conservatively, tens of thousands deaths per year, possibly closer to 174 million deaths per year);
- Communication towers (conservatively, 4 to 5 million deaths per year, possibly closer to 40 to 50 million deaths per year);
- Electrocution (estimated tens of thousands per year);
- Pesticides (at least 72 million deaths annually, likely far more);
- Oil spills (hundreds of thousands of deaths per year);
- Oil and wastewater pits (up to two million deaths per year);
- Cats (hundreds of millions of deaths per year);
- Agricultural practices (i.e., hay mowing, pesticides) (at least 72 million); and
- Hunting (up to 120 million deaths per year) (Gill 1995; Erickson et al. 2001; USFWS 2002).

These sources of mortality are also present or can possibly occur within the Project Area.

The species composition of bird fatalities resulting from turbine collision is primarily passerine species (approximately 60% of bird fatalities in the United States, with high percentages in the eastern United States) that occur at the highest rates during spring and fall migration (AWWI 2015). For most bird species, there is often only one individual killed at a site, suggesting that wind power projects do not have impacts at local or range-wide population levels for those species. Most of the fatalities resulting from a project would be of single individuals of one species, but the most common species would have fatalities of multiple individuals. Fatality rates at currently estimated values of avian mortality do not appear likely to lead to population declines in most bird species (AWWI 2015), which is even more applicable for a cumulative evaluation of three proposed projects in Chautauqua County, New York.

Providing a context for the impact of the estimated regional bat mortality from local wind energy facilities in upstate New York (approximately 99 to 5,680 bats/year) on bat populations overall is challenging. The overall status of bat species populations is poorly known and the ecological impact of bat fatality levels is not known (AWWI 2015). Therefore, it is not possible to quantitatively evaluate population impacts on even a regional scale.

4.2.3 Threatened and Endangered Species

The proposed Arkwright Summit, Cassadaga Wind, and Ball Hill projects have been included in the threatened and endangered species cumulative impacts evaluation because the presence of threatened and endangered species is likely similar at all proposed sites in the region.

Based on consultation with the USFWS and the New York State NHP, except for transient individuals no threatened or endangered species or communities were identified within the Project Area (see Section 2.5).

During field surveys, two state-listed endangered species (the Golden Eagle and Peregrine Falcon), two state-listed threatened species (Bald Eagle and Northern Harrier), and seven state species of special concern (Common Loon, Osprey, Sharp-shinned Hawk, Cooper's Hawk, Red-shouldered Hawk, Horned Lark, and Grasshopper Sparrow) were observed in the Project Area. Generally, these species were observed in low numbers and, therefore, no significant adverse impacts on these species would be anticipated (see Section 2.6, Bird and Bat Resources, for additional details).

Bald Eagle nests within the vicinity of the Project Area are described in Section 2.6, Bird and Bat Resources, of this SDEIS. These same nests are in the general vicinity of the other three proposed wind projects, as well as several more nests to the south of the Cassadaga and Arkwright projects. The number of Bald Eagle nests has steadily increased over the last two decades in New York State and Chautauqua County and continued expansion is anticipated. No significant adverse impacts from Ball Hill construction activities on nesting Bald Eagles are anticipated given the distances to nests and adherence to the USFWS guidance (2007) for construction activities. The same adherence to USFWS guidance and level of impacts is anticipated for the Arkwright Summit and Cassadaga Wind projects, if they are constructed. Significant adverse impacts would not be anticipated from operation of each project. Ball Hill will continue to coordinate with the USFWS regarding the potential risk to eagles from the Project. It is anticipated that there will be permit conditions from NYSDEC regarding monitoring for Bald Eagles and other listed species during Project operation and measures to avoid and minimize any potential impacts from operation. Arkwright Summit and the Cassadaga Wind Project are also coordinating with the USFWS and NYSDEC, thus, similar approaches are anticipated. To date, only eight Bald Eagle fatalities have been reported in the United States as a result of wind farm development (Allison 2012; Pagel et al. 2013). Therefore, as impacts to this species have been low in the United States and each project is anticipated to conduct monitoring and coordinate with agencies regarding minimization measures, significant adverse cumulative impacts on the local Bald Eagle nesting population would not be anticipated from the operation of multiple wind projects.

Acoustic bat surveys conducted in summer 2015 revealed the probable presence of northern long-eared bat at the Project Area in low numbers (see Section 2.6 above), and at the Arkwright Summit project, and the probable presence there of northern long-eared bats in low numbers was documented . A similar survey was also conducted at the Cassadaga Wind Project, and the results were provided to USFWS and NYSDEC personnel in April 2015, but the results are not yet available for public review. Ball Hill will continue to coordinate with the USFWS and NYSDEC to help conserve the northern long-eared bat in the Project Area, including operational minimization (see Section 2.6). Given the threatened status of this species, it is anticipated that Arkwright Summit (and the Cassadaga Wind Project, if surveys reveal the presence of this species) would also need to coordinate with the wildlife agencies and enact measures to minimize impacts on this species.

Only limited use of the Project Area by other endangered, threatened, and special concern species during construction is anticipated because most of any occurrences would be related to migration or transient (i.e., limited) use. Therefore, no significant adverse impacts on these species are expected during construction. In addition, no critical habitat for any threatened or endangered species were identified within the Project Area. As a result, no significant adverse impacts on such habitat would occur.

Both the USFWS and NHP were consulted as part of the DEIS, SDEIS, and SEIS2 prepared for Arkwright Summit and, except for transient individuals, no threatened or endangered species or significant communities and no critical habitat for such species were identified within the Arkwright Summit Project Area

(Tetra Tech 2007, 2009; EDR 2015a). As described in the SEIS2, similar species were identified as occurring in the vicinity of Arkwright Summit during avian surveys conducted in 2013 and 2015, including the Golden Eagle, Bald Eagle, Northern Harrier, Red-shouldered Hawk, Cooper's Hawk, Sharp-shinned Hawk, Osprey, Common Loon, Cerulean Warbler, and American Bittern. Additionally, the USFWS Information for Planning and Conservation system identified two endangered clam species (the clubshell and the rayed bean) and two federally listed threatened species as potentially occurring within the project vicinity (the bog turtle and the northern long-eared bat).

Avian surveys, a bat acoustic survey, and preliminary research of available sources regarding the possible presence of threatened and endangered species or habitat also have been conducted for the Cassadaga Wind Project. Copies of all avian and bat reports were provided to the USFWS and NYSDEC personnel in April 2015, and upon receipt of comments, if any, the reports will be finalized and included in the Article 10 Application. As presented in the PSS, available sources indicated that three federally listed species were identified within or in the vicinity of the Project Area: the clubshell (*Pleurobema clava*) and the rayed bean (*Villosa fabalis*), which are federally listed as endangered species, and the northern long-eared bat (*Myotis septentrionalis*), a listed threatened species (also discussed above). Species identified in the 2013 and 2014 surveys include Bald Eagle, Northern Harrier, Red-shouldered Hawk, Sharp-shinned Hawk, and bats belonging to the Myotis genus (individual species not determined). Given the similar habitat and geographic proximity, it is anticipated that any impacts at the Ball Hill Wind and Arkwright Summit projects would be similar and collectively no significant adverse impacts are anticipated.

Little use of these areas is anticipated by federally or state-listed endangered, threatened, and special concern species; therefore, the potential cumulative risk to these species from both construction and operation of multiple projects is considered low.

4.2.4 Visual

The introduction of additional turbines within the same viewshed can increase the number of structures visible from affected vantage points, thus creating a potential higher density of visible structures. However, visibility of turbines depends on viewer location/orientation, distance, and other factors such as the topography and vegetation, the areas of the other wind projects, and the surrounding region. The farther one travels from a wind farm, the more diminished the impacts and visual influence of the Project become. The dominance of a wind farm on a landscape would either be diminished to a distant background view as one travels farther from a wind farm or, in most cases, would not be visible at all. As such, cumulative impacts are considered only for those projects within a 20-mile radius from the Project Area. There are no existing wind farms within a 20-mile radius of the Project.

Ball Hill retained the services of Saratoga Associates, Landscape Architects, Architects, Engineers, and Planners, P.C. (Saratoga) to evaluate the potential cumulative impact of the Project along with the proposed Arkwright Summit project and Cassadaga Wind Project to the regional viewshed within and outside of the Project's 5 mile study area.

Construction of each wind power project would require use of mobile cranes and other large construction vehicles. Components would be delivered in sections via large semi-trucks. However, the construction period is expected to be relatively short (approximately 9 to 18 months). As such, construction-related visual impacts at any given receptor location would be brief and are not expected to result in adverse prolonged visual impacts on area residents or visitors. The construction schedule for the proposed Arkwright Summit project may overlap with the Project; however, these projects are located at a sufficient distance apart so that any visual impacts during construction would be minor.

To assess the cumulative visual impacts resulting from operation, a viewshed map was created to show where there was a possibility to view the Ball Hill, Arkwright Summit, and Cassadaga project turbines from locations within the Project's 5 mile study area. The viewshed mapping process is discussed in Section 2.7 of this SDEIS, and the cumulative viewshed map is provided as Figure B1 of Appendix B of the VRA (see Appendix M). Theoretically, one or more turbines would be visible from approximately 40% of the entire 5 mile Project study area (comprising101,462 acres).

To demonstrate how the actual turbines would appear within the study area, two locations, Route 83 in the town of Arkwright (VP #33) and Flucker Hill Road in the town of Villenova (VP #54), were identified for photo simulations to represent the most likely locations where the three wind projects would be visible. The simulations are provided as Figures B2-a through B3-q of Appendix B of the VRA (see Appendix M).

Based on an evaluation of the aesthetic resources, land uses, users groups, and visual simulations, it is apparent that each project would change the visible landscape of the region and create a distinct visual aspect. Overall, the cumulative impact appears to be relatively minor because the increased visibility is approximately 6.6% of the total acreage of the study area. The introduction of additional turbines within the same viewshed will increase the number of structures visible from many affected vantage points, thus creating a potentially higher density of visible structures. However, visibility of the projects depends on viewer location/orientation, distance, and other factors, and the additional turbines would be in the background view. Figures B2 and B3 of the VRA (see Appendix M) demonstrate that the additional Arkwright and Cassadaga turbines are visible in the distance, behind the proposed Project, resulting in minimal additional impact. Although there would be an increase in the number of locations in the area where one or more turbines can be seen, it is unlikely that the quality of the view would change if multiple turbines are visible from any combination of the projects.

Generally, visibility of the projects may be found on higher elevations along road corridors or open agricultural lands. The cumulative impact of the projects is highly variable, depending on the number of turbines visible, the proximity of the turbines to the viewer, whether the viewer is stationary or moving, and the landscape setting. The cumulative visual impact will be minimal.

Cumulative shadow flicker would not result from collective operation of the wind power projects and the Project. The proposed Arkwright Summit project and Cassadaga Wind project are located at a far enough distance to not contribute to cumulative shadow flicker at any residences in the Project Area. It is generally accepted that shadow flicker would have no effect on properties at a distance farther than 10 turbine rotor diameters (approximately 2,625 feet from turbines in the Project Area, and approximately 2,950 feet for Arkwright Summit). Beyond this distance a wind turbine would not be perceived as intercepting sunlight, but rather as an object with the sun behind it; thus, the intensity of the blade shadow is considered negligible at distances beyond 2,625 feet from a turbine on the Project. The distance between the closest turbines in the Project Area and the Arkwright Summit project is approximately 7,392 feet (1.4 miles).

Cumulative visual impacts from aviation safety lighting on turbines are anticipated in the same geographic areas as the viewshed for the Project. However, not all turbines proposed for each project would have safety lighting. The cumulative impact is highly variable depending on the final number of turbines with lighting. Factors affecting visual impact may include the proximity of the turbines to the viewer, whether the viewer is stationary or moving, and the landscape setting. The lighting plan in the DEIS for Arkwright Summit proposed lights on 21 of the 44 turbines. Although a final lighting plan has not been completed for any of the projects at this time, it is expected that approximately one-half of the proposed turbines would have simultaneously flashing red lights. Thus, the cumulative lighting impacts would be minimal.

4.2.5 Sound

Because noise impacts are limited by the distance sound travels, no significant adverse cumulative impacts are expected with respect to noise. Any noise impacts resulting from construction of the projects would be considered localized and temporary. While the anticipated construction periods of the Project and Arkwright Summit could potentially overlap, given the distance of approximately 1.4 miles between the nearest points of the two projects, cumulative construction noise impacts are not expected. Operational noise impacts would be localized in the area of the proposed turbines at each wind power project.

4.2.6 Cultural Resources

The construction and operation of the Project would not have any significant adverse impacts on archaeological resources in the Project Area. Since there would be no Project-specific impacts, there is no potential for contribution to cumulative archaeological impacts of the other proposed wind power projects in the region.

Construction of the Project would not have any direct impacts on architectural resources (i.e., demolition of any NRL-listed or NRE buildings) and no direct impacts have been identified in connection with Arkwright Summit or Cassadaga Wind. There is, however, a potential for each of the proposed projects in the region to have visual and noise impacts during construction on structures potentially eligible for the NRHP. It is unlikely that these impacts would be significant because they would be temporary. (See discussions of visual and noise impacts during construction in Section 2.7 and 2.8, respectively.)

Operation of the three wind power projects would result in visual impacts on NRE and NRL properties within the region. Ball Hill's archaeological and architectural resource consultants, Panamerican, identified 163 existing NRE properties and recommended NRE properties within the 5-mile Project study area. Within the 5-mile APE for Arkwright Summit, a total of 288 properties that are listed in or determined eligible for the NRHP were identified (EDR 2015a). The 5-mile-radius study area for Cassadaga Wind contains two properties listed on the NRHP, 67 properties determined eligible for listing on the NRHP, and 15 properties whose NRHP eligibility is currently undetermined. One or more turbines may be visible from most of the structures. The visual impacts on these structures resulting from the operation of the other projects would be additive in the sense that more turbines are potentially visible from each property. The impact would vary depending on the number of turbines from each project that may be visible from a given property. The cumulative impacts on these resources would be reduced by a number of factors, including topography, distance from the turbines, existing landscaping and vegetation, and surrounding land uses. Mitigation would be required as a condition of the construction of each of the projects to offset these impacts and, thus, cumulative impacts as a result of these projects are not anticipated.

4.2.7 Land Use

Based on their proximity to each other, the Ball Hill, Arkwright Summit and Cassadaga Wind projects have the potential to contribute to cumulative land use impacts. Activities associated with the three projects would result in temporary and permanent impacts on land use, primarily conversion from one land use to another. Impacts would be greater during construction due to the need to build wider temporary access roads to support construction vehicles. Impacts would be reduced during operation when the width of these roads is reduced. For each project, locations of the turbines were chosen in large part to minimize the loss of active agricultural land and interference with farm operations and other environmental resources.

Although, by their nature, each project would significantly change the appearance of the landscape, the projects are generally consistent with land use patterns within the region, and there is not expected to be a significant cumulative increase in the overall land use impact due to the operation of the projects. Land use in the region is described as rural-agricultural. The regional rural character is generally defined by its wide open agricultural parcels and limited residential density. The projects are located entirely on private lands in areas dominated by active agricultural and forested lands, thereby avoiding significant adverse impacts on residential, commercial, and recreational land uses.

The proposed projects are compatible with agricultural land use, which dominates the region. Chautauqua County comprises 235,858 acres of agricultural land, which represents approximately 35% of the county (USDA 2007; U.S. Census Bureau 2010). The total acreage of farmland that would be permanently impacted by conversion to nonagricultural uses for the Project and Arkwright Summit is approximately 75 acres (66 acres for the Project and 9 acres for Arkwright Summit). The corresponding analysis has not yet been conducted for the Cassadaga Wind Project, but the impacts are likely on a similar order, in which case the cumulative loss of farmland would not significantly affect the total acreage of farmland in the region. Furthermore, while the impacts on land use generally occur on agricultural lands, agricultural activities on the individual farms would continue in the future.

Compliance with local laws regulating the development of wind power facilities would ensure that cumulative impacts on land use are minimal. The Town Laws regulating wind energy facilities have specific agricultural mitigation measures based on NYSDAM guidelines, which include locating structures along field edges where possible, locating access roads along ridge tops, avoiding dividing large fields into smaller fields, and avoiding and maintaining all existing drainage and erosion-control structures. Compliance with these measures will limit adverse impacts on agricultural land use.

4.2.8 Transportation

Traffic volumes on the roads in the vicinity of the projects would increase during the construction of each project due to equipment and material deliveries.

No major or extended road closures or improvements are expected to be required to construct the projects. Minor intersection improvements would be required to accommodate the turning radii of oversize trucks. Because there is currently little or no congestion on the roads in the Project Area, it is expected that increased traffic volumes from the projects would result in minimal delays for local traffic.

Potential impacts during construction for each project could include damage to area roads and bridges. However, such potential damage would only be significant if the projects are constructed simultaneously and if the same haul routes are used. Roadway repairs as a result of damage incurred by Project construction activity would be coordinated through road use agreements with the towns and the county. The process of creating a road use agreement would allow the towns' plans for scheduled paving and resurfacing to be coordinated with improvements and repairs by the wind power projects' developers.

If construction of either or both projects ultimately overlaps with construction of the Project, any cumulative impacts would be temporary and short-term. Based on current proposed haul routes, the haul routes for the proposed Arkwright Summit project and the Project would not overlap. The proposed haul route for Arkwright Summit follows I-86 to Highway 60, to Highway 20, to Highway 39, to CR-79. The proposed haul route for Ball Hill also follows I-86 but then follows SR 394 to Highside Bridge under I-86, to Waterboro Rd., to Highway 62, to SR 83, to CR 87, to Danker Rd, to Ball Hill Rd.

If delivery routes were to change during the design and construction preparation such that simultaneous hauling of equipment for both projects occurs in the area, Ball Hill and the other two projects would re-evaluate roadway conditions and make appropriate modifications. In the NYSDOT permitting process, a final route survey would be developed that identifies improvements necessary on state roads to accommodate delivery and construction vehicles when re-routing is impractical. These final plans are also coordinated with road-use agreements between the towns and the county.

As previously stated, existing road traffic within Chautauqua County is below capacity and existing traffic conditions are light. A limited number of light trucks would occasionally access the facilities for service and maintenance; therefore, operation of the projects is not expected to have permanent impacts on local traffic and transportation.

4.2.9 Socioeconomics

None of the projects in the region are expected to adversely impact housing and population. It is likely that motels/hotels in larger population centers, such as Dunkirk-Fredonia, Jamestown, and Buffalo, would be able to absorb the temporary influx of construction workers to the area, even if the Project and the proposed Arkwright Summit project are constructed simultaneously. The hotels and motels would benefit from extended construction worker stays during the construction period of each project. These revenues would increase if considering the cumulative benefit of construction of multiple wind projects in the area. During construction of the projects, the local economy would experience several significant cumulative benefits from construction, including an increase in local economic activity and purchases of automotive fuel, meals, and other items.

The sales data collected in existing wind farm markets indicate that the construction and operation of wind power projects has no influence on property values (see Section 2.13). Furthermore, the projects would have a positive long-term cumulative impact on the local economy in the form of PILOTs to local municipalities, license agreements with host communities, and lease revenues to participating landowners.

4.3 Mitigation of Wind Project Cumulative Impacts

The cumulative impacts of constructing and operating the Project and other wind generating facilities in the region are, on balance, either positive or of limited significance and, therefore, do not necessitate mitigation. This is particularly true with the economic benefits to host communities when payments in lieu of taxes and Host Community Agreements are considered. Additionally, the Project, as proposed in the SDEIS, has reduced the number of turbines, length of overhead line, and overall Project footprint from the 2008 DEIS attached hereto (see Appendix A), thereby reducing the cumulative impact on environmental resources. Ball Hill will review the potential for cumulative cultural impacts with the SHPO to develop a Memorandum of Agreement, if necessary. Ball Hill will continue to coordinate with NYSDEC and the USFWS regarding wildlife impacts and it is anticipated that the other project sponsors will do the same.

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A

Draft Environmental Impact Statement for the Noble Ball Hill Windpark, Towns of Villenova and Hanover, Chautauqua County, New York, September 2008

Please see DVD in back pocket.

B Project Layout

Please see DVD in back pocket.

C

Draft Progress Wetland Delineation Report

Please see DVD in back pocket.

D Preliminary Transportation Site Survey

Please see DVD in back pocket.

E Stormwater Pollution Measures

Please see DVD in back pocket.

F

Draft Environmental Management Plan and Invasive Species Management Plan

Please see DVD in back pocket.

G Health and Safety Plans

Please see DVD in back pocket.

H Material Safety Data Sheets

This appendix will be submitted with the FEIS.

I

Draft Drain Tile Repair

Please see DVD in back pocket.

J

Conceptual Wetland Mitigation Measures

Please see DVD in back pocket.

K Bird Surveys

Please see DVD in back pocket.

L Bat Surveys

Please see DVD in back pocket.

M Visual Resource Assessment

Please see DVD in back pocket.

N Decommissioning Plan

Please see DVD in back pocket.

O Sound level Assessment Report

Please see DVD in back pocket.

P Communication Surveys

Please see DVD in back pocket.

Q Agency Correspondence

Please see DVD in back pocket.

R Obstruction Evaluation Analysis Report

Please see DVD in back pocket.

S Cultural Resource Surveys

Please see DVD in back pocket.