# SUPPLEMENTAL
# ENVIRONMENTAL IMPACT STATEMENT

## PROPOSED ARKWRIGHT SUMMIT WIND FARM PROJECT
## TOWN OF ARKWRIGHT
## CHAUTAUQUA COUNTY, NEW YORK

Lead Agency:
Town of Arkwright

Date of Submittal: April 3, 2009
Date of Acceptance: April 13, 2009
Comment Submittal Deadline: June 1, 2009

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**April 2009**

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**ARKWRIGHT SUMMIT WIND FARM SUPPLEMENTAL EIS**

**FIRMS INVOLVED IN PREPARATION OF THIS SEIS**

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## EXECUTIVE SUMMARY

This Supplemental Environmental Impact Statement (SEIS) has been prepared to further describe the potential environmental impacts and mitigation measures associated with the construction and operation of the proposed Arkwright Summit Wind Farm (the Project) as required under the New York State Environmental Quality Review Act (SEQRA) (6 NYCRR 617). The Project as originally proposed was described, and its impacts evaluated, in the New Grange Wind Farm Draft Environmental Impact Statement (DEIS) accepted by the Town of Arkwright, Lead Agency under the SEQRA, on February 27, 2008. The New Grange Wind Farm was subsequently renamed the Arkwright Summit Wind Farm. Since completion of the DEIS, various public and agency comments were received and reviewed, and additional studies were conducted and data were collected and analyzed. This SEIS describes revisions to the Project layout, presents the results of additional studies, and addresses significant issues raised during the public comment period on the DEIS. To minimize duplication and inconsistency, this SEIS follows the same general format as the DEIS and incorporates various sections of the DEIS by reference. Only information that has changed or been added since preparation of the DEIS is specifically addressed in this document. A Final Environmental Impact Statement (FEIS) will eventually be completed for the Project later this year (2009) and will include the final Project design and consider public and agency comments received on both the DEIS and this SEIS and will incorporate the final Project design.

Provided below is a brief Project description, along with summaries of the regulatory process; the Project's purpose, need, and benefit; a summary of potential environmental impacts; and proposed mitigation measures. Alternatives to the Project and its effect on use and conservation of energy are also reviewed.

### Project Description

Arkwright Summit Wind Farm LLC (the Applicant), a subsidiary of Horizon Wind Energy LLC, is now proposing to develop a wind-powered generating facility of up to 44 wind turbines with a maximum capacity of between 79.2 and 79.8 megawatts (MW), depending on the specific wind turbine used. The Applicant currently plans to utilize the Vestas V-90 turbine or an equivalent model of equal or lesser size and development footprint. The Vestas V-90 turbine has a rotor diameter of 90 meters (295 feet) and a hub height of 80 meters (262 feet). In addition to the wind turbines, the Project will involve construction of four permanent meteorological towers, a system of gravel access roads, both buried and overhead electrical collection lines, an operation and maintenance building, an electrical switchgear facility, and an interconnection substation facility. A temporary construction staging area is also planned during the construction phase of the Project.

The revised Project Site encompasses 5,964 acres of leased, privately owned land in the Towns of Arkwright (5,879 acres) and Pomfret (85 acres), as compared to the DEIS Project Site, which consisted of 5,930 acres. The proposed facilities will temporarily impact approximately

359 acres of land during construction and 90 acres of land during Project operations. These impacts are based on conservative assumptions regarding potential impact areas, and will likely be reduced once final design is completed and associated impacts are reported in the Project FEIS.

All Project facilities are shown in Figure 1.1-2, the proposed Project layout, as well as in the full-size Project layout drawing in Appendix A. A summary of the primary project facilities in the new SEIS layout compared to the prior DEIS layout is provided below.

**Comparison of Project Facilities Proposed in the DEIS and the SEIS Layouts**

| Facility Type | DEIS Layout | SEIS Layout |
|---|---|---|
| Wind Turbines | 47 | 44 |
| Access Roads | 18 miles | 15.8 miles |
| Power Collection Lines (buried) | 21.0 miles | 17.9 miles |
| Power Collection and Transmission Lines (overhead) | 4.7 miles | 5.4 miles |
| Permanent Meteorological Towers | 3 | 4 |
| Operations & Maintenance Facility | 1 | 1 |
| Substation/Point of Interconnection | 1 | 1 |
| Electrical Switchgear Facility | 0 | 1 |
| Temporary Construction Laydown Yard | 1 | 1 |

All wind turbines will be located in the Town of Arkwright. The Project will be constructed in one phase, with an anticipated construction start date of April 2010, instead of the May 2009 start date stated in the DEIS.

The Project will create jobs for between 125 and 200 people during construction. Once built, the wind turbines and associated components operate in almost a completely automated fashion. The Project will, however, permanently employ approximately 10 to 15 personnel.

**Regulatory Process**

This SEIS has been prepared by Tetra Tech EC, Inc. (Tetra Tech) of Boston, Massachusetts. 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. The Town of Arkwright is acting as Lead Agency to provide a review under SEQRA, and requested that the Applicant prepare this SEIS as the next step in the SEQRA process. The decision to prepare an SEIS was arrived at because of the significant amount of new, detailed information that was compiled by the Applicant in 2008, particularly several field-based environmental resource studies. This new data is presented in this SEIS and provides the basis

for the Applicant's updated facility layout. After public and agency review of this SEIS, the Applicant will prepare a FEIS to complete the SEQRA process requirements.

New data collected for the potential impact area since the submittal of the DEIS, and which is now reported on in this SEIS includes, but is not limited to, the following:

- Comprehensive field-based wetland delineation and water resources evaluation, conducted in coordination with the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Army Corps of Engineers (USACE);
- Subsurface archaeological resource investigations, conducted in accordance with field study guidelines for wind energy facilities that were developed by the New York State Historic Preservation Office (SHPO);
- A review of historic architectural resources within a 5-mile radius of the Project Site that are either listed on or are potentially eligible for listing on the National Register of Historic Places (NRHP), conducted in accordance with guidelines developed by the New York SHPO;
- A hydrogeologic study of the Project Site;
- An updated assessment of avoided air emissions from the Arkwright Summit Wind Farm; and
- An updated economic and fiscal impact study reflecting the current Project.

In addition, the Applicant updated the following impact assessment studies, which were originally conducted and reported on in the Project DEIS. These revised investigations now evaluate the revised Project facility layout presented in this SEIS:

- Additional aviation hazard assessment and consultation with the Federal Aviation Administration (FAA);
- TV broadcast reception impacts;
- Licensed microwave beam paths and worst-case fresnel zone;
- Updated information regarding potential avian and bat impacts;
- Visual impact assessment, with new photosimulations from viewpoints requested since the preparation of the DEIS, including views of both wind turbines and the proposed overhead electric transmission line;
- Shadow flicker impact analysis;
- Environmental sound survey and noise impact assessment;
- Land use impact assessment;
- Impacts to geology and soils, including farmlands of statewide significance and prime farmland soils; and
- Additional information regarding potential property value impacts.

**Purpose, Need, and Benefit**

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

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

The Project as currently presented in this SEIS is expected to reduce annual air emissions of nitrogen oxide ($NO_x$) by 214 tons, sulfur dioxide ($SO_2$) by 746 tons, and carbon dioxide ($CO_2$) by 195,183 tons.

**Summary of Potential Impacts**

In accordance with the requirements of SEQRA, potential impacts arising from the proposed action were identified early in the application process and are evaluated in either the DEIS or this SEIS with respect to an array of environmental and cultural resources. Provided below is a summary list of potential impacts that may occur in association with the construction and/or operation of the Project. These impacts and associated mitigation measures are described in greater detail in the Project DEIS and updated where relevant in this SEIS.

| Environmental Factor | Potential Impacts |
|---|---|
| Topography, Geology, and Soils | • Soil erosion<br>• Soil compaction<br>• Loss of agricultural land |
| Surface and Groundwater Resources | • Stream crossings<br>• Siltation/sedimentation<br>• Temporary disturbance<br>• Wetland filling<br>• Permanent stream crossings |
| Biological Resources | • Vegetation clearing<br>• Incidental wildlife injury and mortality<br>• Loss or alteration of habitat |
| Land Use and Zoning | • Adverse and beneficial impacts on farming<br>• Changes in community character and land use trends |
| Socioeconomic | • Host community payment / PILOT<br>• Revenue to participating landowners<br>• Expenditures on goods and services<br>• Tourism<br>• Short and long-term employment |
| Transportation | • Road wear<br>• Road system improvements/upgrades<br>• Traffic congestion/delays (temporary)<br>• Aviation/airspace interference |
| Cultural Resources | • Visual impacts on sensitive architectural resources<br>• Disturbance of underground archaeological resources |
| Visual Resources | • Visual change to the landscape<br>• Visual impact on sensitive sites/viewers<br>• Shadow-flicker impact on adjacent residents |
| Community Services, Public Utilities, and Infrastructure | • Demands on police and emergency services<br>• Telecommunication interference<br>• Utility distribution lines and poles<br>• New source of clean renewable energy |
| Communications | • Interference with public, private or government communication facilities |
| Public Safety | • Stray voltage<br>• Tower collapse/blade failure<br>• Ice throw<br>• Lightning strike<br>• Fire |

| Environmental Factor | Potential Impacts |
|---|---|
| Climate and Air Quality | • Construction vehicle emissions<br>• Dust during construction<br>• Reduced long-term air pollutants and greenhouse gases |
| Noise | • Construction noise impacts on neighboring/adjacent residents<br>• Operational noise impacts on neighboring/adjacent residents |

**Summary of Mitigation Measures**

Various measures will be taken to avoid, minimize and/or mitigate potential environmental impacts. General mitigation measures will include adhering to requirements of various Local, State, and Federal ordinances and regulations, and entering into development agreements with adjacent landowners. The Applicant will also employ an environmental inspector to assure compliance with permit requirements and environmental protection commitments during construction and operation of the Project. The proposed Project will result in significant environmental and economic benefits to the area. These benefits also serve to mitigate unavoidable adverse impacts associated with Project construction and operation.

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

- Siting the Project away from population centers and areas of residential development.
- Locating access roads and turbines along field edges, where practical, and in field corners to avoid or minimize disturbance of agricultural land.
- Keeping turbines a minimum of 1,200 feet from off-site residences to minimize noise and visual impacts.
- Utilizing multiple-megawatt scale turbines to reduce the length of interconnect and access roads per megawatt of capacity.
- Burying electrical interconnection lines between turbines except where unavoidable due to sensitive environmental/cultural resources, construction or electrical constraints, in order to minimize visual and agricultural impacts.
- Using existing roads for turbine access whenever possible to minimize disturbance to agricultural land, wildlife habitat, wetlands, and streams.
- Utilizing construction techniques that minimize disturbance to vegetation, streams, and wetlands.
- Siting the interconnection substation facilities in an area screened by existing mature vegetation.
- Painting the turbines with a matte non-specular finish.
- Developing and implementing a sedimentation and erosion control plan.
- Proposing a compensatory stream/wetland mitigation program.

- Siting select turbines to avoid or minimize wetland, wildlife, or visual impacts.
- Performing post-construction monitoring to improve understanding of possible avian and bat impacts.
- Siting turbines to avoid interference with microwave and AM/FM communication systems.
- Siting turbines to avoid interference with exiting gas wells and associated infrastructure.
- 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.
- Upgrading public roads utilized during construction.
- Finalizing a component delivery plan that minimizes impacts on residential areas.
- Developing and implementing a historic resource protection plan in concert with the New York SHPO.
- Developing and implementing a Complaint Resolution Procedure.

**Alternatives**

Alternatives to the proposed Project that were considered and evaluated include no action, alternative Project location, alternative Project design/layout, alternative energy production technologies, alternative turbine technology, alternative Project size/magnitude, and alternative Project timing. 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 feasible Project. The Applicant has investigated several alternative locations across western New York and rejected many locations due to significant development constraints, including migratory bird issues, incompatible land uses, lack of contiguous land, a lack of adequate wind resource, unsuitable transmission facilities, and lack of likely community acceptability. All suitable locations, including the proposed Project Site, must be seriously considered if the State is to meet its obligations regarding domestic generation of renewable energy by 2013.

The Applicant has revised the Project layout several times since its inception in an effort to optimize the balance between energy generation and the protection of agricultural, environmental, and aesthetic resources, as well as community safety and welfare. The Applicant considered several types of wind energy conversion technologies for the Project. However, the 3-bladed, upwind, horizontal axis, propeller-type wind turbine provides the smallest land-use footprint per unit of clean energy generated, and has demonstrated itself as the most reliable and commercially viable for the application of utility scale electrical power generation. The Applicant has reduced the size of the originally proposed Project layout from over 60 turbines to the 47 proposed in the DEIS and now to the 44 turbines indicated in this SEIS. This reduction in size was made in large part due to the siting parameters described above. The Applicant has also considered reducing the Project size by using smaller turbines in this current layout. Doing so, however, would not fully capture the available wind resource and 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.

**Effects on Use and Conservation of Energy Resources**

The proposed Project will have significant, long-term beneficial effects on the use and conservation of energy resources. Energy will be expended during the construction phases of the Project, as well as for the maintenance of the wind turbines and support facilities on the Project Site. However, the operating Project will generate up to 79.8 MW of electricity from a renewable resource (the wind) without any fossil-fuel emissions. This greatly exceeds the energy required to construct and operate the Project. The Project will add to and diversify the State's sources of power generation helping to stabilize power prices currently subject to spikes in fossil fuel prices. Over the long-term, the Project will help displace some of the State's older, less efficient, and dirtier sources of power and possibly stave off the need to build new fossil fuel plants.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| Ag & Markets | New York State Department of Agriculture and Markets |
| APE | area of potential effect |
| Applicant | Arkwright Summit Wind Farm LLC |
| BBS | breeding bird survey |
| CCIDA | Chautauqua County Industrial Development Agency |
| $CO_2$ | carbon dioxide |
| dB | decibel |
| dBA | decibels on the A-weighted scale |
| DEIS | Draft Environmental Impact Statement |
| E&E | Ecology and Environment, Inc. |
| EAF | Environmental Assessment Form |
| EPA e-GRID | USEPA's Emissions and Generation Resource Integrated Database |
| FEIS | Final Environmental Impact Statement |
| IBA | Important Bird Area |
| IEC | International Electrotechnical Commission |
| JD | Jurisdictional Determination |
| kV | kilovolt |
| $L_{10}$ | A-weighted sound level exceeded 10 percent of the measured time period (intrusive sound level) |
| $L_{90}$ | A-weighted sound level exceeded 90 percent of the measured time period (residual sound level) |
| $L_{eq}$ | equivalent sound level |
| m/s | meters per second |
| MDS | map documented structure |
| MOA | Memorandum of Agreement |
| MW | megawatts |
| MWh | megawatt-hours |
| NHP | Natural Heritage Program (New York) |
| NIA | Noise Impact Assessment |
| $NO_x$ | nitrogen oxide |
| NRCS | Natural Resources Conservation Service |
| NYISO | New York Independent System Operators |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDEC Guidelines | NYSDEC Program Guidelines Assessing and Mitigating Noise Impacts |
| NYSDOT | New York State Department of Transportation |
| NYSERDA | New York State Energy Research and Development Authority |
| O&M | operation and maintenance |
| PILOT | payment-in-lieu of taxes |
| POI | point-of-interconnect |
| Project | Arkwright Summit Wind Farm |
| PSC | Public Service Commission |

## ACRONYMS AND ABBREVIATIONS – Cont'd

| | |
|---|---|
| RPS | Renewable Portfolio Standard |
| RSG | Resource Systems Group |
| SEIS | Supplemental Environmental Impact Statement |
| SEQRA | State Environmental Quality Review Act (New York) |
| SHPO | State Historic Preservation Office (New York) |
| $SO_2$ | sulfur dioxide |
| SPL | sound pressure level |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| VRA | Visual Resource Assessment |
| WCFZ | Worst Case Fresnel Zone |
| WECS | wind energy conversion system |
| WOZ | Wind Overlay Zone |
| WTG | wind turbine generator |

# 1.0 DESCRIPTION OF PROPOSED ACTION

Arkwright Summit Wind Farm LLC (the Applicant), formerly known as New Grange Wind Farm LLC, has prepared this Supplemental Environmental Impact Statement (SEIS) for the proposed Arkwright Summit Wind Farm (the Project), formerly known as the New Grange Wind Farm, located in the Towns of Arkwright and Pomfret in Chautauqua County, New York as shown in Figure 1.1-1. The Project location was selected due to the energetic wind resource of the area and its proximity to the National Grid 115-kilovolt (kV) transmission line, which gives the Project access to New York's electricity market.

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

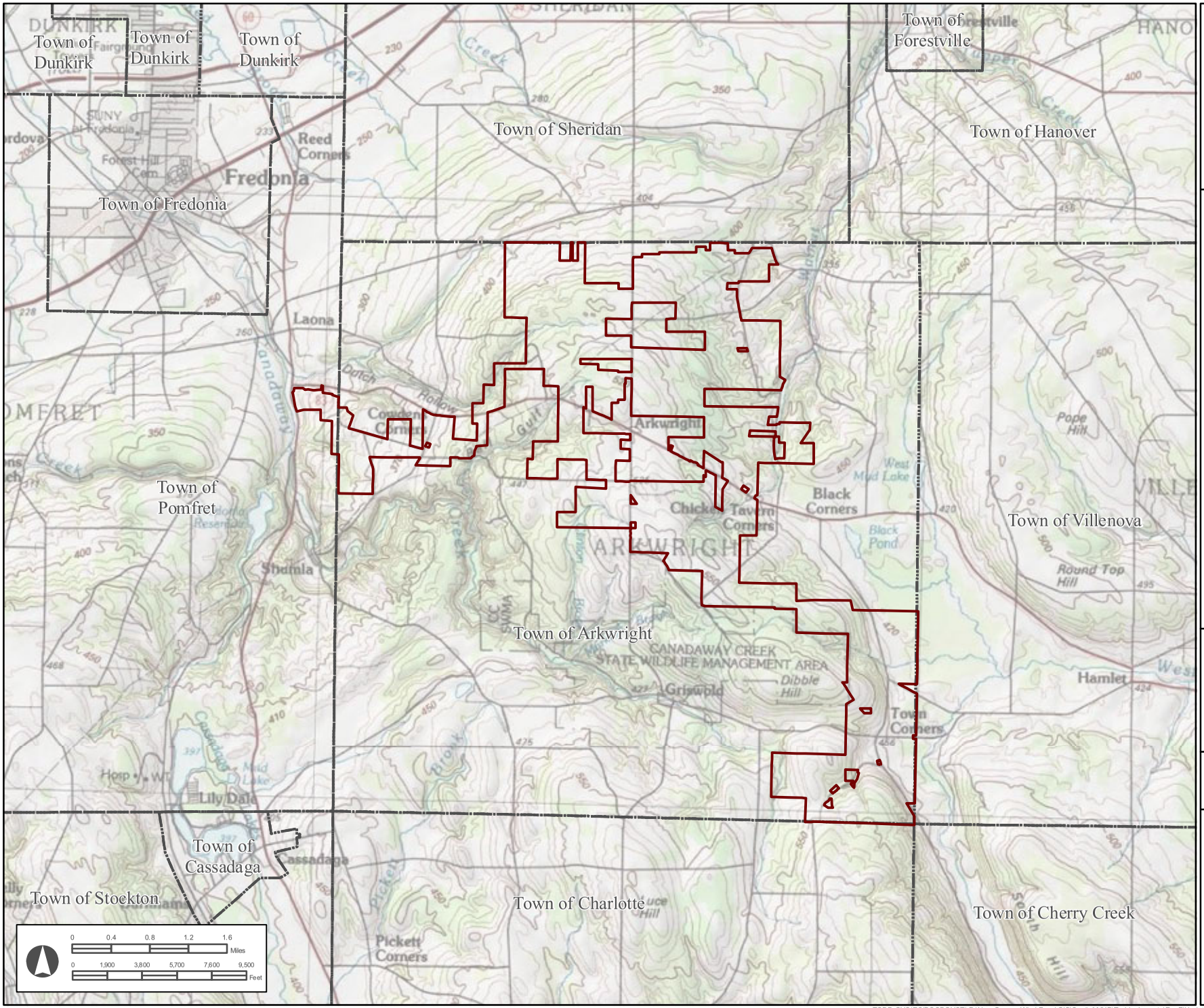
**Applicant.** Refers to Arkwright Summit Wind Farm LLC, formerly New Grange Wind Farm LLC, a wholly owned subsidiary of Horizon Wind Energy.

**Project.** Refers to all activities associated with the construction, operation, and individual components of the Arkwright Summit Wind Farm, including, but not limited to, turbines (including blades, towers, nacelle, foundations, etc.), electrical collection lines, access roads, crane pads, laydown areas, meteorological towers, and other facilities. The name of the Project has been changed from the New Grange Wind Farm since the publication of the Draft Environmental Impact Statement (DEIS).

**Project Site.** Refers to the parcels of land where the Project will be placed. This term is also used interchangeably with the Wind Overlay Zone (WOZ). Arkwright Summit LLC has obtained consent from all landowners within the Project Site where development will take place.

**Project Area.** Refers to the larger geographic study area including the Project Site and immediate vicinity.

The Project as originally proposed was described, and its impacts evaluated, in the DEIS accepted by the Town of Arkwright, Lead Agency under the State Environmental Quality Review Act (SEQRA), on February 27, 2008. Since completion of the DEIS, various public and agency comments have been received, the Project layout has been revised, and additional studies and data collection have been conducted. This SEIS describes the revised Project, presents the results of additional studies, and addresses certain issues raised during the public comment period on the DEIS. To minimize duplication and inconsistency, the SEIS follows the same general format as the DEIS and incorporates the DEIS by reference. Only information that has changed or been added since preparation of the DEIS is addressed in this document. For ease of reference, the headings and section numbers shown in the SEIS are the same as they appear in the DEIS. Where information is the same as described in the DEIS, it is so noted in the SEIS. All references to sections, appendices, and figures within this document pertain to this SEIS unless otherwise noted. A map of the modified Project and brief summary of the modifications and supplemental information presented in this SEIS is provided below.

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**Changes Between DEIS and SEIS**

1. Revised locations and number of wind turbines

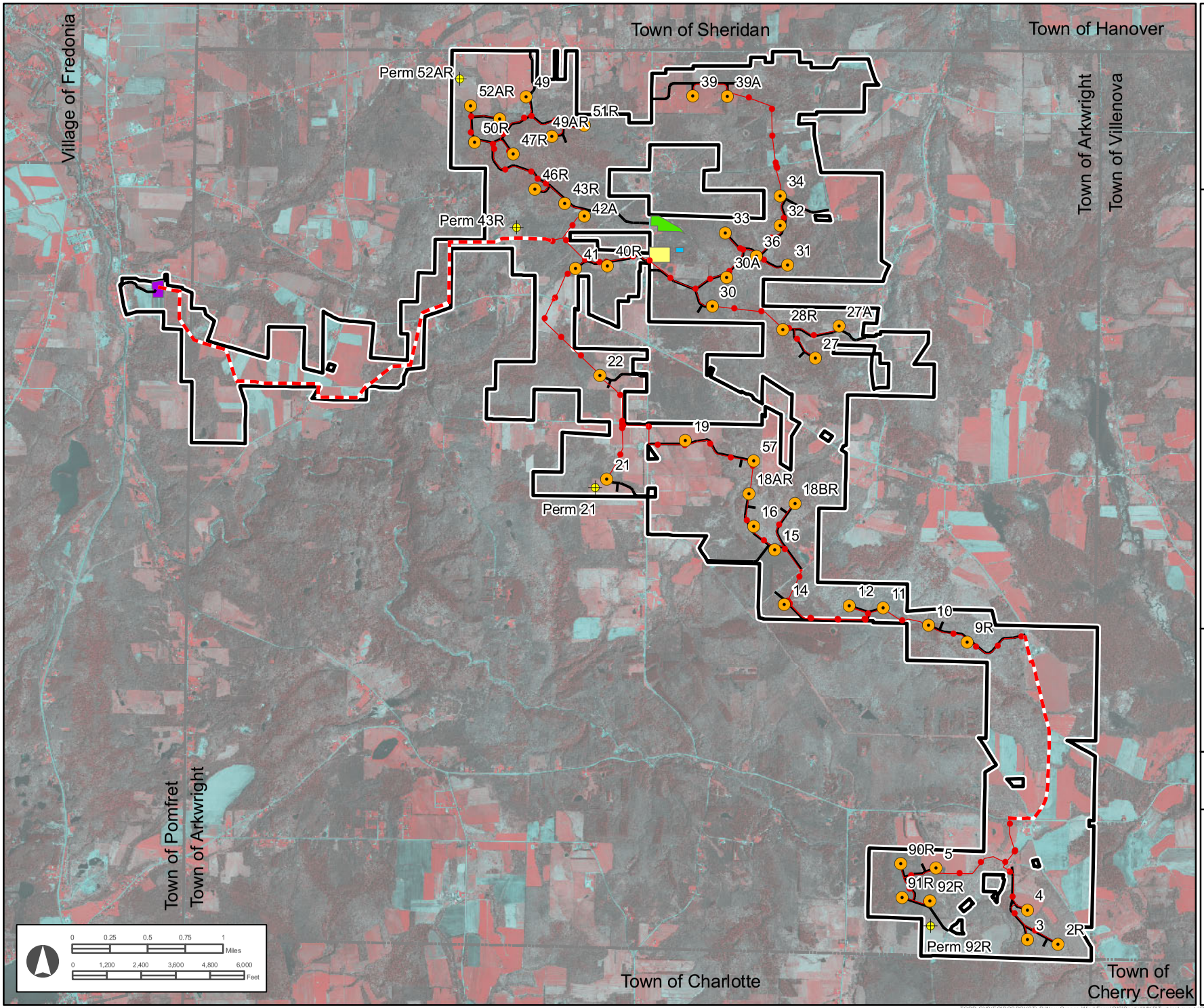
   Wind turbine generator (WTG) locations were revised based on wind resource assessment, engineering considerations, environmental constraints, and the Town of Arkwright zoning requirements and setbacks. The revised layout also considers agency and public comments received during the review of the DEIS. The Project currently consists of 44 WTGs in the Town of Arkwright, which reduces the number of WTGs from the 47 WTGs proposed in the DEIS layout. The SEIS assumes that the WTG used for the Project will be the Vestas V-90, or equivalent model, of equal or lesser height and development footprint. With the reduction in the number of turbines, the total nameplate generating capacity for the Project will be between 79.2 and 79.8 megawatts (MW), depending on the specific turbine used. Wind turbine locations are depicted in Figure 1.1-2, Proposed Project Layout, as well as in the full-size Project layout drawing in Appendix A.

2. Revised power collection system and transmission line interconnection route

   The total distance of underground interconnecting electric power collection lines is now 17.9 miles, compared to 21 miles shown in the DEIS. In addition, a 1.4-mile segment of overhead collection line remains unchanged in the southeastern portion of the Project Area. A proposed overhead 34.5 kV electric transmission line will transport power from the wind turbines to the substation, where the power will be stepped up to 115 kV for introduction into the National Grid system. This overhead line route now extends approximately 4.0 miles from the western side of the wind farm to the new substation, as compared to 3.3 miles for the similar route shown in the DEIS. The updated route is now based on consideration of field-based resource data not available at the time of the DEIS filing, as well as negotiations with landowners within the route vicinity. The route is shown on Figure 1.1-2, Proposed Project Layout. A one-acre switchgear facility near the Operations and Maintenance (O&M) building has also been added to the Project since the filing of the DEIS and is shown on Figure 1.1-2. The location of the substation and point-of-interconnect (POI) switchyard in Pomfret to the 115 kV National Grid transmission line remains the same as in the DEIS.

3. Revised access road configuration

   The access road layout was modified to facilitate the construction and maintenance of the revised wind turbine locations and the overhead electrical collection system. In addition, access roads were modified to minimize or avoid potential impacts to wetlands and cultural resources. Proposed access roads now total 15.8 miles, compared to 18 miles as included in the DEIS, and are depicted in Figure 1.1-2, Proposed Project Layout. This includes both new roads and existing roads that will be improved by the Applicant to accommodate the construction and operation of the Project.

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4. Revised Project Site (i.e., WOZ)

   The Project Site was revised to encompass the current development footprint, which includes Project components such as wind turbines, access roads, collection lines, permanent meteorological towers, and a substation and POI switchyard. It also includes a permanent O&M building, an adjacent switchgear facility, and a temporary construction laydown yard. The revised Project Site encompasses 5,964 acres of leased privately owned land in the Towns of Arkwright (5,879 acres) and Pomfret (85 acres), as compared to the DEIS Project Site, which consisted of 5,930 acres (5,830 acres in Arkwright and 100 acres in Pomfret). The revised Project Site is depicted in Figure 1.1-2, Proposed Project Layout.

5. Revised Project Construction Schedule

   The anticipated Project construction start date has been moved from May 2009 to April 2010. Additional details regarding the anticipated Project construction schedule are provided in Section 1.6.

6. Revised temporary and permanent impacts

   Updated temporary and permanent impacts are provided in each resource impact section of the SEIS. The updated development footprint for all Project facilities temporarily impacts up to 359 acres of land and permanently impacts up to 90 acres, compared to temporary impacts of 375 acres and permanent impacts of 89 acres associated with the layout presented in the DEIS.

7. Additional hydrogeologic and water resources studies and wetland delineation report

   An updated hydrogeologic study report is provided in Appendix B. The additional water resources and wetland field delineation report, appears as Appendix C.

8. Updated energy offset analysis (Appendix D)
9. Supplemental visual impact assessment and shadow flicker analysis (Appendix E)
10. Additional cultural resources studies

    These include a Phase 1B subsurface archaeological field study report (Appendix F) and a Historical Architecture 5-Mile Ring study report (Appendix G). The Phase 1B is a confidential report and its distribution is limited by the request of the State Historic Preservation Office (SHPO).

11. Updated analysis of WTG sound impacts, including sound contours associated with each proposed WTG location (Appendix H)
12. Updated economic and fiscal impact analysis (Appendix I)

13. Revised Project name

    The Arkwright Summit Wind Farm was formerly known as the New Grange Wind Farm when the DEIS was prepared.

## 1.1 Project Description

The Applicant is proposing to develop a wind-powered electric generating facility consisting of up to 44 WTGs, each with a nameplate capacity of 1.8 MW for a total nameplate capacity between 79.2 and 79.8 MW, depending on the specific turbine used. The Applicant currently plans to utilize the Vestas V-90 turbine or equivalent model of equal or lesser size and development footprint. The Vestas V-90 turbine has a rotor diameter of 90 meters (295 feet) and a hub height of 80 meters (262 feet). Additional turbine specifications for the Vestas V-90 were provided in Section 1.1 and Appendix B of the DEIS. In addition to the WTGs, the Project will include construction and operation of four permanent meteorological towers, a system of gravel access roads, electrical collection and communication cable networks, an O&M building, an electrical switchgear facility, and a substation and associated POI switchyard. In addition to the permanent components of the Project, the Project will require a temporary construction trailer site and construction work space, including, but not limited to, areas to store Project components (laydown yards), construction vehicle parking areas, and cleared areas for turbine assembly. A site layout map illustrating these key elements is provided in Figure 1.1-2, Proposed Project Layout.

The Project is designed to provide economical renewable electricity to meet New York State's growing energy needs. The Project design and construction methodology were chosen to strike a balance between maximizing energy production, accommodating geological and environmental conditions, and limiting potential intrusions on the host community. The Project is expected to be in service for at least 20 years. Well maintained wind power plants operating according to industry standard practices are capable of service lives longer than 20 years. Due to the rapid advancement in wind turbine technology, it is possible that during the Project's service life, the turbines would be retrofitted or replaced under a re-powering program. Such retrofitting is not uncommon at older wind power projects in Europe and California.

## 1.2 Project Location

The Project Area is located in the northwestern corner of Chautauqua County in the Towns of Arkwright and Pomfret, as depicted in Figure 1.1-1. The proposed Project is located approximately 9.5 miles southeast of the southern shore of Lake Erie, approximately 8 miles southeast of the City of Dunkirk, 6 miles southeast of the Village of Fredonia, 6 miles southwest of the Village of Forestville, and 5.5 miles northeast of the Village of Cassadaga (as measured from the geographic center of the Project Site to the center of each municipality). Project components will be spread across the Project Site, which consists of roughly 5,964 acres of leased privately owned land in the Towns of Arkwright (5,879 acres) and Pomfret (85 acres);

however, these facilities will temporarily impact approximately 359 acres of land during construction and 90 acres of land during Project operations.

The Project Area is bordered at its northern extent by the Arkwright-Sheridan town line and Straight Road; at its eastern extent by the Arkwright-Villenova town line; at its southern extent by the Arkwright-Charlotte town line; and at its western extent by State Highway 60 (located in the Town of Pomfret, approximately 0.5 mile west of the Arkwright-Pomfret town line). The proposed site for the Project substation and POI switchyard is located in Pomfret near the western extent of the property, between State Highway 60 and the Arkwright-Pomfret town line. No WTGs will be located in the Town of Pomfret.

The Project Area is primarily situated at the western end of the Allegheny Plateau, north of the Canadaway Creek Wildlife Management Area. This area is characterized by topography with elevations ranging from approximately 1,700 feet above mean sea level to 2,100 feet above mean sea level. The land cover within the Project Area consists mainly of deciduous and mixed forests and agricultural pastures, with predominantly rural residential, agricultural, and recreational land use.

### *1.2.1 Project Participation*

Approximately 79 landowners own the 116 parcels of land that make up the Project Site. The Applicant has secured sufficient acreage under lease and easement option agreements to construct the Project and is concluding negotiations on additional neighboring parcels.

## 1.3 Project Facility Owner/Developer/Operator

Arkwright Summit Wind Farm LLC, formerly known as New Grange Wind Farm LLC, is a wholly owned indirect subsidiary of Horizon Wind Energy LLC. Horizon develops, constructs, owns, and operates wind farms throughout the United States.

Horizon-developed wind farms operate in New York, Iowa, Illinois, Pennsylvania, Oklahoma, Texas, Oregon, Minnesota, Washington, and Kansas. Horizon constructed projects in Iowa, Illinois, and Oregon in 2008 and plans to construct projects for 2009 in Illinois, Oregon, Oklahoma, Iowa, and Indiana. Operating assets in New York include the Maple Ridge Wind Farm on Tug Hill in Lewis County, New York (50 percent owned by Horizon and 50 percent owned by Iberdrola Renewables) and the Madison Wind Farm in Madison County, New York. At the time this report was prepared, Horizon has roughly 18,000 MW under development and owns approximately 2,500 MW of operating wind energy capacity at the end of 2008.

In July 2007, Horizon was acquired by Energias de Portugal, a worldwide leader in development and operation of wind energy projects. Horizon is now in its tenth year of developing wind energy facilities in New York, with two operating projects, four New York development offices, and extensive experience in development, construction, and operation.

## 1.4 Project Purpose, Need and Benefit

The purpose of the proposed Project is to create a profitable, economically viable wind-powered energy facility that will provide a significant source of clean and renewable energy to the New York power grid.

The impetus for clean renewable energy in New York comes predominantly from the Public Service Commission (PSC) "Order Approving Renewable Portfolio Standard Policy," issued on the 24th of September 2004. This order calls for an increase in renewable energy used in New York State from 19 percent at the time of the order in September 2004 to 25 percent by the year 2013. Meeting this goal would result in approximately 11,988,888 megawatt-hours (MWh) of installed renewable energy by the year 2013. This renewable energy policy was identified in the 2002 State Energy Plan (New York State Energy Planning Board 2002) and the Preliminary Investigation into Establishing a Renewable Portfolio Standard (RPS) in New York (NYSERDA 2003). The New York State Energy Research and Development Authority (NYSERDA) 2003 preliminary report found that an RPS can be implemented in a manner that is consistent with the wholesale and retail marketplace in New York and that an RPS has the potential to improve energy security and help diversify the state's electricity generation mix.

One of PSC's goals in designing the solicitation process and RPS eligibility criteria was to ensure that renewable energy is procured at the lowest possible cost to the state's electricity consumers. Most of the wind energy projects proposed in New York, including this Project, are expected to participate in one of NYSERDA's renewable energy auctions. In addition, other renewable energy projects (biomass, small hydro, solar, landfill gas, etc.) in New York and adjoining states/provinces can compete in such auctions. A report prepared by GE Energy on behalf of NYSERDA and issued in February 2004 (Preliminary Reliability Assessment Report) concludes that wholesale energy prices are likely to decline by approximately $362 million annually once the targets of the RPS are met. Subsequent New York State Assembly Hearing testimony has indicated that the decline may be more than $500 million (Parella 2006).

In addition to the benefit of the RPS in helping New York reduce its reliance upon fossil fuels, increasing the State's renewable energy consumption to 25 percent should reduce statewide air emissions of nitrogen oxide ($NO_x$) by 6.8 percent, sulfur dioxide ($SO_2$) by 5.9 percent, and carbon dioxide ($CO_2$) by 7.7 percent by 2013. The Project alone is expected to reduce annual air emissions of $NO_x$ by 214 tons, $SO_2$ by 746 tons, and $CO_2$ by 195,183 tons (Section 2.4). Estimated emissions offsets are based on an avoided air emissions analysis, included as Appendix D to this SEIS. Section 2.4 provides further discussion of the report and comparison with the DEIS.

Beyond meeting the goals of the RPS, the benefits of the Project include positive impacts on socioeconomics (e.g., increased employment, increased revenues to local municipalities and lease revenues to participating landowners and neighbors), air quality (through reduction of

emissions from fossil-fuel-burning power plants), and climate (reduction of greenhouse gases that contribute to global warming). By eliminating pollutants and greenhouse gases, the Project will also benefit ecological and water resources and human health. Additional information on the air quality and socioeconomic benefits of the proposed Project is included in Sections 2.4 and 2.9.

## 1.5 Project Facility Layout and Components

### *1.5.1 Facility Layout Criteria*

In addition to the facility layout criteria described in the DEIS, which included wind resource assessment, environmental considerations, and setbacks, the layout was further revised, based on the results of field-based wetland delineation, cultural resources investigations, and other issues raised during the public comment period, to avoid sensitive resources to the extent practicable. Further information regarding supplemental wetland and cultural resource investigations performed since the DEIS are provided in Sections 2.2 and 2.6, respectively, and corresponding Appendices C, F, and G.

### *1.5.2 Roads and Civil Construction Work*

Project Site access roads will be designed to allow for oversized heavy equipment to be transported to the Project Site, and will be used throughout the life of the Project to allow access to and from the wind turbines, substations, and meteorological monitoring towers. In order to facilitate the erection of wind turbines and towers, a crane pad, which is a flat work area approximately 60 feet by 100 feet, will be cleared of topsoil, compacted, and graveled as necessary adjacent to each turbine location. Crane paths leading to wind turbine sites will be along existing or new access roads. The Project also entails a gravel parking area at the O&M facility and a gravel surfaced equipment laydown yard. The primary proposed laydown yard is currently located on approximately 8.3 acres of land off of Center Road in the northeastern part of the Project Site near turbine 33 as shown on Figure 1.1-2. The Applicant anticipates that the entire 8.3-acre parcel may temporarily be impacted during construction. Auxiliary staging areas may be necessary to further facilitate construction. The size and location of any additional staging areas will be submitted for review by municipal officials prior to construction. The location of the O&M facility and adjoining parking lot will be built just south of the primary construction laydown yard on an 8.7-acre parcel. The O&M building, equipment storage yard, maintenance area, and parking area that make up this facility will be located in an area that will disturb no more than 8.7 acres. All proposed roads and transportation facilities locations have been sited to minimize ground disturbance in general and disturbance to agricultural lands, wetlands, and cultural resources in particular.

Road access to the Project Site will be provided by a number of existing public roads, as described in Section 2.8, Traffic and Transportation. The Applicant is in the process of developing a transportation, or delivery plan, that examines the feasibility of transporting large

or heavy Project components to and around the Project Site. It is currently estimated that several miles of existing public roads will be improved to facilitate Project construction. An updated Traffic Routing Plan will be provided in the Project Final Environmental Impact Statement (FEIS).

#### *1.5.2.1 Project Site Roads*

Approximately 15.8 miles of access roads will be constructed and/or improved to access the turbines, as compared with the 18 miles for the DEIS layout. The remainder of this section is as described in the DEIS.

#### *1.5.2.2 Road Design*

Roads will be designed as described in the DEIS.

### *1.5.3 Turbine Tower Foundations*

This section is as described in the DEIS.

### *1.5.4 Wind Turbine Generators and Central Control System*

This section is as described in the DEIS.

#### *1.5.4.1 Wind Turbine Basic Configuration*

This section is as described in the DEIS.

### *1.5.5 Electrical Collection System Infrastructure*

The electrical system overview and description of the nacelle/pad mounted transformers and underground cables are as described in the DEIS. Approximately 17.9 miles of underground power collection lines will be installed, with 9.7 miles placed within the 15.8 miles of Project access road corridors. Buried collection lines located outside of access road corridors will comprise 8.2 miles of the total 17.9-mile collection system. The Applicant proposes to integrate up to 1.4 miles of overhead 34.5 kV power lines into the wind farm power collection system design, which is the same as the DEIS layout of 1.4 miles, in the southeast portion of the Project Site.

The Project will also require approximately 4.0 miles of overhead 34.5 kV electrical power lines, compared with the DEIS layout of 3.3 miles, to collect all of the power from the turbines and transport it west to the substation facility in Pomfret. The currently proposed overhead electrical line route is the result of consultation with area landowners to minimize impacts on current land uses, field investigations of sensitive natural resources (particularly wetlands, water resources, and cultural resources), and a field-based constructability review performed by the Applicant's engineering team. The overhead line will mainly consist of wooden poles with occasional steel poles at certain angle structures. A detailed route configuration, including pole locations, will be provided in the Project FEIS.

The Project will also require a one-acre switchgear facility near the proposed O&M building that will convert the underground power collection system to an overhead line. This facility will consist of a combination of underground and aboveground equipment, and will be presented in greater detail in the Project FEIS.

### *1.5.6 Interconnection Substation Facilities*

The proposed substation facility is as described in the DEIS and is located in the Town of Pomfret on the westernmost portion of the Project Site. A layout plan showing the location and general configuration of the 5-acre substation facility and associated 0.3 mile access road appears in Figure 1.1-3. The access road extending from Route 60 to the substation primarily runs along an existing road and is outside of the 5-acre development footprint. The 34.5 kV voltage power created by the wind farm will be increased to 115 kV at the substation and then interconnected to the existing, adjacent 115 kV electric transmission line. A more detailed site plan for the substation facility will be provided in the FEIS.

### *1.5.7 Project Grounding System*

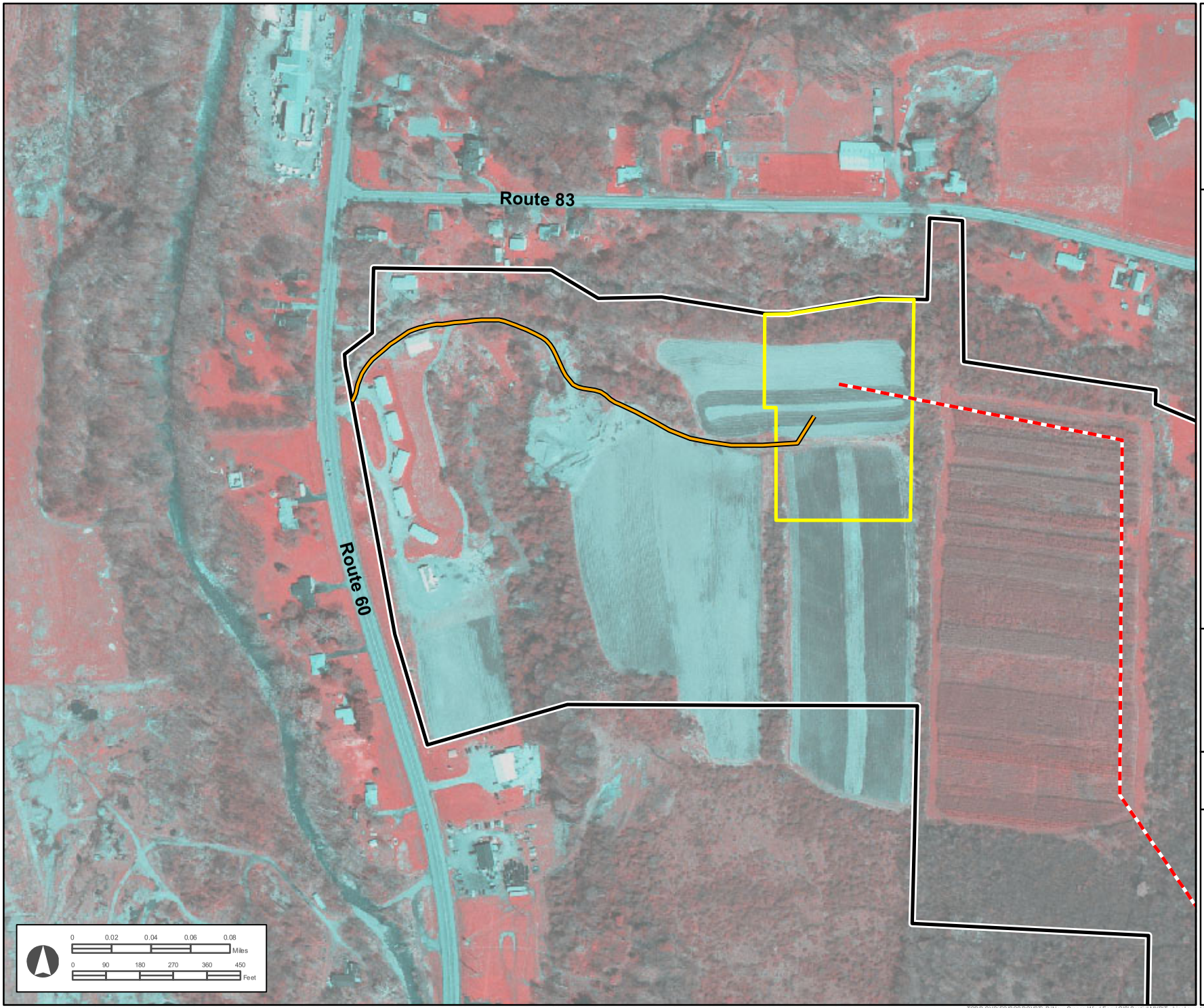
The grounding system is as described in the DEIS.

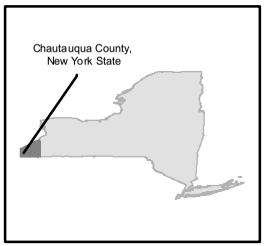
### *1.5.8 Meteorological Monitoring Station Towers*

There will be four permanent meteorological monitoring station towers, compared to the three proposed towers described in the DEIS. This increase in the number of towers is required to meet wind turbine manufacturer warranty conditions. The tower locations are shown on Figure 1.1-2. Temporary impacts associated with the construction of these stand-alone towers will be approximately 1.0 acres per tower. Permanent impacts for each tower will be approximately 0.1 acre per tower.

### *1.5.9 Operations and Maintenance Facility*

The general description of the O&M facility is as provided in the DEIS. The O&M facility, including an O&M building (approximately 5,000 to 8,000 square feet in size), adjacent space for vehicle parking and equipment storage will consist of no more than 8.7 acres of soil disturbance area. The location of the facility is shown in Figure 1.1-2.




- Substation Access Road
- Overhead Collection System
- Substation Area
- Project Site Boundary
- Town Boundary

SOURCE:
NY STATE GIS CLEARINGHOUSE
12 - INCH RESOLUTION COLOR
INFRARED ORTHOIMAGERY - 2004

ARKWRIGHT SUMMIT WIND FARM

TETRA TECH EC, INC.

ARKWRIGHT SUMMIT
WIND FARM

CHAUTAUQUA COUNTY,
NEW YORK

FIGURE 1.1-3
PROPOSED SUBSTATION
LOCATION

ARKWRIGHT SUMMIT
WIND FARM LLC
APRIL 2009

TODD.GYS(ECIBOS:DGYST) P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\RevF\Updates_012609\ASWF_Fig1-1-3_Proposed_Substation.mxd

## 1.6 Project Construction

General Project construction information is as described in the DEIS.

The construction schedule has been revised to assume an anticipated construction start date of spring of 2010 instead of the spring of 2009. Table 1.6-1 provides a revised preliminary construction schedule.

**Table 1.6-1. Revised Preliminary Construction Schedule**

| Task/Milestone | Duration (Weeks) | Commencement |
|---|---|---|
| **Preliminary Activity** | | |
| Reserve Turbines | - | Mid 2009 |
| Order Substation Transformer | - | Mid 2009 |
| Fabricate Turbines | 30 | Fall 2009 |
| Fabricate Substation Transformer | 50 | Fall 2009 |
| Grading of Substation Areas/POI Switchyard | 6 | Fall 2009/Spring 2010 |
| **Construction** | | |
| Estimated Mobilization Date | 1 | April 2010 |
| Environmental and Safety Training | 1 | April 2010 |
| Road Construction | 23 | April 2010 |
| Substation and Switchyard Construction | 30 | April 2010 |
| Foundation Construction | 23 | May 2010 |
| Electrical Collection System Construction | 23 | May 2010 |
| Wind Turbine Assembly and Erection | 13 | July 2010 |
| Switchyard and Substation Energization and Commissioning | 4 | August 2010 |
| Energization and Commissioning of Turbines | 10 | September 2010 |
| Final Grading | 10 | September 2010 |
| Projected Substantial Completion Date | - | November 2010 |
| Restoration Activities | 10 | Spring 2011 |

Note 1: Above table assumes construction in 2010.
Note 2: Many of the above activities will occur simultaneously.

Impact assumptions used to calculate areas of disturbance from Project features have also been updated. Table 1.6-2 provides the revised impact assumptions and calculations. These impact assumptions are conservative and eventual impacts are likely to be less once final design is completed and reported on in the Project FEIS.

**Table 1.6-2. Revised Impact Assumptions and Calculations**

| Project Components | Typical Area of Vegetation Clearing | Area of Total Soil Disturbance (temporary and permanent) | Area of Permanent Soil Disturbance |
|---|---|---|---|
| Wind Turbines and Workspaces | 250-foot radius per turbine | 250-foot radius per turbine | 50-foot radius<br>60 feet x 100 feet crane pad |
| New Access Roads a/ | 100 feet wide per linear foot of road | 54 feet wide per linear foot of road | 34 feet wide per linear foot of road |
| Improved Existing Public Roads b/ | 50 feet wide (adjacent to existing road) | 50 feet wide (adjacent to existing road) | 50 feet wide (adjacent to existing road) |
| Buried Electrical Interconnects and Communications Cables | 75 feet wide per linear foot of cable | 35 feet wide per linear foot of cable plus 10 feet per additional circuit | None (land over buried cable will be restored) |
| Overhead Electrical Interconnects | 150 feet wide per linear foot of cable | 12 feet wide temporary road within cleared area for construction access | Limited to pole footprint diameter |
| Permanent Meteorological Towers | 1 acre per tower | 1 acre per tower | 0.1 acre per tower |
| Operations and Maintenance Building Facility | 8.7 acres | 8.7 acres | 8.7 acres |
| Switchgear Facility | 1.0 acre | 1.0 acre | 1.0 acre |
| Construction Staging Area | 8.3 acres | 8.3 acres | None |
| Collection Substation/POI Switchyard | 5 acres each | 5 acres each | 5 acres each |
| Temporary Crane Paths over Fields c/ | N/A | N/A (within other cleared areas) | None |

a/ Permanent road width in agricultural lands will be 16 feet, with permanent disturbance of 22 feet, in accordance with NY Agricultural Protection Measures. Permanent road widths in wetland areas may be as low as 16 feet wide, with permanent disturbance of 20 feet, depending on site-specific conditions. In areas of steep slopes, cut and fill measures may cause temporary and/or permanent road impact widths to be greater than the typical widths presented in this table. All specific cut and fill areas and their associated impact dimensions will be included in final design documents for the Project and will be included with local building permit applications.

b/ Temporary road widening will average a total of 50 additional feet by the length of the improvement. Improved area will either be on one or both sides of the road, depending on site-specific conditions. Extent of permanent impacts will depend on highway agreements with state, county, and town highway departments. Where requested, improved areas will remain permanent if dictated by highway departments.

c/ Crane paths are designed to walk the crane from turbine to turbine during construction only. Cranes will typically be moved along new or existing access roads. If off-road movement is necessary, soil compaction and decompaction is expected to be limited to plow zone/logging skidding zone and will not result in new ground disturbance. After construction, if and when a crane is needed, it will be trucked in using the access road and erected at the turbine.

### *1.6.1 Pre-construction Activities*

This section is as described in the DEIS.

#### *1.6.1.1 Geotechnical Surveys*

This section is as described in the DEIS.

#### *1.6.1.2 Design and Construction Specifications*

This section is as described in the DEIS.

### *1.6.2 Construction Initiation*

This section is as described in the DEIS, except for adjustments to temporary clearing areas as provided in Table 1.6-2. These adjustments since the publication of the DEIS incorporate reduced impacts within wetlands and stream crossing areas and are explained in detail in Section 2.2 and Appendix C.

The general description of the construction staging area is as described in the DEIS. Its location is shown on Figure 1.1-2.

### *1.6.3 Construction Staging Area*

The construction staging area will be developed as a temporary use area as described in the DEIS. The intended site has been reduced from 10 acres to 8.3 acres. Its location is shown on Figure 1.1-2. Additional auxiliary staging areas may be necessary, as described in Section 1.5.2.

### *1.6.4 Access Road Installation*

Access road installation is as described in the DEIS. The typical temporary impact width for new and existing roads during construction will be 54 feet. Typical permanent impact width for these roads will be 34 feet. Site-specific site conditions may result in either narrower or wider impact widths, based on the need to provide cut and fill of side slopes or to minimize impacts where sensitive resources occur. The final road design and layout included in the FEIS will provide greater detail on the temporary and permanent impacts associated with Project access roads.

### *1.6.5 Foundation Installation*

Foundation installation is as described in the DEIS.

### *1.6.6 Buried Electrical Collection System Installation*

The description of the buried electrical collection system installation is as provided in the DEIS.

### *1.6.7 Overhead Collection Line*

The description of the overhead collection line is as described in the DEIS. A new switchgear facility near the proposed O&M building has been added to the Project layout to convert collected power from four circuits to two circuits prior to entering the overhead collection line.

### *1.6.8 Wind Turbine Assembly and Erection*

The wind turbine assembly and erection process is as described in the DEIS, with the exception that separate crane paths through agricultural fields will not be required.

### *1.6.9 Interconnection Substation Facilities*

The construction of the Project collection system substation and POI switchyard is as described in the DEIS.

### *1.6.10 Plant Energization and Commissioning (Start-Up)*

Plant energization and commission is as described in the DEIS.

### *1.6.11 Operation and Maintenance Facility Construction*

Construction of the O&M facility is as described in the DEIS.

### *1.6.12 Project Construction Clean-Up*

Project construction clean-up is as described in the DEIS.

## 1.7 Operations and Maintenance

### *1.7.1 Operating Schedule*

The operating schedule is as described in the DEIS.

### *1.7.2 Facility Availability*

Facility availability is as described in the DEIS.

### *1.7.3 Scheduled Maintenance – Planned Outages*

The planned outage schedule cycle is as described in the DEIS.

### *1.7.4 Unscheduled Maintenance – Forced Outages*

Unscheduled maintenance is as described in the DEIS.

## 1.8 Decommissioning

### *1.8.1 Estimated Cost of Decommissioning*

This section is as discussed in the DEIS.

### *1.8.2 Ensuring Decommissioning and Site Restoration Funds*

This section is as discussed in the DEIS.

### *1.8.3 Decommissioning Process Description*

The decommissioning process is as described in the DEIS.

### *1.8.4 WTG Removal*

The WTG removal process is as described in the DEIS.

### *1.8.5 WTG Foundation Removal*

The WTG foundation removal is as described in the DEIS.

### *1.8.6 Underground Electrical Collection System*

Removal of the underground electrical collection system is as described in the DEIS.

### *1.8.7 Overhead Collection Lines*

Removal of the overhead collection is as described in the DEIS.

### *1.8.8 Substation Removal*

Substation removal is as described in the DEIS.

## 1.9 Project Cost and Funding

Project cost and funding is as described in the DEIS, with the exception that the federal production tax credit has been extended through December 31, 2009 and will likely be extended further.

## 1.10 Permits and Approvals Required

This section is as described in the DEIS.

## 1.11 Public and Agency Involvement

This section is as described in the DEIS. Any additional agency consultation that has occurred since the publication of the DEIS is either added in Appendix J or included within the separate reports appearing in the appendices. Public and agency comments on the DEIS were reviewed by the lead agency and the Applicant and various follow-up investigations were conducted to address those comments. The filing of this SEIS will result in another public comment period and the combined consultation record from the DEIS and this SEIS will be provided in the FEIS along with responses addressing those comments.

## 1.12 SEQRA Process

On January 10, 2008, a Joint Application for the Wind Overlay Zone and Special Use Permit, which included a Full Environmental Assessment Form (EAF) Part 1 that addressed the proposed Project, was submitted by the Applicant to the Town of Arkwright Town Board pursuant to the SEQRA. A DEIS was prepared for the Project and accepted on February 27, 2008 by the Town of Arkwright Town Board, Lead Agency under SEQRA.

Upon acceptance of the DEIS, the 30-day public comment period began and was subsequently extended through May 30, 2008. Public and agency comments were collected by mail, e-mail, and at the Arkwright Public Hearing, held in the Town of Arkwright on April 30, 2008. Following submission of the DEIS, revisions to the Project layout resulted in changes considered to be a material change by the Lead Agency, necessitating the preparation of an SEIS prior to completing an FEIS. Another 30-day public comment period will be conducted after the filing of the SEIS so that additional public and agency comments can be collected. Responses to comments on both the DEIS and SEIS will be provided in the FEIS. The SEIS provides much of the information requested by comments received on the DEIS and will be referenced in the FEIS comment responses as appropriate.

The remaining SEQRA process for the Project will include the following actions and anticipated time frames:

- SEIS accepted by Lead Agency (Town of Arkwright Town Board);
- File notice of completion of SEIS and notice of public comment period;
- 30-day public comment period;
- Incorporate comments received from both DEIS and SEIS review processes and complete FEIS; document accepted by lead agency;
- File notice of completion of FEIS;
- 10-day public consideration period;
- Lead Agency issue Findings Statement, completing the SEQRA process; and
- Involved agencies issue Findings Statements.

This DEIS, along with a copy of the public notice, will be distributed for review and comment to the public, will be posted on the website (www.arkwrightsummitwind.com), and circulated to the agencies and parties that received a copy of the DEIS.

### *1.12.1 Agency and Public Review*

Agency and public review is as described in the DEIS. The SEIS will be available for agency and public review in a similar manner to the DEIS review process and in accordance with the process established by the lead agency. The Applicant will also be meeting and/or consulting with federal and state agencies in support of separate permitting processes required by the New York State Department of Environmental Conservation (NYSDEC), the U.S. Army Corps of Engineers (USACE) and local municipalities.

# 2.0 ENVIRONMENTAL SETTING, IMPACT ANALYSIS, AND MITIGATION MEASURES

## 2.1 Geology, Topography and Soils

### *2.1.1 Geology and Topography*

#### *2.1.1.1 Existing Conditions*

*Topography*

Information regarding the existing conditions of topography is as described in the DEIS. Additional details regarding the topographic features in the Project Area, including drainage systems and elevational data, are provided in Appendix B. A map showing the updated Project layout over the existing topography is provided in Figure 2.1-1.

*Surficial Geology*

Information regarding the existing conditions of surficial geology is as described in the DEIS, with two exceptions:

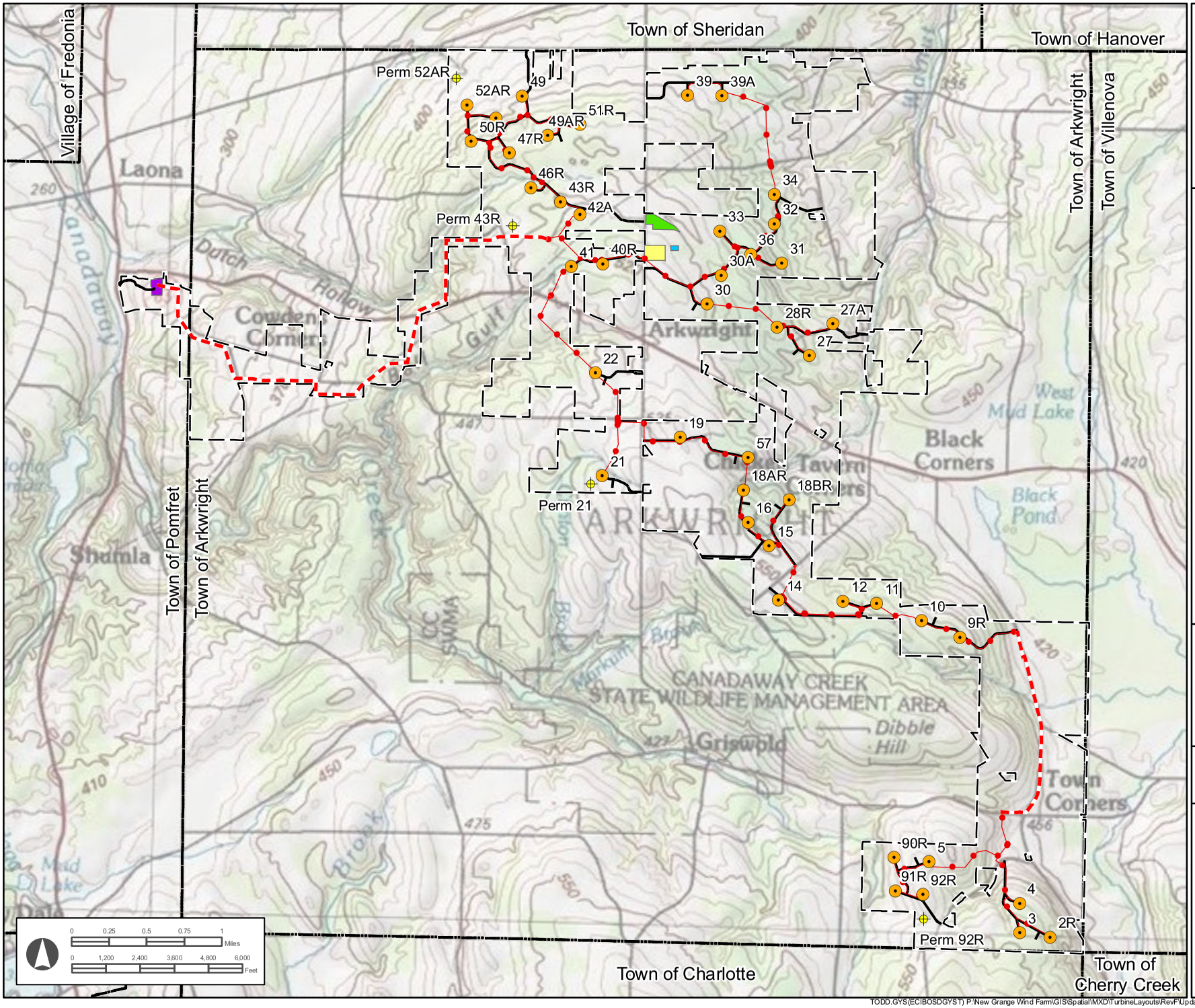
- The DEIS describes a till layer mapped by Cadwell and others in 1986 “as being relatively thin along the crest of the hill where 11 turbines are proposed.” Due to the revised Project layout, only 10 wind turbines are now proposed to be located along this hill crest.
- The DEIS states that kame deposits are located “near the moraine in the northwest and northeast sides of the site.” This information is inaccurate; based on the current Project layout, kame deposits are located on the northwest and southeast portions of the site.

Additional details regarding the depositional history, thicknesses, and permeability of surficial sedimentary units are provided in Appendix B. A map showing the updated Project layout over the existing surficial geology is provided in Figure 2.1-2.

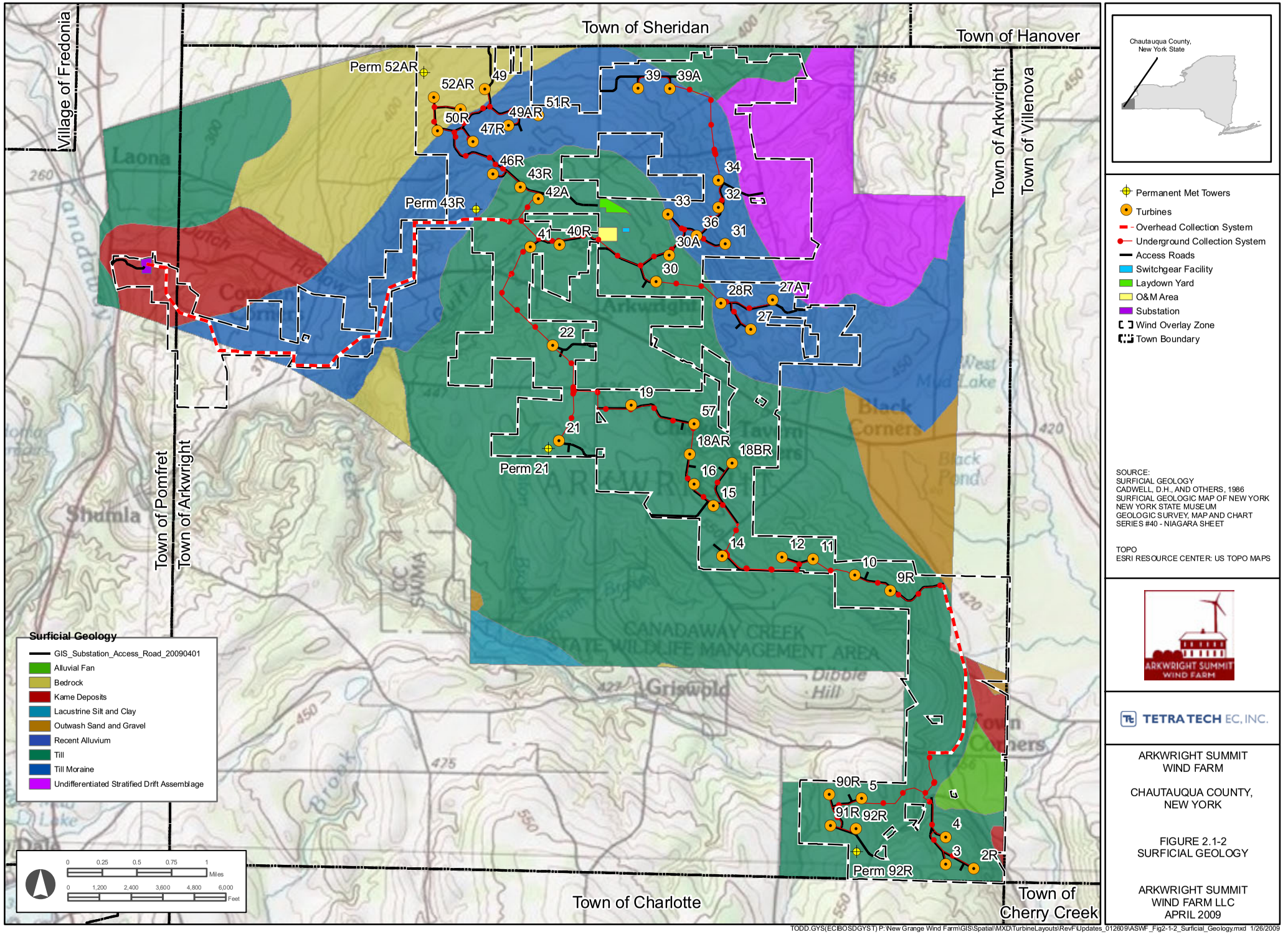
*Bedrock Geology*

Information regarding the existing conditions of bedrock geology is as described in the DEIS, with two exceptions:

- The DEIS states: “Exposed bedrock is present at the surface in the northwest corner of the Project Site and in smaller outcrops in the southwest and the southern edge of the Project Site.” This information is inaccurate; based on the current Project layout, exposed bedrock is present only in the northwest corner of the Project Site.




TODD.GYS(ECIBOSDGYST) P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\RevF\Updates_012609\ASWF_Fig2-1-1_Topography.mxd 1/26/2009







- Permanent Met Towers
- Turbines
- Overhead Collection System
- Underground Collection System
- Access Roads
- Switchgear Facility
- Laydown Yard
- O&M Area
- Substation
- Wind Overlay Zone
- Town Boundary

SOURCE:
SURFICIAL GEOLOGY
CADWELL, D.H., AND OTHERS, 1986
SURFICIAL GEOLOGIC MAP OF NEW YORK
NEW YORK STATE MUSEUM
GEOLOGIC SURVEY, MAP AND CHART
SERIES #40 - NIAGARA SHEET

TOPO
ESRI RESOURCE CENTER: US TOPO MAPS

ARKWRIGHT SUMMIT WIND FARM

TETRA TECH EC, INC.

ARKWRIGHT SUMMIT
WIND FARM

CHAUTAUQUA COUNTY,
NEW YORK

FIGURE 2.1-2
SURFICIAL GEOLOGY

ARKWRIGHT SUMMIT
WIND FARM LLC
APRIL 2009

TODD.GYS(ECIBOSDGYST) P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\RevF\Updates_012609\ASWF_Fig2-1-2_Surficial_Geology.mxd 1/26/2009

- The DEIS states: “The site bedrock consists of three shale and siltstone members of the Canadaway Formation, located under in the lower elevations and the younger overlying Chadokoin Formation in the upper elevations of the Project Area.” This statement is poorly phrased, and for clarity, the following statement should be used in its place: “The site bedrock consists of three shale and siltstone members of the Canadaway Formation, which are located in the lower elevations of the Project Area. The younger, overlying Chadokoin Formation is located in the upper elevations of the Project Area.”

A map showing the updated Project layout over the existing bedrock geology is provided in Figure 2.1-3.

Additional details regarding bedrock lithology and thicknesses, as well as depths to bedrock throughout the Project Area, are provided in Appendix B.

*Geologic Formations*

Information regarding the existing conditions of geologic formations is as described in the DEIS, with two exceptions:

- Based on the current Project layout, the Project Area contains 125 natural gas wells (producing wells, non-commercial wells, and plugged and abandoned wells) with 52 natural gas wells occurring within the Project Site. Figure 2.1-4 shows the location of these known wells within the Project Site.
- The DEIS states that two sand and gravel/unconsolidated mining operations (borrow pits) are located within the Project Area. This is inaccurate; according to NYSDEC data, four borrow pits are within the Project Area, two of which are active. These four sites are shown in Figure 2.1-4.

*Groundwater*

Detailed information regarding existing groundwater conditions are provided in Appendix B.

*Unusual Landforms*

Information regarding the existing conditions of unusual landforms is as described in the DEIS.

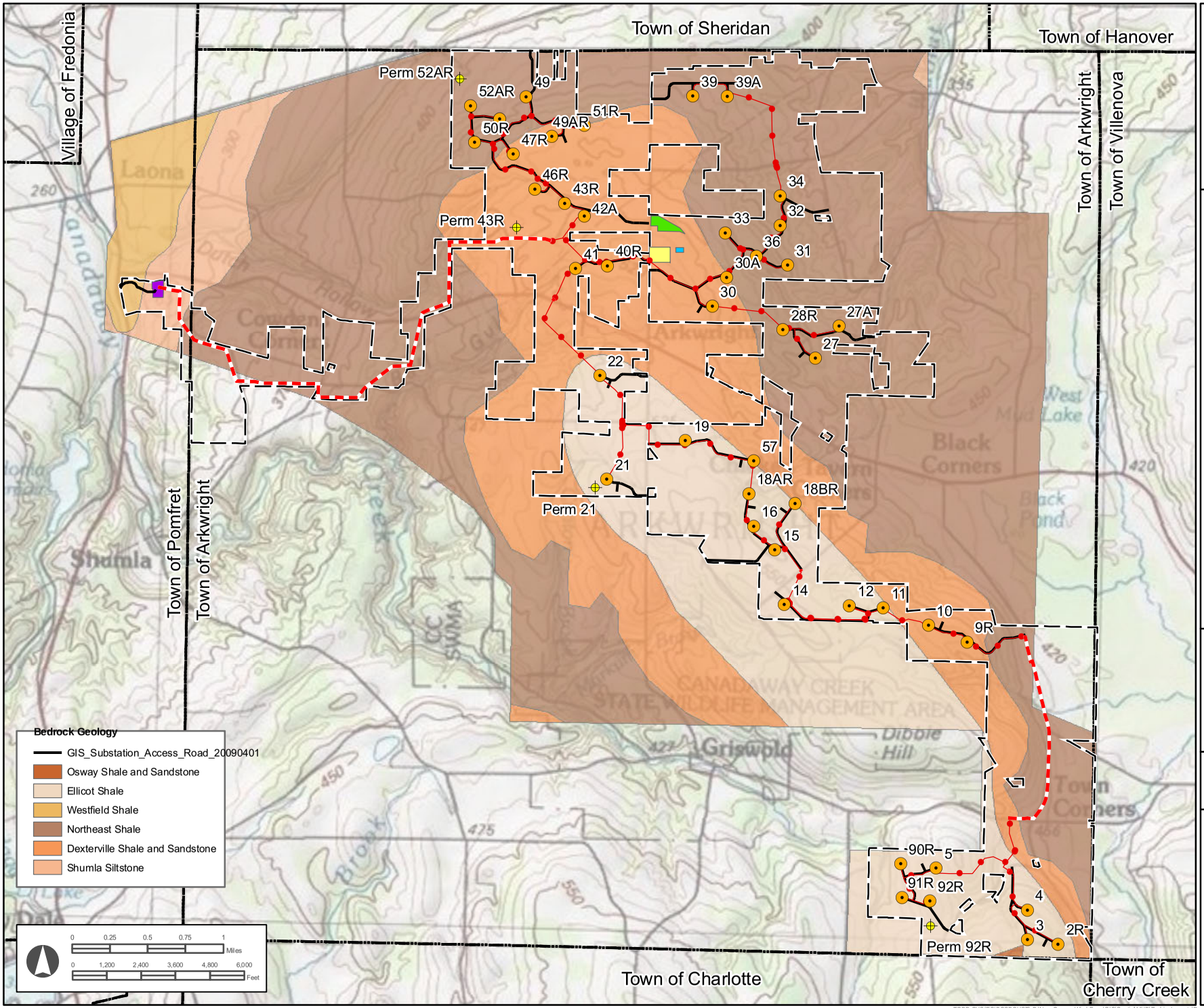
*Geologic Hazards*

Information regarding the existing conditions of geologic hazards is as described in the DEIS. Figure 2.1-5 shows the location of Chautauqua County Faults.

### *2.1.1.2 Anticipated Impacts*

#### *2.1.1.2.1 Construction*

Information regarding the anticipated impacts of construction to geology and topography are as described in the DEIS. This will include conducting pre-construction and post-construction blasting surveys and preparation of a blasting plan to address any areas where blasting is anticipated.

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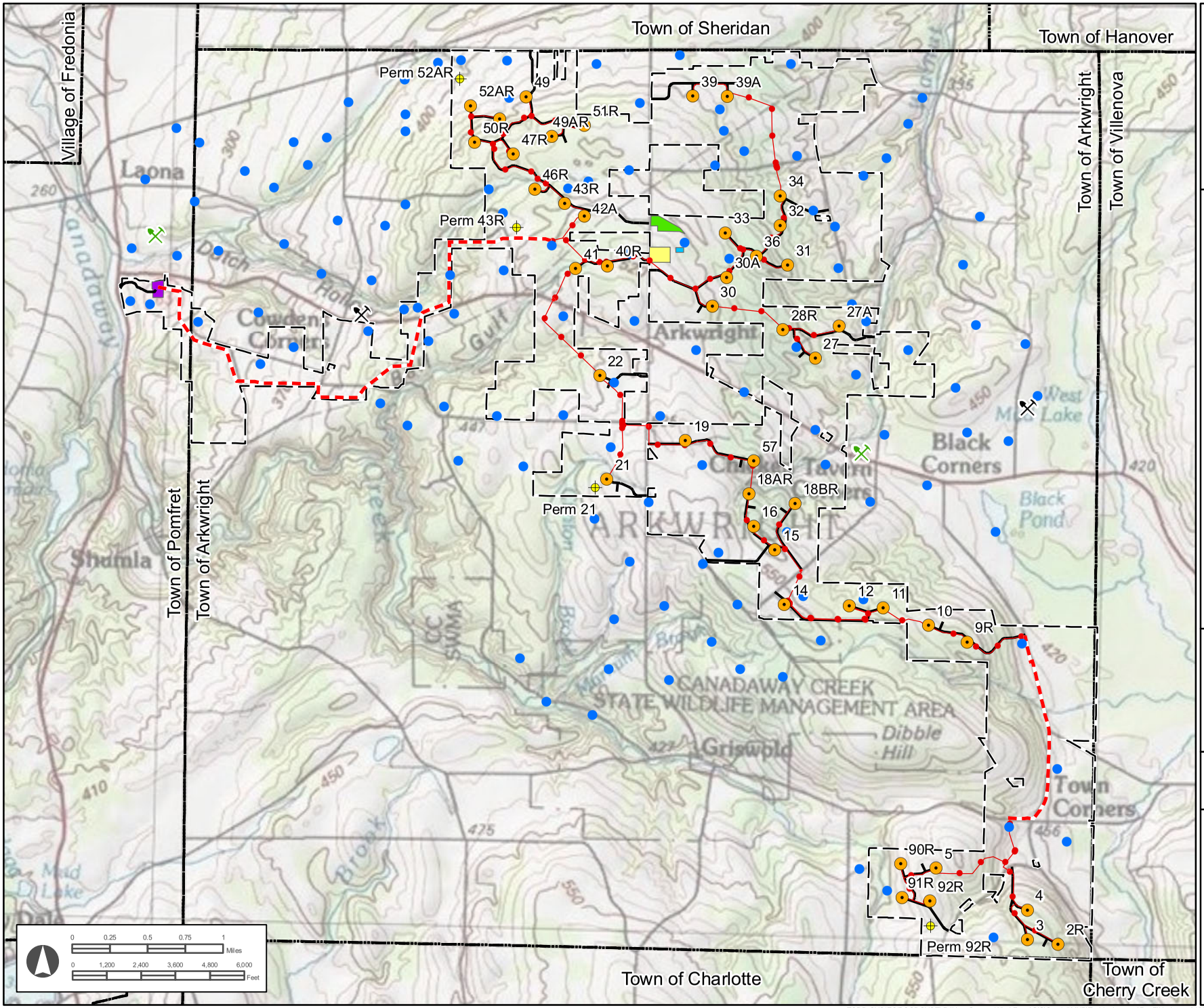


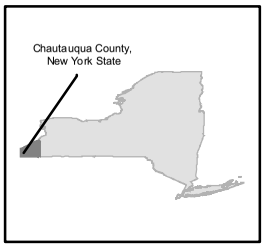


- Permanent Met Towers
- Turbines
- Overhead Collection System
- Underground Collection System
- Access Roads
- Laydown Yard
- O&M Area
- Substation
- Switchgear Facility
- Wind Overlay Zone
- Town Boundary
- Gas Wells
- Active Borrow Pit
- Reclaimed Borrow Pit

SOURCE:
MINE AND WELL DATA
NYSDEC ENVIRONMENTAL MAPPER DATABASE

TOPO
ESRI RESOURCE CENTER: US TOPO MAPS

ARKWRIGHT SUMMIT WIND FARM

TETRA TECH EC, INC.

ARKWRIGHT SUMMIT
WIND FARM

CHAUTAUQUA COUNTY,
NEW YORK

FIGURE 2.1-4
GAS WELLS AND MINES

ARKWRIGHT SUMMIT
WIND FARM LLC
APRIL 2009

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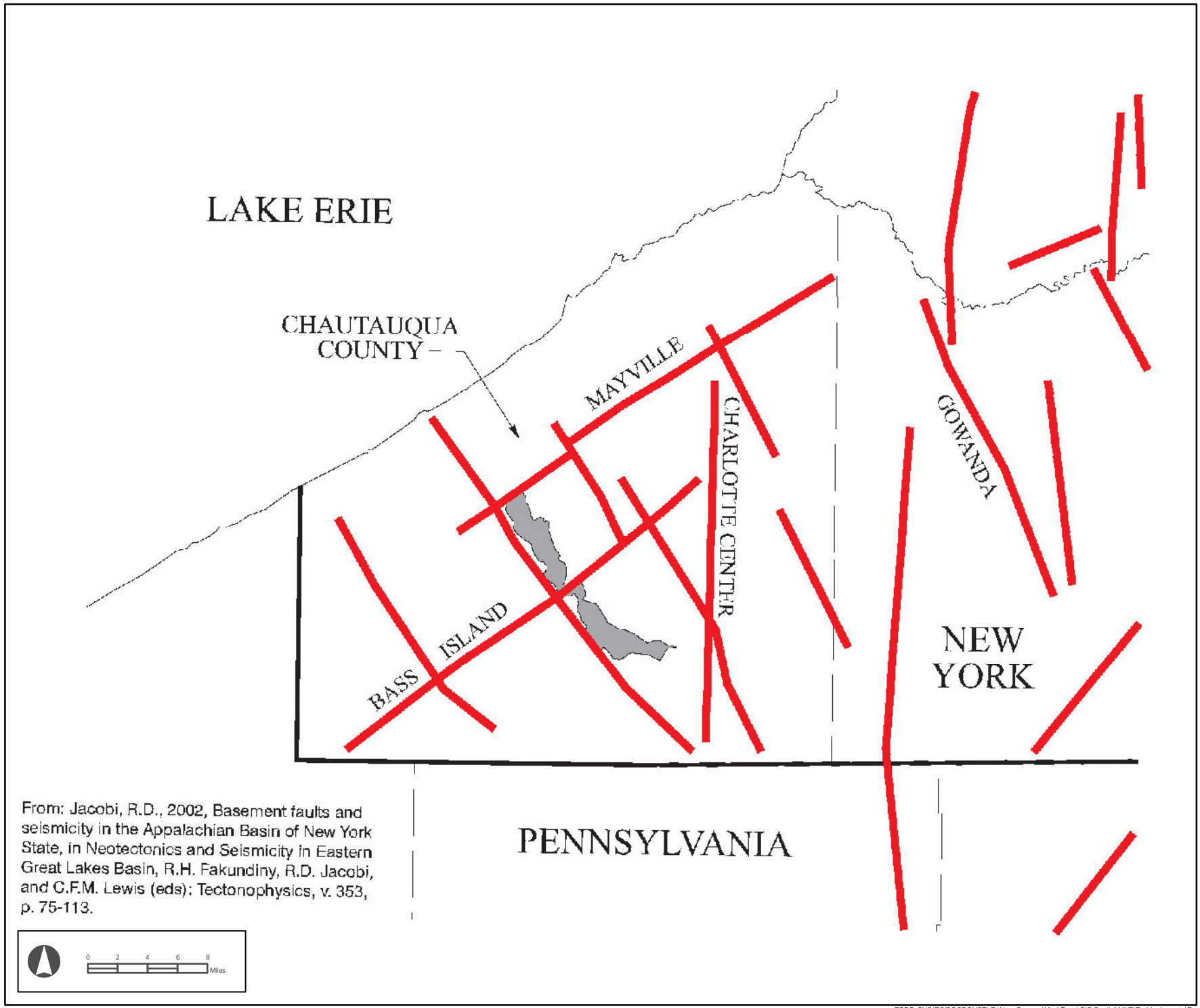
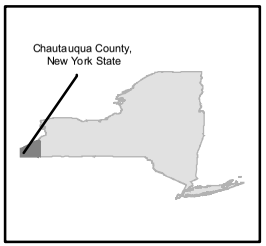



Fault Lines

ARKWRIGHT SUMMIT WIND FARM

TETRA TECH EC, INC.

ARKWRIGHT SUMMIT WIND FARM

CHAUTAUQUA COUNTY, NEW YORK

FIGURE 2.1-5
CHAUTAUQUA COUNTY FAULTS

ARKWRIGHT SUMMIT WIND FARM LLC
APRIL 2009

*2.1.1.2.2 Operation*

Information regarding the anticipated impacts of operation to geology and topography are as described in the DEIS.

*2.1.1.3 Mitigation Measures*

Proposed measures to avoid, minimize, and mitigate impacts to geology and topography are as described in the DEIS.

### *2.1.2 Soils*

*2.1.2.1 Existing Conditions*

*2.1.2.1.1 Soil Designations*

Information regarding the existing conditions of soil designations is as described in the DEIS, with the exception of Table 2.1-2, Anticipated Impacts by Soil Types, which has been updated based on the new Project layout. A map showing the updated Project layout over the existing soil types is provided in Figure 2.1-6.

**Table 2.1-2. Anticipated Impacts by Soil Types**

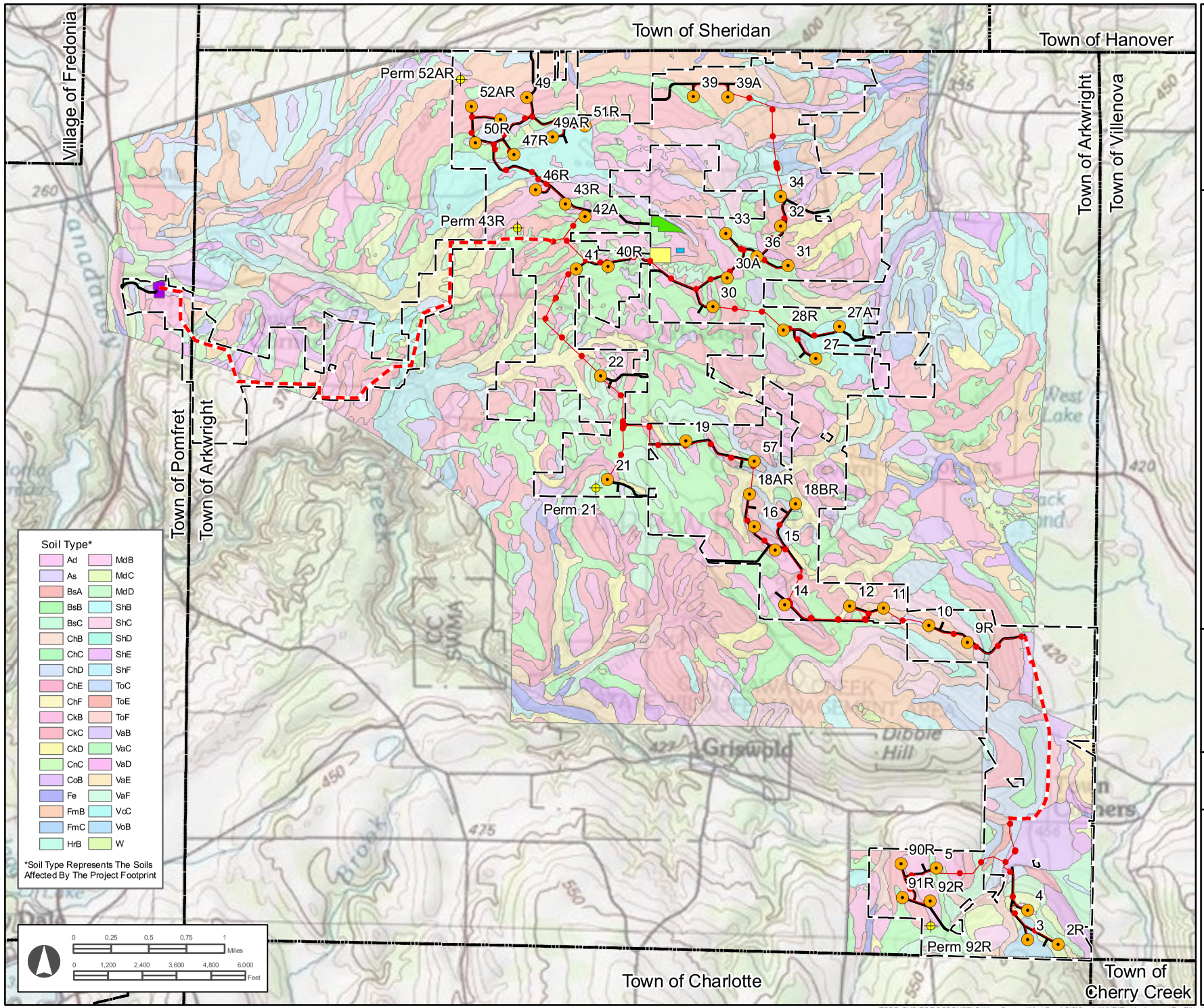
| Soil Symbol | Soil Name | Acres Temporary Impact | Acres Permanent Impact |
|---|---|---|---|
| Ad | Alden mucky silt loam | 0.31 | 0.16 |
| As | Ashville silt loam | 5.36 | 1.14 |
| BsA | Busti silt loam, 0 to 3 percent slopes | 2.23 | 0.10 |
| BsB | Busti silt loam, 3 to 8 percent slopes | 74.57 | 17.75 |
| BsC | Busti silt loam, 8 to 15 percent slopes | 10.33 | 1.48 |
| ChB | Chadakoin silt loam, 3 to 8 percent slopes | 4.99 | 1.28 |
| ChC | Chadakoin silt loam, 8 to 15 percent slopes | 0.59 | 0.18 |
| ChD | Chadakoin silt loam, 15 to 25 percent slopes | 18.57 | 4.16 |
| ChE | Chadakoin silt loam, 25 to 35 percent slopes | 0.97 | 0.00 |
| ChF | Chadakoin silt loam, 35 to 50 percent slopes | 7.65 | 0.35 |
| CkB | Chautauqua silt loam, 3 to 8 percent slopes | 62.30 | 20.19 |
| CkC | Chautauqua silt loam, 8 to 15 percent slopes | 52.60 | 13.31 |
| CkD | Chautauqua silt loam, 15 to 25 percent slopes | 1.08 | 0.53 |
| CnA | Chenango gravelly loam, 0 to 3 percent slopes | 0.77 | 0.62 |
| CnB | Chenango gravelly loam, 3 to 8 percent slopes | 0.57 | 0.36 |
| CnC | Chenango gravelly loam, 8 to 15 percent slopes | 0.97 | 0.70 |
| CoB | Chenango channery loam, fan, 3 to 8 percent slopes | 6.71 | 4.15 |
| CpB | Churchville silt loam, 3 to 8 percent slopes | 0.19 | 0.19 |
| CsB | Collamer silt loam, 3 to 8 percent slopes | 0.12 | 0.00 |
| DeB | Darien silt loam, 3 to 8 percent slopes | 0.08 | 0.00 |
| Fe | Fluvaquents-Udifluvents complex, frequently flooded | 0.18 | 0.00 |
| FmA | Fremont silt loam, 0 to 3 percent slopes | 0.001 | 0.00 |

**Table 2.1-2. Anticipated Impacts by Soil Types**

| Soil Symbol | Soil Name | Acres Temporary Impact | Acres Permanent Impact |
|---|---|---|---|
| FmB | Fremont silt loam, 3 to 8 percent slopes | 27.11 | 6.41 |
| FmC | Fremont silt loam, 8 to 15 percent slopes | 0.26 | 0.17 |
| LnC | Langford silt loam, 8 to 15 percent slopes | 0.73 | 0.00 |
| MdB | Mardin channery silt loam, 3 to 8 percent slopes | 2.63 | 0.40 |
| MdC | Mardin channery silt loam, 8 to 15 percent slopes | 7.93 | 1.75 |
| MdD | Mardin channery silt loam, 15 to 25 percent slopes | 3.23 | 0.71 |
| NgA | Niagara silt loam, 0 to 3 percent slopes, loamy substratum | 0.15 | 0.00 |
| ShB | Schuyler silt loam, 3 to 8 percent slopes | 0.60 | 0.00 |
| ShC | Schuyler silt loam, 8 to 15 percent slopes | 3.69 | 0.76 |
| ShD | Schuyler silt loam, 15 to 25 percent slopes | 4.29 | 0.69 |
| ShE | Schuyler silt loam, 25 to 35 percent slopes | 0.40 | 0.18 |
| ShF | Schuyler silt loam, 35 to 50 percent slopes | 0.34 | 0.00 |
| ToC | Towerville silt loam, 8 to 15 percent slopes | 0.30 | 0.00 |
| ToE | Towerville silt loam, 25 to 35 percent slopes | 0.32 | 0.00 |
| ToF | Towerville silt loam, 35 to 50 percent slopes | 0.002 | 0.00 |
| UnA | Unadilla silt loam | 0.24 | 0.15 |
| VaB | Valois gravelly silt loam, 3 to 8 percent slopes | 2.22 | 1.06 |
| VaC | Valois gravelly silt loam, 8 to 15 percent slopes | 20.62 | 3.69 |
| VaD | Valois gravelly silt loam, 15 to 25 percent slopes | 1.45 | 0.26 |
| VaF | Valois gravelly silt loam, 35 to 50 percent slopes | 0.42 | 0.24 |
| VcC | Valois gravelly silt loam, rolling | 23.93 | 5.39 |
| VoB | Volusia channery silt loam, 3 to 8 percent slopes | 6.11 | 1.13 |
| W | Water | 0.33 | 0.00 |
| | **Total** | **358.53** | **89.63** |

*2.1.2.1.2 Prime Farmland*

As stated in the DEIS, Prime Farmland is a specific designation attributed to soil types meeting certain physical and chemical parameters. It is defined by the U.S. Department of Agriculture (USDA) specifically as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. The land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water. The soils are of the highest quality and can economically produce sustained high yields of crops when treated and managed according to acceptable farming method” (USDA). Very specific technical criteria were established by Congress to identify prime farmland soils. In general, the criteria reflects adequate natural moisture content; specific soil temperature range; pH between 4.5 and 8.4 in the rooting zone; low susceptibility to flooding; low risk to wind and water erosion; minimum permeability rates; and low rock fragment content (USDA).

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Soils may also be designated as Prime Farmland Soils–When Drained or Farmland of Statewide Significance. The former is attributed to soils that would meet the Prime Farmland designation, as described above, if drained, while the latter is attributed to lands that contain "nearly" prime farmland, as determined by the pertinent state agency or agencies, and contain similar criteria for classification as prime farmland. The designation of a soil under any of these classes does not necessarily indicate 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.

Information regarding the existing conditions of prime farmland is as described in the DEIS, with two exceptions:

- The DEIS states that Farmland Soils of Statewide Importance were obtained from the New York State Department of Agriculture and Markets (Ag & Markets). This is inaccurate. These data were obtained for Chautauqua County from the Natural Resources Conservation Service (NRCS).
- Table 2.1-3, Impacts to Farmland Soils, has been updated based on the new Project layout.

**Table 2.1-3. Impacts to Farmland Soils**

| | Acres Temporary Impact | Acres Permanent Impact |
|---|---|---|
| **Prime Farmland Soils** | | |
| Chadakoin silt loam, 3 to 8 percent slopes | 5.0 | 1.3 |
| Chautauqua silt loam, 3 to 8 percent slopes | 62.4 | 20.2 |
| Chenango gravelly loam, 0 to 3 percent slopes | 0.8 | 0..6 |
| Chenango gravelly loam, 3 to 8 percent slopes | 0.6 | 0.4 |
| Chenango channery loam, fan, 3 to 8 percent slopes | 6.7 | 4.1 |
| Collamer silt loam, 3 to 8 percent slopes | 0.1 | 0.0 |
| Schuyler silt loam, 3 to 8 percent slopes | 0.6 | 0.0 |
| Valois gravelly silt loam, 3 to 8 percent slopes | 2.2 | 1.1 |
| Unadilla silt loam, 0 to 3 percent slopes | 0.2 | 0.2 |
| **Subtotal** | **78.6** | **27.8** |
| **Prime Farmland When Drained** | | |
| Busti silt loam, 0 to 3 percent slopes | 2.2 | 0.1 |
| Busti silt loam, 3 to 8 percent slopes | 74.6 | 17.8 |
| Churchville silt loam, 3 to 8 percent slopes | 0.2 | 0.2 |
| Darien silt loam, 3 to 8 percent slopes | 0.1 | 0.0 |
| Fremont silt loam, 0 to 3 percent slopes | 0.001 | 0.0 |
| Niagara silt loam, 0 to 3 percent slopes, loamy substratum | 0.2 | 0.0 |
| **Subtotal** | **77.2** | **18.0** |

**Table 2.1-3. Impacts to Farmland Soils**

| | Acres Temporary Impact | Acres Permanent Impact |
|---|---|---|
| **Farmland of Statewide Importance** | | |
| Ashville silt loam | 5.4 | 1.1 |
| Busti silt loam, 8 to 15 percent slopes | 10.3 | 1.5 |
| Chadakoin silt loam, 8 to 15 percent slopes | 0.6 | 0.2 |
| Chautauqua silt loam, 8 to 15 percent slopes | 52.6 | 13.3 |
| Chenango gravelly loam, 8 to 15 percent slopes | 1.0 | 0.7 |
| Fremont silt loam, 3 to 8 percent slopes | 27.1 | 6.4 |
| Fremont silt loam, 8 to 15 percent slopes | 0.3 | 0.2 |
| Langford silt loam, 8 to 15 percent slopes | 0.7 | 0.0 |
| Mardin channery silt loam, 3 to 8 percent slopes | 2.6 | 0.4 |
| Mardin channery silt loam, 8 to 15 percent slopes | 7.9 | 1.7 |
| Schuyler silt loam, 8 to 15 percent slopes | 3.7 | 0.8 |
| Towerville silt loam, 8 to 15 percent slopes | 0.3 | 0.0 |
| Valois gravelly silt loam, 8 to 15 percent slopes | 20.6 | 3.7 |
| Valois gravelly silt loam, rolling | 23.9 | 5.4 |
| Volusia channery silt loam, 3 to 8 percent slopes | 6.1 | 1.1 |
| **Subtotal** | **163.2** | **36.5** |
| **Total** | **319.0** | **82.3** |

*2.1.2.1.3 Hydric Soils*

Information regarding the existing conditions of hydric soils is as described in the DEIS, with the exception of Table 2.1-4, Impacts to Hydric Soils, which has been updated based on the new Project layout.

**Table 2.1-4. Impacts to Hydric Soils**

| Soil Name | Acres Temporary Impact | Acres Permanent Impact |
|---|---|---|
| Alden mucky silt loam | 0.3 | 0.2 |
| Ashville silt loam | 5.4 | 1.1 |
| Fluvaquents-Udifluvents complex, frequently flooded | 0.2 | 0.0 |
| **Total** | **5.9** | **1.3** |

### *2.1.2.2 Anticipated Impacts to Soils*

#### *2.1.2.2.1 Construction*

*Soil Erosion and Siltation*

Information regarding the anticipated impacts of construction to soil erosion and siltation are as described in the DEIS, with minor changes to the temporary and permanent acres of impact. Table 2.1-5, Approximate Area of Soil Disturbance, has been updated based on the current Project layout and impact assumptions. A total of approximately 359 acres of surface soils will be disturbed during the construction of the Project. Once construction activities are complete, approximately 75 percent of the disturbed area, or approximately 269 acres of surface soil, will be restored. The net result of permanently disturbed soils will be approximately 90 acres.

**Table 2.1-5. Approximate Area of Soil Disturbance**

| Component | Acres Temporary Impact | Acres Permanent Impact |
|---|---|---|
| Wind Turbines and Work Spaces | 198 | 8 |
| New Access Roads | 83 | 63 |
| Improvements to Existing Public Roads | 4 | 4 |
| Underground Collection System | 39 | 0[1] |
| Overhead Collection System | 8 | <1[2] |
| Substation and POI Switchyard | 5 | 5 |
| Laydown Yard | 8 | 0 |
| O&M Building | 9 | 9 |
| Switchgear Facility | 1 | 1 |
| Meteorological Towers | 4 | <1 |
| **Total acres of disturbed soils** | **359** | **90** |
| **Total acres of restored soils** | **268 / 75%** | |

*Farmland Soils and Wooded Areas*

Information regarding anticipated impacts of construction to farmland soils and wooded areas are as described in the DEIS, with minor changes to the temporary and permanent acres of impact. The updated Table 2.1-3, Impacts to Farmland Soils, indicates that based on the current proposed layout and GIS mapping, construction of the Project would temporarily impact

[1] Once construction is completed, all underground power collection lines will be covered with reclaimed soils that are temporarily removed to bury the cables. Thus, the replaced soils will not be permanently impacted. Impacts will be limited to the removal of trees or other woody vegetation to accommodate long-term maintenance of the collection line, but not the removal of soils.

[2] Once construction is completed, permanent soil disturbance impacts within the overhead power collection lines will be limited to the fill associated with each pole structure. Specific impact calculations will be provided in the FEIS once final design is completed and the number and location of poles is known. The area within the utility right-of-way that is temporarily cleared to accommodate construction will be allowed to revegetate, except where pole placement occurs but permanent removal of soils will not occur. Other permanent impacts will be limited to the removal of mature trees or other woody vegetation within the right-of-way for maintenance of future vegetative height to allow for safe operation of the electric line.

approximately 156 acres of Prime Farmland Soils and Prime Farmland Soils-When Drained. After restoration, the area of impact will be reduced to approximately 46 acres of Prime Farmland Soils and Prime Farmland Soils-When Drained permanently affected by the Project. Most impacts would therefore be short-term (temporary) and would not affect the potential use of prime farmland for agricultural purposes. In total, the Project will temporarily affect 163 acres of Farmland of Statewide Importance. After restoration, a net of 37 acres of Farmland of Statewide Importance may remain permanently affected. It's important to note that only 5.5 acres of designated farmlands of statewide significance that are temporarily impacted occur within actively cultivated croplands, while 2.1 acres will be permanently impacted Both temporary and permanent impacts will be mitigated in accordance with the agricultural protection measures described in Appendix C of the DEIS.

As explained in Section 2.1.2.1.2, these areas are not necessarily used for active agricultural purposes; rather, based on their physical and chemical properties, they are simply characterized as soils of "the highest quality and can economically produce sustained high yields of crops when treated and managed according to acceptable farming method" (USDA). Refer to Section 2.3.2 for estimated temporary and permanent impacts to actual areas of cultivated crops. Both temporary and permanent impacts to farmland soils and wooded areas will be mitigated as detailed in Appendix C Agricultural Protection Measures of the DEIS.

*Liquid Spills*

Information regarding anticipated impacts of liquid spills to soils is as described in the DEIS.

#### *2.1.2.2.2 Operation*

Information regarding anticipated impacts from operation is as described in the DEIS.

### *2.1.2.3 Measures to Mitigate Impacts to Soils*

#### *2.1.2.3.1 Temporary Mitigation Measures*

Proposed temporary measures to avoid, minimize, and mitigate impacts to soils are as described in the DEIS.

#### *2.1.2.3.2 Permanent Mitigation Measures*

Proposed permanent measures to avoid, minimize, and mitigate impacts to soils are as described in the DEIS, with minor changes to the areas of soils that will be restored. Based on the current layout and impact assumptions, approximately 268 acres out of 359 acres of disturbed soils will be restored once construction activities have been completed. The areas that will be restored include temporary disturbances to turbine site workspaces, access road work areas, pathways of underground and overhead collection line facilities, meteorological tower workspaces, and the Project laydown yard.

## 2.2 Water Resources

This section provides an updated description of surface waters, wetlands, and groundwater resources within the Project Site.

### *2.2.1 Existing Conditions*

#### *2.2.1.1 Surface Waters*

Existing surface water conditions in the Project Area are as described in the DEIS. Impacts to drainages and streams within the Project Site are listed in Table 2.2-5. A Project-wide map showing the updated facility layout in relation to existing surface waters is provided in Figure 2.2-1. Please refer to the Wetland Delineation Report for further information.

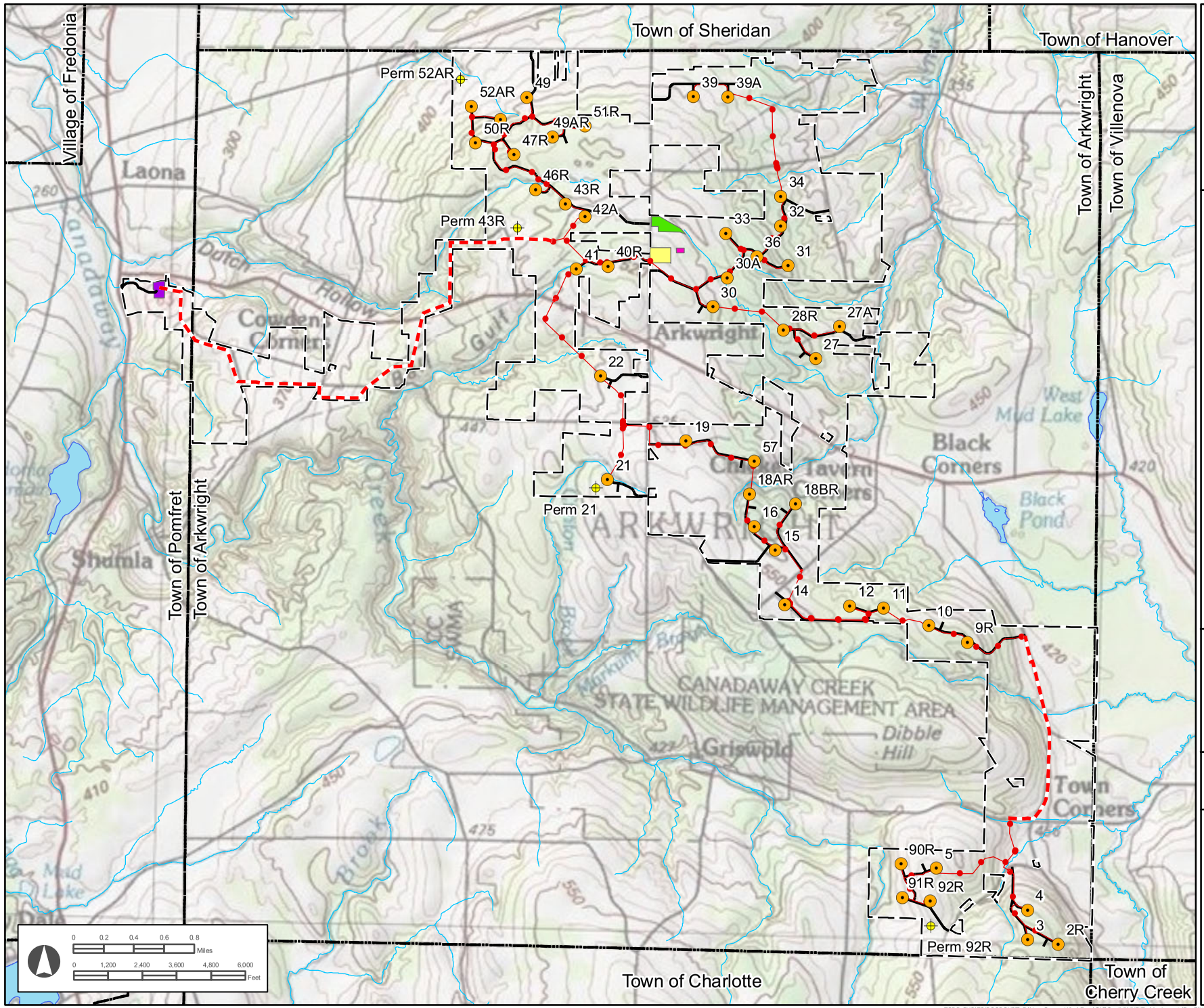
#### *2.2.1.2 Wetlands*

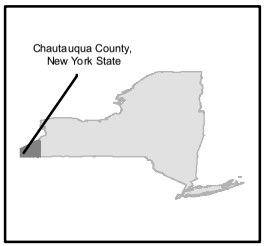
Existing wetland conditions for the Project Area are as described in the DEIS. In addition, a Wetlands and Waterbodies Report is included in Appendix C for further information on the wetlands within the Project Site. This report presents the results of a field-based wetland delineation effort conducted during the summer and fall of 2008 by Ecology and Environment, Inc. Please reference Table 2.1-4 for hydric soils within the Project Site. Wetland impacts within the Project Site are listed in Table 2.2-6. A Project-wide map showing the updated facility layout in relation to existing wetlands is provided in Figure 2.2-2 and a map showing the Project in relation to hydric soils appears in Figure 2.2-3.

Information about the functions and value of each identified and delineated wetland is included in Table 5-2 of Appendix C of this SEIS. A Joint Permit Application will be prepared and filed with the NYSDEC and USACE by the Applicant in 2009 and will include a cluster detail, which will describe in detail the impacts and the efforts taken by the Applicant to avoid and/or minimize impacts to the extent practicable. The Joint Permit Application will also be attached to the FEIS as an appendix.

*Consultation with NYSDEC and USACE*

Initial meetings with NYSDEC and USACE staff were conducted prior to and during the implementation of the 2008 wetland and waterbody field work. A pre-application meeting was held on August 22, 2008, with representatives of the USACE. The intent of this meeting was to provide a general overview of the Project and to review the general timeline of the application submission and the corresponding field work. Additionally, representatives from the NYSDEC visited and reviewed the Project Site on September 10, 2008, as part of an overall effort by the NYSDEC to field visit potential wind sites in Western New York. Members of Arkwright Summit and the NYSDEC drove through the Project Area, discussed the layout, and discussed the Applicant's overall strategies to avoid impacts to wetlands.




- Permanent Met Towers
- Turbines
- Overhead Collection System
- Underground Collection System
- Access Roads
- Switchgear Facility
- Laydown Yard
- O&M Area
- Substation
- Wind Overlay Zone
- Town Boundary
- NYSDEC Surface Water
- NYSDEC Streams

SOURCE:
SURFACE WATER BODIES
NYSDEC WATERBODY INVENTORY/PRIORITY WATERBODIES LIST

TOPO
ESRI RESOURCE CENTER: US TOPO MAPS

ARKWRIGHT SUMMIT WIND FARM

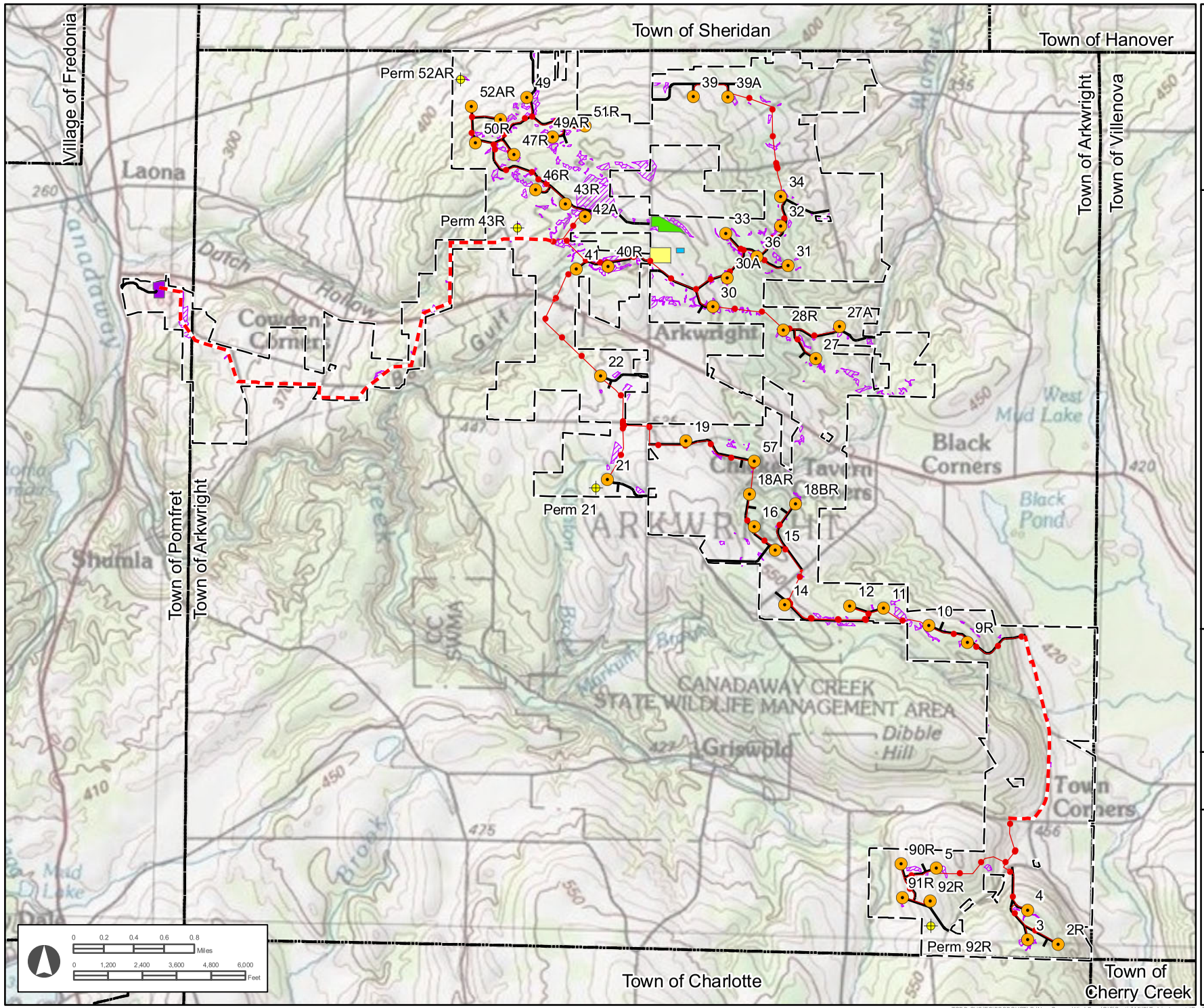
TETRA TECH EC, INC.

ARKWRIGHT SUMMIT
WIND FARM

CHAUTAUQUA COUNTY,
NEW YORK

FIGURE 2.2-1
SURFACE WATERBODIES
IN THE PROJECT AREA

ARKWRIGHT SUMMIT
WIND FARM LLC
APRIL 2009

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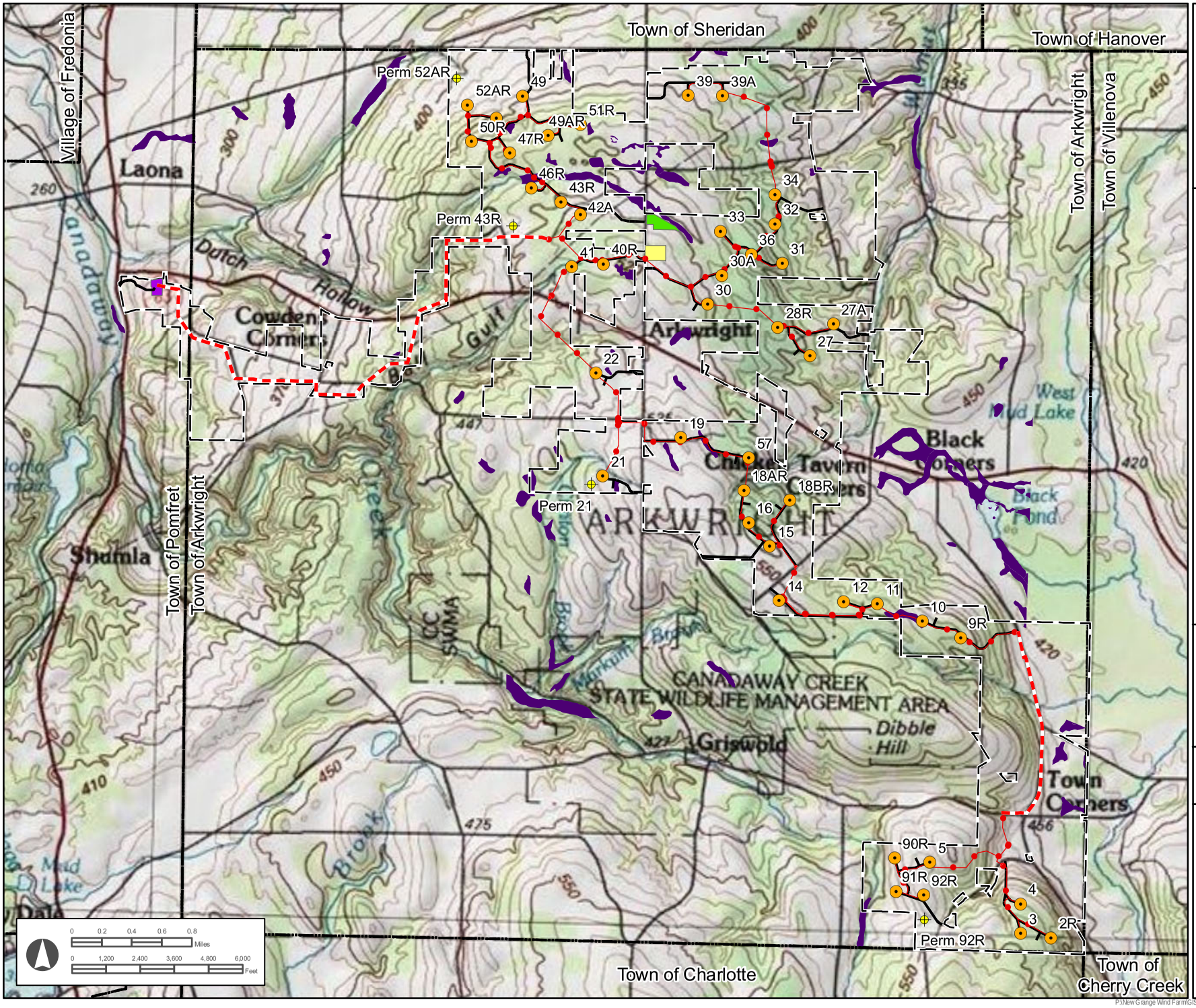

Town of Sheridan
Town of Hanover
Village of Fredonia
Town of Arkwright
Town of Villenova
Town of Pomfret
Town of Charlotte
Town of Cherry Creek
Laona
Cowden Corners
Arkwright
Black Corners
Shumla
Griswold
Town Corners
Canadaway
Dutch Hollow
Gulf
Perm 52AR
Perm 43R
Perm 21
Perm 92R
52AR
49
51R
50R
49AR
47R
46R
43R
42A
41
40R
39
39A
34
32
33
36
31
30A
30
28R
27A
27
22
19
57
21
18AR
18BR
16
15
14
12
11
10
9R
90R
5
91R
92R
4
3
2R
West Mud Lake
Black Pond
CANADAWAY CREEK STATE WILDLIFE MANAGEMENT AREA
Dibble Hill
Markham Brook
Mud Lake
Chautauqua County, New York State
Permanent Met Towers
Turbines
Overhead Collection System
Underground Collection System
Access Roads
Laydown Yard
O&M Area
Substation
Wind Overlay Zone
Town Boundary
Hydric Soils
SOURCE:
SOIL DATA
NRCS SOIL SURVEY GEOGRAPHIC (SSURGO) DATABASE
TOPO
ESRI RESOURCE CENTER: US TOPO MAPS
ARKWRIGHT SUMMIT WIND FARM
TETRA TECH EC, INC.
ARKWRIGHT SUMMIT WIND FARM
CHAUTAUQUA COUNTY, NEW YORK
FIGURE 2.2-3
HYDRIC SOILS
IN THE PROJECT AREA
ARKWRIGHT SUMMIT WIND FARM LLC
APRIL 2009
0 0.2 0.4 0.6 0.8 Miles
0 1,200 2,400 3,600 4,800 6,000 Feet
P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\RevF\ASWF_Fig2.2-3_Hydric_Soils.mxd

Additional meetings were held after the field work in anticipation of the submission of this SEIS. Members of Arkwright Summit met with NYSDEC officials on February 4, 2009 to discuss the findings and format of this SEIS. The Applicant reviewed the conservative impact approach of this SEIS. The NYSDEC agreed with the approach and expects revised impact numbers for the FEIS. The NYSDEC also suggested that the Applicant send a letter to the NYSDEC to schedule a field review of the Project Area (letter is included in Appendix J). The NYSDEC also requested a literature review of the short-eared owl, which was completed and is summarized in Section 2.3.1.4. Mitigation was briefly reviewed and the NYSDEC suggested that the mitigation plan in the wetland application involve the same wetland and same wetland type if possible. The NYSDEC agreed that the post-construction monitoring plan be included in the FEIS. Additional meetings with the NYSDEC and field reviews are anticipated prior to and as part of the joint application for permits.

An additional meeting with the USACE was held on March 25, 2009. The purpose of the meeting was to confirm the schedule and timing of both the wetland application and the corresponding field visit. The Applicant and the USACE also discussed the format of the wetland application submission and the Applicant verbally indicated that they will seek a preliminary Jurisdictional Determination (JD).

The Wetlands and Waterbodies Report states that wetland WL46 is likely to fall under NYSDEC jurisdiction because of its size. WL46 was only delineated within the proposed study corridor and, therefore, its total area was not calculated. This was discussed during a meeting between NYSDEC and Arkwright Summit staff and its consultants on February 4, 2009 (see Appendix J for meeting summary). NYSDEC has not yet made a JD because it has not yet received the Wetlands and Waterbodies Report, which will be submitted in conjunction with this SEIS.

### *2.2.2 Anticipated Impacts*

#### *2.2.2.1 Construction*

Construction impacts are as described in the DEIS.

*Surface Waters and Wetlands*

Discussion on general construction impacts to surface waters and wetlands is as described in the DEIS. The Project Site will have 17,046 linear feet of temporary impacts to surface waters from construction of Project facilities. Temporary impacts to wetlands within the Project Site due to construction of Project facilities are 12.28 acres (534,886 square feet), which is less than the 13.56 acres of temporary wetland impacts proposed in the DEIS. The temporary wetland impacts include 2.61 acres of forested wetlands and 9.67 acres of non-forested wetlands. Wetland cover types are indicated for each field-delineated wetland included in Table 2.2-6. Wetlands that included any portion of forested cover type were conservatively considered forested wetlands when calculating the acreages noted in the previous sentence.

#### *2.2.2.2 Operation*

*Surface Waters and Wetlands*

General operation impacts to surface waters and wetlands are as described in the DEIS. The Project Site will have permanent surface water impacts due to operation of Arkwright Summit of 3,425 linear feet. Also, permanent wetland impacts due to operation of the Arkwright Summit will be 1.27 acres (55,396 square feet), which is less than the 1.63 acres of permanent wetland impacts proposed in the DEIS. These impacts will be from access roads, turbines, and underground electrical collection lines. The permanent wetland impacts include 0.04 acres of forested wetlands and 1.23 acres of non-forested wetlands. Wetland cover types are indicated for each field-delineated wetland included in Table 2.2-6. Wetlands that included any portion of forested cover type were conservatively considered forested wetlands when calculating the acreages noted in the previous sentence. As stated in the DEIS, the conversion of forested wetlands to non-forested wetlands constitutes a permanent change in wetland vegetation composition under NYSDEC regulations. While this conversion from one cover class to another does not constitute a net loss of wetlands, it may alter the structure and function of these wetland habitats. As such, the construction of the Project will result in the conversion of 2.57 acres of forested wetlands to non-forested wetland cover classes. Once final Project design is completed, a more precise calculation of both temporary and permanent wetland impacts will be prepared and presented in the Project FEIS.

### ***2.2.3 Mitigation Measures***

Mitigation is as described in the DEIS.

**Table 2.2-5. Surface Waters Crossed by the Project**

| Location ID | Water Body Name | Federal Jurisdictional Determination | Type | Waters Crossed | | Facility Type |
|---|---|---|---|---|---|---|
| | | | | Estimated Temporary Impacts (linear ft.) | Estimated Permanent Impacts (linear ft.) | |
| D158 | | Jurisdictional | Drainage | 100.44 | **100.44** | O&M Building |
| D58 | | Jurisdictional | Drainage | 318.20 | **79.82** | Turbine |
| D135 | | Jurisdictional | Drainage | 230.04 | **43.45** | Turbine |
| D4 | | Jurisdictional | Drainage | 194.12 | **37.28** | Access Road/Turbine |
| D9 | | | Drainage | 31.44 | **24.76** | Access Road |
| S512 | Ball Gulf | Jurisdictional | Stream | 540.10 | **36.76** | Access Road/Turbine |
| D512 | | Jurisdictional | Drainage | 79.72 | **38.08** | Access Road/UE Collector |
| S1008 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 71.19 | **44.43** | Access Road |
| S1009 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 550.41 | **150.93** | Access Road/Turbine |
| D51 | | Jurisdictional | Drainage | 33.76 | **33.76** | Access Road |
| D52 | | Jurisdictional | Drainage | 76.37 | **39.11** | Access Road |
| D53 | | Jurisdictional | Drainage | 56.46 | **35.38** | Access Road |
| D54 | | Jurisdictional | Drainage | 584.31 | **573.78** | Access Road |
| D62a | | Jurisdictional | Drainage | 71.57 | **34.03** | Access Road/UE Collector |
| S65 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 592.59 | **109.03** | Access Road/UE Collector/Turbine |
| S28 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 580.07 | **34.43** | Access Road/UE Collector/Turbine |
| D67 | | Jurisdictional | Drainage | 138.51 | **53.84** | Access Road/UE Collector |
| D1008 | | Jurisdictional | Drainage | 54.05 | **34.03** | Access Road |
| S1001 | Unnamed tributary to West Branch Conewango Creek | | Stream | 67.46 | **42.48** | Access Road |
| S18 | Unnamed tributary to Ball Gulf | Jurisdictional | Stream | 50.42 | **34.00** | Access Road |
| S27 | Unnamed tributary to Dutch Hollow | | Stream | 71.70 | **34.09** | Access Road/UE Collector |
| D1511a | | Jurisdictional | Drainage | 209.33 | **60.32** | Access Road/UE Collector |
| D1511 | | Jurisdictional | Drainage | 577.26 | **196.32** | Access Road/UE Collector/Turbine |
| D1510 | | Jurisdictional | Drainage | 91.88 | **37.11** | Access Road/UE Collector |

**Table 2.2-5. Surface Waters Crossed by the Project**

| Location ID | Water Body Name | Federal Jurisdictional Determination | Type | Waters Crossed | | Facility Type |
|---|---|---|---|---|---|---|
| | | | | Estimated Temporary Impacts (linear ft.) | Estimated Permanent Impacts (linear ft.) | |
| S90 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 62.21 | **40.09** | Access Road |
| S98 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 466.29 | **56.35** | Access Road/Turbine |
| D100 | | | Drainage | 80.20 | **38.14** | Access Road/UE Collector |
| S118 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 90.09 | **39.26** | Access Road/UE Collector |
| D118 | | Jurisdictional | Drainage | 884.15 | **784.49** | Access Road |
| S560 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 522.66 | **57.22** | Access Road/UE Collector/Turbine |
| D560b | | | Drainage | 125.00 | **110.02** | Access Road |
| S565 | Unnamed tributary to Walnut Creek | | Stream | 76.80 | **37.08** | Access Road/UE Collector |
| D565 | | | Drainage | 72.89 | **14.62** | Access Road/UE Collector |
| D1009 | | TBD | Drainage | 55.88 | **35.65** | Access Road |
| S123 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 78.09 | **34.12** | Access Road/UE Collector |
| S141 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 97.86 | **39.37** | Access Road/UE Collector |
| S137 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 141.73 | **66.18** | Access Road/UE Collector |
| D136 | | Jurisdictional | Drainage | 55.47 | **34.92** | Access Road |
| D135 | | Jurisdictional | Drainage | 0.00 | **19.59** | Access Road |
| S55a | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 102.22 | **37.61** | Access Road/UE Collector |
| S55 | Unnamed tributary to Dutch Hollow | | Stream | 84.54 | **36.50** | Access Road/UE Collector/Turbine |
| S569 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 57.50 | **36.59** | Access Road |
| S1007 | Unnamed tributary to West Branch Conewango Creek | Jurisdictional | Stream | 8.23 | 0.00 | Overhead Collector |
| S1501 | Unnamed tributary to West Branch Conewango Creek | Jurisdictional | Stream | 33.65 | 0.00 | Overhead Collector/UE Collector |
| S1017 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 118.92 | 0.00 | Overhead Collector |
| S1018 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 46.75 | 0.00 | Overhead Collector |
| S1019 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 13.08 | 0.00 | Overhead Collector |
| D150 | | Jurisdictional | Drainage | 36.60 | 0.00 | Overhead Collector |

**Table 2.2-5. Surface Waters Crossed by the Project**

| Location ID | Water Body Name | Federal Jurisdictional Determination | Type | Waters Crossed | | Facility Type |
|---|---|---|---|---|---|---|
| | | | | Estimated Temporary Impacts (linear ft.) | Estimated Permanent Impacts (linear ft.) | |
| S1020 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 12.28 | 0.00 | Overhead Collector |
| S1021 | Dutch Hollow | Jurisdictional | Stream | 12.00 | 0.00 | Overhead Collector |
| S133 | Unnamed tributary to Ball Gulf | Jurisdictional | Stream | 17.25 | 0.00 | Overhead Collector |
| S1015 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 12.53 | 0.00 | Overhead Collector |
| S1000 | Unnamed tributary to West Branch Conewango Creek | Jurisdictional | Stream | 35.49 | 0.00 | UE Collector |
| S509 / S509a | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 71.83 | 0.00 | UE Collector |
| D1513 | | Jurisdictional | Drainage | 35.77 | 0.00 | UE Collector |
| D1512 | | Jurisdictional | Drainage | 54.34 | 0.00 | UE Collector |
| S1002 | Unnamed tributary to Ball Gulf | | Stream | 102.33 | 0.00 | UE Collector |
| D77 | | Isolated | Drainage | 54.38 | 0.00 | UE Collector/Turbine |
| S78 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 67.72 | 0.00 | UE Collector |
| S1010 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 43.35 | 0.00 | UE Collector |
| S81 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 35.61 | 0.00 | UE Collector |
| S513 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 51.51 | 0.00 | UE Collector |
| S8 | Unnamed tributary to West Branch Conewango Creek | Jurisdictional | Stream | 430.09 | 0.00 | UE Collector / Access Road / Turbine |
| D1007 | | Jurisdictional | Drainage | 35.00 | 0.00 | UE Collector |
| D1004 | | Jurisdictional | Drainage | 50.90 | 0.00 | UE Collector |
| D1005 | | Jurisdictional | Drainage | 35.03 | 0.00 | UE Collector |
| S548 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 53.95 | 0.00 | UE Collector |
| D548 | | Jurisdictional | Drainage | 48.37 | 0.00 | UE Collector |
| D548a | | Jurisdictional | Drainage | 44.53 | 0.00 | UE Collector |
| D549 | | Jurisdictional | Drainage | 1.12 | 0.00 | UE Collector |
| D105 | | | Drainage | 46.74 | 0.00 | UE Collector/Turbine |

**Table 2.2-5. Surface Waters Crossed by the Project**

| Location ID | Water Body Name | Federal Jurisdictional Determination | Type | Waters Crossed | | Facility Type |
|---|---|---|---|---|---|---|
| | | | | Estimated Temporary Impacts (linear ft.) | Estimated Permanent Impacts (linear ft.) | |
| D112 | | | Drainage | 111.35 | 0.00 | UE Collector |
| S1000a | Unnamed tributary to West Branch Conewango Creek | | Stream | 48.20 | 0.00 | UE Collector |
| D8a | | | Drainage | 547.72 | 0.00 | UE Collector / Access Road |
| D562 | | | Drainage | 78.32 | 0.00 | UE Collector / Access Road |
| D124 | | Jurisdictional | Drainage | 77.15 | 0.00 | UE Collector/Turbine |
| D142 | | Jurisdictional | Drainage | 17.51 | 0.00 | UE Collector |
| D130 | | Jurisdictional | Drainage | 40.49 | 0.00 | UE Collector |
| S1003 | Unnamed tributary to Ball Gulf | Jurisdictional | Stream | 35.22 | 0.00 | UE Collector |
| D1001 | | Jurisdictional | Drainage | 23.77 | 0.00 | Access Road |
| D8 | | Jurisdictional | Drainage | 110.29 | 0.00 | Access Road |
| D29 | | Jurisdictional | Drainage | 312.66 | 0.00 | Access Road |
| S18a | Unnamed tributary to Ball Gulf | Jurisdictional | Stream | 3.55 | 0.00 | Access Road |
| D5 | | Jurisdictional | Drainage | 144.73 | 0.00 | Turbine |
| D6 | | Jurisdictional | Drainage | 63.28 | 0.00 | Turbine |
| S1500 | Unnamed tributary to West Branch Conewango Creek | Jurisdictional | Stream | 314.00 | 0.00 | Turbine |
| D500 | | Jurisdictional | Drainage | 182.90 | 0.00 | Turbine |
| D512d | | | Drainage | 64.79 | 0.00 | Turbine |
| S69 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 124.19 | 0.00 | Turbine |
| S41 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 351.87 | 0.00 | Turbine |
| D43 | | Jurisdictional | Drainage | 22.92 | 0.00 | Turbine |
| D37 | | Jurisdictional | Drainage | 114.38 | 0.00 | Turbine |
| S60 | Unnamed tributary to Dutch Hollow | Jurisdictional | Stream | 331.83 | 0.00 | Turbine |
| D21 | | Jurisdictional | Drainage | 80.24 | 0.00 | Turbine |
| D25 | | Jurisdictional | Drainage | 171.13 | 0.00 | Turbine |

**Table 2.2-5. Surface Waters Crossed by the Project**

| Location ID | Water Body Name | Federal Jurisdictional Determination | Type | Waters Crossed | | Facility Type |
|---|---|---|---|---|---|---|
| | | | | Estimated Temporary Impacts (linear ft.) | Estimated Permanent Impacts (linear ft.) | |
| D534 | | Jurisdictional | Drainage | 281.14 | 0.00 | Turbine |
| D543 | | Isolated | Drainage | 86.76 | 0.00 | Turbine |
| S530 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 221.27 | 0.00 | Turbine |
| D1009 | | | Drainage | 86.40 | 0.00 | Turbine |
| D98 | | | Drainage | 275.77 | 0.00 | Turbine |
| D103 | | | Drainage | 205.63 | 0.00 | Turbine |
| D103a | | | Drainage | 61.66 | 0.00 | Turbine |
| S93 | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 221.77 | 0.00 | Turbine |
| D108 | | | Drainage | 354.88 | 0.00 | Turbine |
| D116 | | Jurisdictional | Drainage | 55.95 | 0.00 | Turbine |
| D500a | | | Drainage | 238.74 | 0.00 | Turbine |
| D560 | | | Drainage | 27.16 | 0.00 | Turbine |
| D560a | | | Drainage | 37.26 | 0.00 | Turbine |
| D145 | | Jurisdictional | Drainage | 55.97 | 0.00 | Turbine |
| S13 | Unnamed tributary to West Branch Conewango Creek | Jurisdictional | Stream | 105.14 | 0.00 | Turbine |
| S69a | Unnamed tributary to Walnut Creek | Jurisdictional | Stream | 379.26 | 0.00 | Turbine |
| S21 | Clinton Brook | Jurisdictional | Stream | 307.73 | 0.00 | Turbine |
| D108a | | | Drainage | 167.40 | 0.00 | Turbine |
| D537 | | | Drainage | 40.63 | 0.00 | Turbine |
| D55 | | | Drainage | 232.74 | 0.00 | Turbine |
| S60a | Unnamed tributary to Dutch Hollow | | Stream | 196.25 | 0.00 | Turbine |
| | **Total Impacts (linear feet)** | | | **17,046.33** | **3,425.46** | |

**Table 2.2-6. Wetlands Crossed by the Project**

| Location ID | Cover Type | Isolated / Jurisdictional | Wetland Impacts | | Facility Type |
|---|---|---|---|---|---|
| | | | Estimated Temporary Impacts (sq. ft.) | Estimated Permanent Impacts (sq. ft.) | |
| W515 | PEM | Isolated | 780.87 | **175.55** | Access Road/Turbine |
| W519 | PEM | Isolated | 2,220.42 | **983.17** | Access Road/UE Collector |
| W512a/514/516 | PEM/PSS | Jurisdictional | 15,288.01 | **2,680.95** | Access Road/UE Collector/Turbine |
| W42 | PEM | Jurisdictional | 1,582.57 | **715.83** | Access Road/UE Collector |
| W46 | PEM / PSS / PFO | Jurisdictional / NYSDEC Wetland | 826.16 | **41.67** | Access Road |
| W51 | PEM/PSS | Jurisdictional | 1,048.79 | **42.73** | Access Road |
| W9 | PEM | Jurisdictional | 8,419.35 | **5,324.13** | Access Road |
| W537 | PEM / PSS / PFO | Jurisdictional | 1,791.63 | **1,157.94** | Access Road/Turbine |
| W90 | PEM/PFO | Jurisdictional | 306.85 | **33.97** | Access Road |
| W52 | PEM / PSS / PFO | Jurisdictional | 1,172.51 | **375.93** | Access Road |
| W118 | PEM | Jurisdictional | 1,079.62 | **747.09** | Access Road/UE Collector |
| W554(2) | PEM | Jurisdictional | 1,186.24 | **323.13** | Access Road |
| W562 | PEM | Jurisdictional | 339.70 | **90.38** | Access Road/UE Collector |
| W565 | PEM | Jurisdictional | 438.90 | **193.32** | Access Road/UE Collector |
| W124 | PEM | Jurisdictional | 2,042.19 | **36.57** | Access Road/UE Collector/Turbine |
| W142 | PEM | Jurisdictional | 1,099.70 | **683.44** | Access Road/UE Collector |
| W144 | PEM | Jurisdictional | 1,972.69 | **949.63** | Access Road/UE Collector |
| W137 | PEM | Jurisdictional | 2,857.49 | **1,180.06** | Access Road/UE Collector |
| W156 | PEM | Jurisdictional | 405.76 | **87.61** | Access Road |
| W569 | PEM | Jurisdictional | 1,435.65 | **869.70** | Access Road |
| W568 | PEM | Jurisdictional | 1,738.29 | **1,024.03** | Access Road |
| W158 | PEM | Jurisdictional | 16,701.29 | **16,701.29** | O&M Building |
| W158b | PEM | Jurisdictional | 1,997.09 | **1,997.09** | O&M Building |
| PO1004 | Pond | Jurisdictional | 18,980.62 | **18,980.62** | O&M Building |
| W71 | PEM/PSS | Jurisdictional | 604.19 | 0.00 | Overhead Collector |

**Table 2.2-6. Wetlands Crossed by the Project**

| Location ID | Cover Type | Isolated / Jurisdictional | Wetland Impacts | | Facility Type |
|---|---|---|---|---|---|
| | | | Estimated Temporary Impacts (sq. ft.) | Estimated Permanent Impacts (sq. ft.) | |
| W70 | PEM/PFO | Jurisdictional | 191.81 | 0.00 | Overhead Collector |
| W150 | PEM | Jurisdictional | 316.74 | 0.00 | Overhead Collector |
| W151 | PEM | Jurisdictional | 134.07 | 0.00 | Overhead Collector |
| W152 | PEM | Jurisdictional | 3,305.94 | 0.00 | Overhead Collector |
| W148 | PEM | Jurisdictional | 261.35 | 0.00 | Overhead Collector |
| W133 | PEM | Jurisdictional | 198.96 | 0.00 | Overhead Collector |
| W134 | PEM/PFO | Jurisdictional | 2,754.58 | 0.00 | Overhead Collector |
| W153 | PEM | Jurisdictional | 229.93 | 0.00 | Overhead Collector |
| W154 | PSS | Jurisdictional | 24.54 | 0.00 | Overhead Collector |
| W155 | PSS | Jurisdictional | 3,102.56 | 0.00 | Overhead Collector |
| W54 | PEM/PSS | Jurisdictional | 95.66 | 0.00 | Access Road |
| W550 | PEM | Jurisdictional | 1,586.84 | 0.00 | MET Tower |
| W554 | PEM | Isolated | 2,268.72 | 0.00 | MET Tower |
| W8 | PEM | Jurisdictional | 3,979.18 | 0.00 | Access Road/UE Collector |
| W86 | PEM | Jurisdictional | 0.36 | 0.00 | Access Road |
| W53 | PEM | Jurisdictional | 34.57 | 0.00 | Access Road |
| W561 | PEM | Jurisdictional | 3.00 | 0.00 | Access Road |
| W508 | PEM | Isolated | 18.79 | 0.00 | UE Collector |
| W518 | PEM | Isolated | 66.78 | 0.00 | UE Collector |
| W513 | PEM | Jurisdictional | 461.38 | 0.00 | UE Collector |
| W522 | PFO | Jurisdictional | 8,693.08 | 0.00 | UE Collector |
| W14 | PEM | Jurisdictional | 1,444.40 | 0.00 | UE Collector |
| W548 | PEM | Jurisdictional | 1,570.61 | 0.00 | UE Collector |
| W548A | PEM | Jurisdictional | 400.06 | 0.00 | UE Collector |
| W549B | PEM | Jurisdictional | 1,524.06 | 0.00 | UE Collector |

**Table 2.2-6. Wetlands Crossed by the Project**

| Location ID | Cover Type | Isolated / Jurisdictional | Wetland Impacts | | Facility Type |
|---|---|---|---|---|---|
| | | | Estimated Temporary Impacts (sq. ft.) | Estimated Permanent Impacts (sq. ft.) | |
| W539 | PEM | Jurisdictional | 652.30 | 0.00 | UE Collector/Turbine |
| W100 | PEM/PFO | Jurisdictional | 15.04 | 0.00 | UE Collector |
| W109 | PEM / PSS / PFO | Jurisdictional | 7,172.03 | 0.00 | UE Collector/Turbine |
| W111 | PEM | Jurisdictional | 834.50 | 0.00 | UE Collector |
| W112 | PEM | Jurisdictional | 994.73 | 0.00 | UE Collector |
| W12 | PEM | Jurisdictional | 2,282.64 | 0.00 | UE Collector |
| W2 | PEM | Jurisdictional | 10,657.15 | 0.00 | UE Collector/Turbine |
| W82 | PEM | Jurisdictional | 4,781.88 | 0.00 | UE Collector |
| W63 | PEM/PFO | Jurisdictional | 3.68 | 0.00 | UE Collector |
| W566 | PEM | Jurisdictional | 0.27 | 0.00 | UE Collector |
| W138 | PEM | Jurisdictional | 276.91 | 0.00 | UE Collector |
| W5 | PEM | Jurisdictional | 2,009.51 | 0.00 | Turbine |
| W6 | PEM | Jurisdictional | 3,821.53 | 0.00 | Turbine |
| W501 | PEM | Jurisdictional | 771.96 | 0.00 | Turbine |
| W500A | PEM | Jurisdictional | 2,315.32 | 0.00 | Turbine |
| W512b | PEM / PSS / PFO | Jurisdictional | 4,048.44 | 0.00 | Turbine |
| W517 | PEM | Isolated | 3,183.36 | 0.00 | Turbine |
| W512 | PEM/PSS | Jurisdictional | 27,216.57 | 0.00 | Turbine |
| W77 | PEM | Isolated | 28,074.93 | 0.00 | Turbine |
| W69 | PEM/PFO | Jurisdictional | 3,568.41 | 0.00 | Turbine |
| W41 | PEM | Jurisdictional | 13,379.83 | 0.00 | Turbine |
| W43 | PEM | Jurisdictional | 8,589.62 | 0.00 | Turbine |
| W58 | PEM | Jurisdictional | 2,105.42 | 0.00 | Turbine |
| W60 | PEM | Jurisdictional | 10,217.35 | 0.00 | Turbine |
| W28 | PEM | Jurisdictional | 5,049.87 | 0.00 | Turbine |

**Table 2.2-6. Wetlands Crossed by the Project**

| Location ID | Cover Type | Isolated / Jurisdictional | Wetland Impacts | | Facility Type |
|---|---|---|---|---|---|
| | | | Estimated Temporary Impacts (sq. ft.) | Estimated Permanent Impacts (sq. ft.) | |
| W67 | PEM | Jurisdictional | 1,866.08 | 0.00 | Turbine |
| W13 | PEM | Jurisdictional | 12,541.22 | 0.00 | Turbine |
| W37 | PEM | Jurisdictional | 458.26 | 0.00 | Turbine |
| W25 | PEM | Jurisdictional | 753.02 | 0.00 | Turbine |
| W24 | PEM | Jurisdictional | 2,944.98 | 0.00 | Turbine |
| W23 | PEM | Jurisdictional | 1,953.77 | 0.00 | Turbine |
| W538 | PEM | Jurisdictional | 10,056.24 | 0.00 | Turbine |
| W533 | PEM/PSS | Jurisdictional | 6,244.58 | 0.00 | Turbine |
| W534 | PEM/PSS | Jurisdictional | 3,515.75 | 0.00 | Turbine |
| W542 | PEM | Isolated | 440.57 | 0.00 | Turbine |
| W543 | PEM/PSS | Isolated | 3,464.76 | 0.00 | Turbine |
| W543A | PEM/PSS | Isolated | 1,325.17 | 0.00 | Turbine |
| W544 | PEM | Isolated | 333.22 | 0.00 | Turbine |
| W546 | PEM | Jurisdictional | 317.17 | 0.00 | Turbine |
| W530 | PEM | Jurisdictional | 9,175.35 | 0.00 | Turbine |
| W87 | PEM | Jurisdictional | 670.07 | 0.00 | Turbine |
| W88 | PEM | Jurisdictional | 2,078.11 | 0.00 | Turbine |
| W99 | PEM/PFO | Jurisdictional | 151.66 | 0.00 | Turbine |
| W98 | PEM/PFO | Jurisdictional | 9,865.18 | 0.00 | Turbine |
| W103 | PEM/PFO | Jurisdictional | 14,119.03 | 0.00 | Turbine |
| W95 | PEM | Jurisdictional | 519.87 | 0.00 | Turbine |
| W94 | PEM | Jurisdictional | 5,738.97 | 0.00 | Turbine |
| W108 | PEM | Jurisdictional | 6,186.06 | 0.00 | Turbine |
| W64 | PEM | Jurisdictional | 8,183.60 | 0.00 | Turbine |
| W50 | PEM / PSS / PFO | Jurisdictional | 18,071.13 | 0.00 | Turbine |

**Table 2.2-6. Wetlands Crossed by the Project**

| Location ID | Cover Type | Isolated / Jurisdictional | Wetland Impacts | | Facility Type |
|---|---|---|---|---|---|
| | | | Estimated Temporary Impacts (sq. ft.) | Estimated Permanent Impacts (sq. ft.) | |
| W116 | PEM | Jurisdictional | 46,107.27 | 0.00 | Turbine |
| W114 | PEM | Jurisdictional | 12,501.86 | 0.00 | Turbine |
| W560 | PEM | Jurisdictional | 4,791.52 | 0.00 | Turbine |
| W564 | PEM | Isolated | 1,094.45 | 0.00 | Turbine |
| W563 | PEM | Isolated | 1,860.85 | 0.00 | Turbine |
| W128 | PEM | Jurisdictional | 12,238.26 | 0.00 | Turbine |
| W125 | PEM | Isolated | 1,017.64 | 0.00 | Turbine |
| W146 | PEM | Isolated | 4,130.48 | 0.00 | Turbine |
| W145 | PEM | Jurisdictional | 2,825.60 | 0.00 | Turbine |
| W140 | PEM | Jurisdictional | 1,328.11 | 0.00 | Turbine |
| W136 | PEM | Jurisdictional | 2,534.44 | 0.00 | Turbine |
| W135 | PFO | Jurisdictional | 15,591.36 | 0.00 | Turbine |
| W119 | PEM | Isolated | 2,014.14 | 0.00 | Turbine |
| W122 | PEM | Isolated | 1,602.23 | 0.00 | Turbine |
| PO512 | Pond | Jurisdictional | 17,575.67 | 0.00 | Turbine |
| PO1519 | Pond | Isolated | 545.66 | 0.00 | Turbine |
| W157 | PEM/PFO | Jurisdictional | 25,145.25 | 0.00 | Turbine |
| | | **Total Impacts (square feet)** | **534,886.41** | **55,395.83** | |
| | | **Total Impacts (acres)** | **12.28** | **1.27** | |

## 2.3 Biological, Terrestrial, and Aquatic Ecology

This section provides an updated description of ecological resources within the Project Area, including vegetation, ecological communities, wildlife, and listed threatened and endangered species.

### *2.3.1 Existing Conditions*

#### *2.3.1.1 Vegetation and Ecological Communities*

Vegetation and ecological communities for the Project Area are as described in the DEIS. Due to slight changes in the Project Site boundary, the acreage of land cover types has changed. Updated information specific to the Project Site is discussed below.

**Table 2.3-1. Land Cover Classes Found within the Project Site**

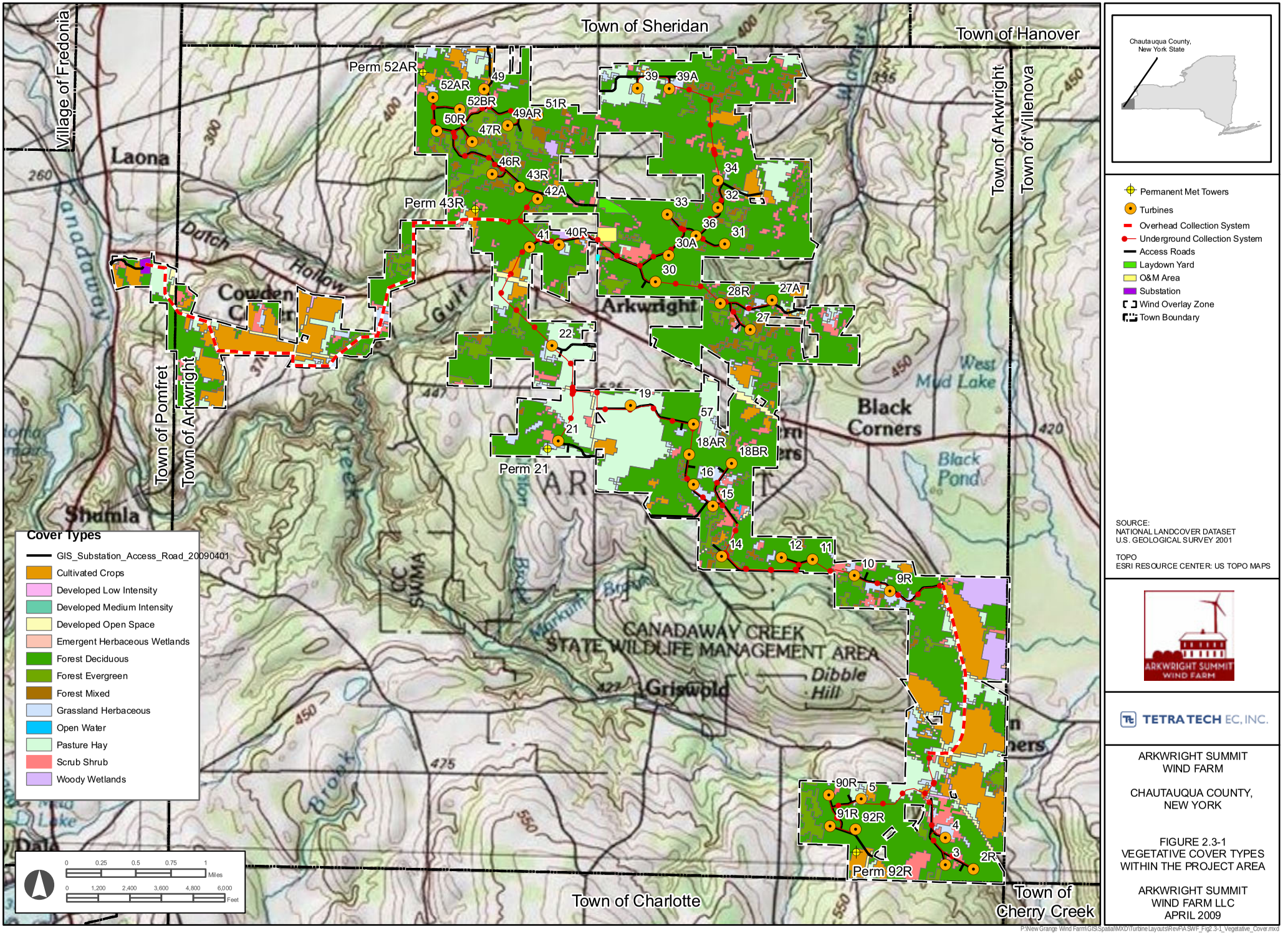
| Land Cover Class | Acres | Percent Cover (%) |
|---|---|---|
| Open Water | 1.33 | <1% |
| Developed, Open Space | 113.89 | 2% |
| Developed, Low Intensity | 7.01 | <1% |
| Developed, Medium Intensity | 0.04 | <1% |
| Deciduous Forest | 3,385.47 | 57% |
| Evergreen Forest | 313.71 | 5.3% |
| Mixed Forest | 220.61 | 3.7% |
| Shrub/Scrub | 291.45 | 4.9% |
| Grassland/Herbaceous | 182.11 | 3.1% |
| Pasture/Hay | 718.80 | 12.1% |
| Cultivated Crops | 638.19 | 10.7% |
| Woody/Forested Wetlands | 89.73 | 1.5% |
| Emergent Herbaceous Wetlands | 1.12 | <1% |
| **Total** | **5,963.7** | |

Source: USGS National Land Cover Dataset (NLCD) 2001

The Project Site encompasses approximately 5,962 acres of land. Sixty-six percent of the Project Site is characterized by upland forest. Agricultural lands, present in the form of pasture, hayfields, and cultivated crops, are also abundant in the Project Site (23 percent). The remaining lands within the Project Site comprise approximately 11 percent of the total coverage which include wetland habitats (forested and non-forested; 1.5 percent), shrub/scrub and grasslands/herbaceous (7.9 percent), open water habitat (<1 percent), and developed areas (2 percent). Figure 2.3-1 shows the updated Project layout in relation to land cover classes.

#### *2.3.1.2 Significant Ecological Communities and Rare Plant Species*

As stated in the DEIS, no significant ecological communities or rare, threatened and endangered plant species listed by either the federal or state agencies occur within the Project Area. Field surveys conducted by Ecology and Environment, Inc. (E&E) in summer 2008 for the Wetlands and Waterbodies Report (Appendix C) did not identify any rare, threatened or endangered species of concern, which is consistent with the findings in the DEIS that no species of concern have been reported from the Project Area. That statement is based on a search by West, Inc. (2004) of the New York Natural Heritage Program (NHP) database, which turned up no records of federally listed, state listed, or otherwise sensitive plants for the Arkwright Project Area and the area within a 5-mile buffer. Based on E&E's knowledge of the Project Area, and the lack of uniqueness of the habitats encountered during the field surveys, it is unlikely that species of concern would occur in the Project Area.


Village of Fredonia
Town of Sheridan
Town of Hanover
Town of Arkwright
Town of Villenova
Town of Pomfret
Town of Arkwright
Town of Charlotte
Town of Cherry Creek
Laona
Shumla
Arkwright
Black Corners
Griswold
Perm 52AR
Perm 43R
Perm 21
Perm 92R
Dutch Hollow
Gulf
West Mud Lake
Black Pond
CANADAWAY CREEK STATE WILDLIFE MANAGEMENT AREA
Dibble Hill
Cover Types
GIS_Substation_Access_Road_20090401
Cultivated Crops
Developed Low Intensity
Developed Medium Intensity
Developed Open Space
Emergent Herbaceous Wetlands
Forest Deciduous
Forest Evergreen
Forest Mixed
Grassland Herbaceous
Open Water
Pasture Hay
Scrub Shrub
Woody Wetlands
0 0.25 0.5 0.75 1 Miles
0 1,200 2,400 3,600 4,800 6,000 Feet
Chautauqua County, New York State
Permanent Met Towers
Turbines
Overhead Collection System
Underground Collection System
Access Roads
Laydown Yard
O&M Area
Substation
Wind Overlay Zone
Town Boundary
SOURCE:
NATIONAL LANDCOVER DATASET
U.S. GEOLOGICAL SURVEY 2001
TOPO
ESRI RESOURCE CENTER: US TOPO MAPS
ARKWRIGHT SUMMIT WIND FARM
TETRA TECH EC, INC.
ARKWRIGHT SUMMIT
WIND FARM
CHAUTAUQUA COUNTY,
NEW YORK
FIGURE 2.3-1
VEGETATIVE COVER TYPES
WITHIN THE PROJECT AREA
ARKWRIGHT SUMMIT
WIND FARM LLC
APRIL 2009
P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\Rev\FASWF_Fig2.3-1_Vegetative_Cover.mxd

### *2.3.1.3 Wildlife and Terrestrial Habitat*

Wildlife and terrestrial habitat within the Project Site are as described in the DEIS.

### *2.3.1.4 Threatened and Endangered Species*

Threatened and endangered species are as described in the DEIS. Newly available information for the short-eared owl and small-footed myotis surveys is presented below, in response to agency comments received after their review of the DEIS.

Short-eared owl use of the Project Site is not expected to be high due to lack of suitable habitat. Short-eared owls occur from the high arctic to mid-latitudes and offshore islands in North America. They are typically associated with open country that supports cyclic small mammals (voles, lemmings), such as large expanses of prairie, coastal grasslands, heathlands, shrub-steppe, and tundra. Short-eared owls will also use agricultural areas and large patches of tall, dense, ungrazed grassland (Wiggins et al. 2006). During the winter, short-eared owls occur in similar habitats, including stubble fields, fresh and saltwater marshes, weedy fields, dumps, shrub thickets, dense grasslands, open pastures and fields with low woody vegetation (Wiggins et al. 2006). While the New York NHP identified a short-eared owl occurrence within 10 miles of the Project, it is expected that this record was from coastal areas or marsh habitat along the Lake Erie shore where there is more suitable habitat. Three records of short-eared owl within the general region in the past five years all occurred at Dunkirk Airport, which provides the open grassland habitat that they prefer.

While some open fields are present in the Project Site, there is a substantial amount of woodland and forest present reducing the suitability of habitat for short-eared owls. The open field habitats in the Project Site may be suitable for short-eared owl use; however, the predominantly forested land cover throughout the Project Site is expected to limit use by short-eared owls. Therefore, short-eared owls are not expected to regularly occur in the Project Site during any season.

As requested by the NYSDEC since the filing of the DEIS, the Applicant has conducted an additional search of literature on the short-eared owl to reinforce the findings stated above. The additional literature researched includes the following:

1. Buffalo Ornithological Society Rare Bird Alert. Records search for 2004-present.

2. National Audubon Society (2002). The Christmas Bird Count Historical Results [Online]. Dunkirk-Fredonia and Buffalo counts. Available http://www.audubon.org/bird/cbc. Records search 2004-2008.

3. Hawk Migration Association of North America. HawkCount Monthly Summaries for Ripley Hawk Watch. Hawk Migration Association of North America, Raptors Online. http://www.hawkcount.org/.

4. New York State Breeding Bird Atlas 2000 [Internet]. 2000 - 2005. Release 1.0. Albany (New York): New York State Department of Environmental Conservation. [updated 2007 Jun 11; cited 2009 Mar 17]. Available from: http://www.dec.ny.gov/animals/7312.html.

5. New York State Breeding Bird Atlas [Internet]. 1980 - 1985. Release 1.0. Albany (New York): New York State Department of Environmental Conservation. [updated 2007 Jun 6; cited 2009 Mar 17]. Available from: http://www.dec.ny.gov/animals/7312.html.

6. Sauer, J. R., J. E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis 1966 - 2004. Version 2005.2. *USGS Patuxent Wildlife Research Center*, Laurel, MD.

The site-specific studies included passive AnaBat acoustics surveys but did not include capture surveys for bats. No small-footed bats were definitely identified during the AnaBat surveys. Generally, it is difficult to distinguish small-footed myotis calls from other myotids due to the level of overlap and plasticity of calls. [Note: there are differing opinions among bat biologists about the ability to use AnaBat calls for species identification. We generally take the conservative approach due to the high level of variability in calls and high probability of misidentification.]

Information related to the timing, location, and duration of AnaBat surveys is included in the final report for the avian and bat baseline studies in the DEIS. Small-footed bats typically occur in mixed deciduous forest habitats in mountainous or rugged areas that are characterized by the presence of rocky outcrops or talus slopes and rock fields. During the winter, it generally hibernates in caves, but secretly in small groups in crevices and fissures and not communally in large clusters, like other myotids, so it can go unnoticed. No known summer or winter habitat exists in the Project Area.

While the Project is within the range of small-footed myotis, site conditions do not appear to be highly suited to the species summer habitat. There are no known large rocky outcrop or talus slope areas within the deciduous forest habitat on site. The results of the AnaBat acoustic surveys and species-specific analyses of acoustic data were unable to confirm the presence of this species in the Project Site. This suggests that if the small-footed myotis does occur within the Project Site, it is in very low density. However; it is unlikely that small-footed bat occurs on site.

#### *2.3.1.5 Other Sensitive Wildlife Resources*

Sensitive wildlife resources are as described in the DEIS. Recent correspondence with the NYSDEC regarding a great blue heron rookery is summarized below.

While the Applicant avoided the great blue heron rookery based on old reports, recent investigations by the Applicant and correspondence and meetings with the NYSDEC and others

have revealed that the rookery no longer exists in its previous location. Correspondence with NYSDEC in June 2008 indicated that a rookery had been present on or near the Canadaway Wildlife Management Area but has apparently been abandoned for two years or more. The landowner of the property, Gerald Fancher, confirmed that the rookery had been abandoned for "at least a few years." Further, a July 2008 field review of the Fancher property did not reveal any heron nests in the reported location. As part of this review, other possible nesting locations along the stream on the Fancher property were reviewed and no nests were discovered. In addition, no herons were sighted during both the spring and fall 2007 avian study periods and Mr. Fancher reports that he has not seen herons in the area for a period of years.

The primary study period for the breeding bird survey (BBS) was June 2007. An additional investigation for the rookery was July 2008. These windows fall within the breeding season for great blue heron (Butler 1992) and are appropriate windows for determining presence during the breeding season. Due to the extensive coverage of BBS survey stations both north and south of Canadaway Creek (see map in the baseline report contained in the Project DEIS), if there had been an active rookery in the area, it is likely that great blue herons would have been observed traveling about the area to and from the rookery. If they do nest in the area, the relative abundance is low based on the survey results and the Project is not expected to have a significant impact (Butler 1992)[3].

Currently, there are no known foraging areas within the proposed development corridors that might attract herons to the wind Project. Any exposure from the Project would be to herons flying through the area to and from foraging areas elsewhere, and the presence of the wind farm may create additional collision risks for herons flying in the area. Given that no heron activity was observed during the study periods, the impact to herons would likely be indirect disturbance related impacts. The Applicant will develop a post construction monitoring study plan with input from NYSDEC and U.S. Fish and Wildlife Service (USFWS) that would include herons if they are observed in the Project Area during the post-construction monitoring period.

The Dunkirk Harbor was designated an IBA (Important Bird Area) because of conditions created by a power plant, which maintain open water in the harbor during the winter that in turn concentrates waterfowl and waterbird species that would otherwise migrate further south as the lake freezes over. Wheeler Gulf was designated an IBA due to the presence of old growth forest on either side of a deep valley that supports a diversity of breeding birds common to mature forests. These IBAs create unique habitat conditions that either attract concentrations of birds (e.g., waterfowl) or create suitable conditions for species (e.g. old growth forest) that are not otherwise present in the region. The IBAs effectively create "islands" of important habitat for birds that are removed or away from the proposed wind project. The proposed Project Site is not expected to concentrate birds in a similar fashion as the IBAs (i.e., does not have conditions

[3] Butler, Robert W. 1992. Great Blue Heron (Ardea herodias), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/

that are not expected to concentrate birds) and thus effectively minimizes risk when compared to the IBAs or other areas that may concentrate bird use.

### *2.3.2 Potential Impacts*

#### *2.3.2.1 Construction*

Potential construction impacts are as described in the DEIS. Updated information regarding land cover impacts and potential impacts to a great blue heron rookery is presented in Table 2.3-5.

**Table 2.3-5. Vegetative Cover Classes Affected by the Arkwright Summit Wind Farm**

| Land Use Class | Temporary Impacts | | Permanent Impacts | |
|---|---|---|---|---|
| | (acres) | (% Impact) | (acres) | (% Impact) |
| Developed, Open Space | 3.27 | 1% | 1.86 | 2.1% |
| Developed, Low Intensity | 0.53 | <1% | 0.40 | <1% |
| Developed, Medium Intensity | 0.21 | <1% | 0.21 | <1% |
| Deciduous Forest | 212.93 | 59.6% | 47.75 | 53.6% |
| Evergreen Forest | 24.22 | 6.8% | 4.89 | 5.5% |
| Mixed Forest | 11.75 | 3.3% | 3.04 | 3.4% |
| Shrub/Scrub | 27.26 | 7.3% | 9.47 | 10.4% |
| Grassland/Herbaceous | 16.69 | 4.7% | 3.36 | 3.8% |
| Pasture/Hay | 40.15 | 11.3% | 10.03 | 11.3% |
| Cultivated Crops | 22.40 | 6% | 8.60 | 9.0% |
| Woody/Forested Wetlands | 0.12 | <1% | 0.04 | <1% |
| **Total** | **358.53** | | **89.65** | |

a/ Affected acreages, including wetlands, are from NLCD 2001 coverages and thus are estimated. More detailed wetland impact calculations based on field-based wetland delineations conducted in 2008 are provided in Section 2.2. The temporary forested wetland impact calculation of 2.61 acres presented in Section 2.2.2.2 is a more accurate indication of the anticipated impacts to forested wetlands. Once final Project design is completed, a definitive calculation of all wetland impacts will be provided in the Project FEIS.

The current management of land in the region surrounding the Project has created a patchwork of forested areas interspersed with open fields, roads, rural housing, farms, gas wells, and other developments. The loss of forested habitat to the Project will occur in an area where historically forested conditions have been dynamic, highly variable, and fragmented. Some of the forested acreage lost to the Project will be within already fragmented forests and along existing forest edges. That is, not all of the 55.7-acre loss of forest will be considered interior forest and in fact much of this impact will be on the edge of habitats and potentially affect edge occurring species. Due to the existing fragmented forest conditions, little interior forest conditions exist in the Project Area. Interior forest is often defined as areas within a forest patch that are greater than 10 acres in size and greater than 300 feet (~100 meters) from the forest edge (NLCD 2001). Interior working forest areas that have historically been logged but are currently wooded

generally exist in the areas between Turbine 41 and 49, and Turbine 27 north to Turbine 34. More disturbed areas of successional forest exist from Turbine 14 east to Turbine 9R and Farrington Hollow Road.

#### *2.3.2.2 Operation*

Operation impacts related to the Arkwright Summit Wind Farm are as described in the DEIS. Updated habitat loss impacts and great blue heron impacts are presented below.

*Loss of Habitat:* The Project would result in the permanent loss of 89.7 acres of wildlife habitat, as presented in Table 2.3-5. Most of these impacts would be to forested habitats (55.7 acres), some of which will be converted and managed as a non-forested vegetative community. These converted forestlands would be maintained as shrubland or grassland, or would be converted to Project facilities (e.g., crane pads, access roads, etc.). In addition to the direct loss of habitat, this action may have indirect effects on interior forest wildlife species that maintain a preferred distance away from forest edges. All things considered, loss of habitat from operation of the Project is expected to be less than 1.5 percent of the larger Project Site.

Agricultural land would also be affected during operation of the Project. Active agricultural lands (8.01 acres) consisting of row crops are of poor vegetative habitat quality and are frequently disturbed through management practices, such as tilling, planting, and harvesting. This habitat type is of limited value to grassland species that prefer native graminoid vegetation, which is absent in this type of agricultural land use. Pasturelands and hay fields may also represent less optimal grassland bird habitat if they are grazed or harvested prior to the completion of the breeding season for grassland bird species, typically mid-July. In contrast, fallow pastures and late-harvest hay fields may present ideal breeding, foraging, and refuge habitats for grassland birds. Vegetation clearing activities in fallow pastures and late-harvest hay fields would reduce available habitats to grassland birds, which may adversely affect their reproductive success. Effects of habitat loss on wildlife are expected to be localized. The Project would permanently affect approximately 10.03 percent of pasture and hay fields in the Project Site, and grasslands/herbaceous areas would be unaffected. Although some habitat would be lost to development of permanent Project facilities, new habitats would be added because a portion of permanently affected lands would be maintained as non-forested areas (e.g., areas associated with the underground collection system rights-of-way). Vegetation maintenance activities would maintain open areas such as those used by grassland birds.

*Threatened and Endangered Species*

As cited in Section 2.1.3.5, the previously identified great blue heron rookery near the site has been abandoned. Currently, there are no known foraging areas within the proposed development corridors that might attract herons to the wind Project. Exposure would be to herons flying through the area to and from foraging areas elsewhere.

### *2.3.3 Mitigation*

#### *2.3.3.1 Vegetation*

Vegetation mitigation is as described in the DEIS.

#### *2.3.3.2 Fish and Wildlife*

Fish and wildlife mitigation is as described in the DEIS.

The Project owner will fund an operational (post-construction) monitoring program to estimate impacts of the wind farm on birds and bats. A monitoring plan will include specific information regarding planned mortality searches for birds and bats within the Project Area, and proposed study methodology and candidate mortality search sites. This monitoring study will be designed to be consistent with the NYSDEC Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects (NYSDEC January, 2009). The scope of the study is being developed with the NYSDEC and USFWS and will include at least one year of post-construction monitoring studies. This plan will be finalized based on input from the NYSDEC and will be issued prior to Project operation. The scope may be revised after the first year if results suggest that a change in the scope or additional years of monitoring are warranted. The protocol for the fatality monitoring study will be similar to protocols used at other wind projects throughout New York State. This protocol will also incorporate vegetative management guidelines for agricultural lands that might be temporarily impacted by mortality study plots.

## 2.4 Climate and Air Quality

### *2.4.1 Existing Conditions*

#### *2.4.1.1 Climatic Condition*

Existing climatic conditions are as described in the DEIS.

#### *2.4.1.2 Air Quality*

Existing air quality conditions are as described in the DEIS. Updated air quality data for the State of New York is available in the 2007 New York State Air Quality Report: Data Tables (NYSDEC 2007).

##### *2.4.1.2.1 Conventional Power Plants and Air Pollution*

Existing conditions regarding air quality impacts from conventional power plants and air pollution are as described in the DEIS.

### *2.4.2 Anticipated Impacts*

#### *2.4.2.1 Construction*

Construction-related impacts are as described in the DEIS.

#### *2.4.2.2 Operation*

The operation of the Project is anticipated to have a positive impact on air quality by producing approximately 208,000 MWh per annum of emission-free electricity. This is the equivalent to powering approximately 34,500 New York households (NYSERDA 2005). The power supplied by the Project will generally displace power provided by power plants in the region closest to the Project, such as local coal-fired plants. Resource Systems Group (RSG) conducted a study to evaluate the avoided emissions of selected air pollutants from the operation of the Project, provided as Appendix D of the SEIS.

The RSG study evaluated the emissions that would be offset from displacement of fossil-fuel based power generation sources in the New York power market. The analysis matches the projected hour-by-hour generation of the Project with the actual hourly generation of fossil-fuel units in the New York Independent System Operators (NYISO) power market area. The RSG database model matches expected hourly generation for the Project with the hourly generation of the variably dispatched fossil fuel units at the power plants identified in Figure 1 and Table 1 of the report.

The results of the report estimate that the Project will displace roughly the following emissions:

- 214 tons/year of NOx
- 746 tons/year of $SO_2$
- 195,183 tons/year of $CO_2$

The methodology utilized in the RSG report produces higher avoided emissions estimates than the estimates presented in the DEIS. The DEIS utilized the USEPA's Emissions and Generation Resource Integrated Database (EPA e-GRID) average output emission rates for Upstate New York power generators. As a result, the e-GRID rates produce lower estimates that do not take into consideration marginal plants or the time-matching of wind-generated electricity. The time-matched marginal avoided emissions analysis in the RSG report is based on generally accepted principles and procedures for estimating air emissions reductions from wind and other renewable electric power generation on the electric grid. Additional information regarding the study methodology and assumptions is provided in the report in Appendix D.

The report concludes that the avoided air emissions from electric power generation by the Project will be significant. The avoided emissions will include NOx, $SO_{2,}$ and $CO_{2,}$ which are quantified in the report, as well as pollutants that are more difficult to quantify but are associated with fossil-fuel based power generation, including fine particulate matter, mercury, volatile organic compounds, carbon monoxide, and other toxic air pollutants.

### *2.4.3 Mitigation Measures*

#### *2.4.3.1 Construction*

Mitigation measures are as described in the DEIS.

#### *2.4.3.2 Operation*

Mitigation measures are as described in the DEIS; operation of the Project will have a long-term beneficial impact on air quality and the environment. The air quality benefits from wind energy are principal drivers in the development of such projects and the mission of the Applicant. In essence, the operation of a utility-scale wind farm and its benefit on air quality can and should be viewed as mitigation for other environmental impacts associated with the Project.

## 2.5 Aesthetic and Visual Resources

This section discusses the aesthetic and visual resources in the Project Area and documents an analysis of potential Project impacts on those resources. Since the DEIS, the Project layout has been revised. The number of turbines has been reduced from 47 in the DEIS to 44 in the SEIS. Access roads and power collection line and transmission line corridors have also been revised. An updated Visual Resource Assessment (VRA) was undertaken to assess the potential visual and aesthetic impacts from the revised layout. Appendix E provides the full VRA conducted by Saratoga Associates, Landscape Architects, Architects, Engineers, and Planners, P.C. The VRA, included here as Appendix E, follows the same study methodology used for the DEIS. The VRA procedures used for this study are consistent with methodologies developed or prescribed by a variety of federal and state agencies, specifically including NYSDEC Program Policy *Assessing and Mitigating Visual Impacts* (NYSDEC 2000) (NYSDEC Visual Policy) and SEQRA criteria to minimize impacts on visual resources, and is in common use for environmental impact assessment within the industry.

There are no specific federal rules, regulations, or policies governing the evaluation of visual resources; however, the methodology employed herein is based on standards and procedures used by the U.S. Department of Agriculture (USDA National Forest Service 1974, 1995), U.S. Department of the Interior, Bureau of Land Management (USDOI 1980), U.S. Department of Transportation, Federal Highway Administration (USDOT 1981), New York State Department of Transportation (NYSDOT 1988), and the NYSDEC (2000).

The VRA for this Project included, but was not limited to, the following components:

- 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 places 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.

### *2.5.1 Existing Conditions*

#### *2.5.1.1 Viewshed Area*

Existing conditions regarding the viewshed are as described in the DEIS.

#### *2.5.1.2 Sensitive Resources*

Existing conditions are as described in the DEIS. The updated VRA report in Appendix E includes photo simulations from sites requested by the Town of Arkwright after completion of the DEIS and the corresponding public comment period.

### ***2.5.2 Anticipated Impacts***

#### *2.5.2.1 Construction*

Anticipated construction-related impacts are as described in the DEIS.

#### *2.5.2.2 Operational Impacts*

##### *2.5.2.2.1 Visual Character*

Visual character and turbine design details are the same as described in the DEIS. Section 2 of the VRA (Appendix E) provides further discussion of landscape character and visual setting.

##### *2.5.2.2.2 Visibility Analysis*

Updated viewshed maps showing vegetated, non-vegetated, and nighttime visibility are provided as Figures 1 through 3 of the VRA (Appendix E). Section 5 of Appendix E provides a comparison of the SEIS visibility analysis to the DEIS VRA results. The updated VRA indicates that visual resources identified in the DEIS as having Project visibility will still likely view one or more turbines. The SEIS layout does not eliminate any previously affected visual resources from view; however, two additional resources (Kosciuszko Park and Dunkirk School #4) may have some visibility of the Project. The VRA concludes that while the number of turbines visible from individual receptors may have changed due to layout changes, this is not expected to result in a significant increase in potential visual impact from those resources that had visibility identified in the DEIS.

The updated viewshed maps also indicate that visibility of the turbines in the study area is comparable to the visibility described in the DEIS. For both the DEIS and SEIS, viewshed maps indicate that one or more of the proposed turbines will be theoretically visible from approximately 25 percent of the 5-mile radius study area, and approximately 75 percent of the study area will likely have no visibility of any wind turbines due to intervening landform or vegetation. As discussed in Section 5 of the VRA (Appendix E), the viewshed completed for the 44-turbine layout shows approximately 26,050 acres (25 percent) that could have some degree of Project visibility based on vegetated viewshed, compared to 25,71 acres (25 percent) in the DEIS. Table 9 of Appendix E provides a more-detailed comparison between the DEIS layout and the SEIS layout based on the number of turbine visible.

Section 3.1 of the VRA (Appendix E) provides further discussion of the viewshed mapping.

#### *2.5.2.2.3 Impacts to Visually Sensitive Resources*

Based on the viewshed analysis, the highpoint of one or more of the proposed turbines will be visible from approximately 66 of the 77 inventoried visual resources, compared with 64 in the DEIS. The remaining resources would likely be screened from the proposed Project by intervening landform or vegetation/structures and are eliminated from further study. Tables 5 and 6 in the VRA (Appendix E) provide a visibility and impact summary for each of the resources.

#### *2.5.2.2.4 Affected Viewers*

Affected viewers are as described in the DEIS.

#### *2.5.2.2.5 Photo Simulations*

To demonstrate how the actual turbines will appear within the study area, photo simulations were prepared from 13 predetermined locations. In addition to the 13 locations, two additional locations were selected to show how the proposed transmission line would appear in the landscape. The location for each of the simulations was based on input received from the Town of Arkwright after completion of the DEIS and the corresponding public comment period. Table 7 of the VRA provides a list of the 15 total locations chosen for photo simulations. Appendix A of the VRA (Appendix E) provides the completed simulations from these locations for the SEIS. Prior simulations completed for the DEIS are provided in Appendix B of the VRA (Appendix E) for quick reference.

Turbine design details used to prepare the photo simulations are the same as described in the DEIS. The updated VRA also includes simulations of the proposed transmission line using a height of 60 feet for the height of transmission structures, an average spacing of 230 feet between poles, and a right-of-way clearing of 150 feet. Section 3.4 of the VRA (Appendix E) provides further discussion of the photo simulations methodology and results.

#### *2.5.2.2.6 FAA Lighting Plan Visibility*

An updated nighttime viewshed map is provided as Figure 3 in the VRA in Appendix E. The map was created using the approximate height (275 feet) of the FAA required lights as the control point for 21 turbines, which was the same criteria used in the DEIS. The viewshed map indicates that one or more of the 21 proposed lights will be theoretically visible from approximately 22 percent of the 5-mile study area, which is the same result as in the DEIS. Sections 1.3 and 3.1 of the VRA (Appendix E) provide further discussion of FAA lighting plan visibility.

#### *2.5.2.2.7 Assessment of Shadow Flicker*

An updated shadow flicker assessment was conducted based on the revised layout and is provided in Section 3.6 of the VRA (Appendix E). Based on the SEIS layout, there will be four receptors that will be theoretically affected more than 30 hours per year and are likely to have

project visibility. Of these four receptors, two are project participants and two are non-participants. The potentially impacted non-participants are located on Center Road near Turbine 19 and on Farrington Hollow Road near Turbine 2R. When compared to the DEIS layout data, this is an increase of one receptor. The updated shadow flicker analysis evaluated 205 potential receptors, which is six less than the 211 receptors evaluated in the DEIS. Generally, there was a small increase in receptors that would theoretically experience between 2 and 40 hours of shadow per year, and a small decrease in the number of receptors experiencing between 0 and 2 hours per year and those theoretically impacted 40+ hours per year.

### *2.5.3 Mitigation Measures*

#### *2.5.3.1 Construction*

Construction-related mitigation measures are as described in the DEIS. Because construction-related impacts to visual resources are anticipated to be minor and temporary, no mitigation is required. The Applicant will ensure work areas are confined to the Project Site and are well maintained.

#### *2.5.3.2 Operation*

The operation-related mitigation measures are as described in the DEIS.

## 2.6 Historical, Cultural, and Archaeological Resources

This section describes the existing conditions (Section 2.6.1) and the Project's anticipated impacts (Section 2.6.2) upon archaeologically and historically significant architectural cultural resources. This section also provides a description of possible mitigation measures for any significant impacts (Section 2.6.3).

### *2.6.1 Existing Conditions*

#### *2.6.1.1 Archaeological Resources*

Existing environmental conditions (e.g., landform/terrain, soil characteristics, and proximity to water); the archaeological area of potential effect (APE); background research; archaeological sensitivity statement; survey methodologies; and results from previous surveys, including the 2007 Phase IA and IB results, have been thoroughly documented in the DEIS.

Cultural resources surveys in 2008 focused on the Project's APE that was not surveyed as part of the 2007 investigations. The 2008 archaeological-APE consisted of approximately 55 acres of potential turbine locations. In addition, 21.47 miles of potential access roads and 20.09 miles of potential underground transmission/circuit lines were investigated. The final Project design includes up to 44, 1-acre turbine sites; 15.8 miles of access roads; and 17.9 miles of underground circuit lines. In addition, 5.4 miles of overhead transmission lines are also part of the project design.

Three of the tested areas were positive for cultural material. Two isolated finds and one large lithic scatter were located. These sites are listed and described in detail in the report submitted to the OPRHP (Appendix F).

The 2008 cultural resource surveys were conducted in part to determine the suitability of locations for turbine siting. As a result of these surveys, the Applicant has relocated turbines and removed some potential locations from its development plan. A report detailing the results of the surveys has been submitted to the OPRHP and can be found in Appendix F. In accordance with the request of the SHPO that the locations of archaeological findings be kept confidential, this appended report will only be distributed to the SHPO at this point in time and is not included in the publicly circulated copy of the SEIS.

No additional Phase I surveys were recommended to the OPRHP. As the Project is currently designed, impacts on prehistoric archaeological resources at one site are anticipated as a result of Project development. Phase II archaeological investigations to determine the site's eligibility or potential eligibility for listing in the NRHP may be developed if requested by the OPRHP. SHPO comments and recommendations on the previously submitted Final Phase I Cultural Resources Investigations Report are pending. Any updated information requiring a revision to the Phase I study report or any additional Phase II findings will be available in the Project FEIS.

#### *2.6.1.2 Architectural Resources*

In accordance with the SHPO Guidelines and in consultation with the SHPO staff, the Applicant has completed a survey of historic architectural resources within the Project's APE for architecture (architecture-APE). The survey report, the Historic Architectural Resources Investigation (Appendix G), has been reviewed by the SHPO and comments on it are included in a March 9, 2009 letter (Bonafide 2009, Appendix J). The SHPO has determined that the Project will have an adverse effect on cultural resources under Section 106 of the National Historic Preservation Act (Bonafide 2009). This determination is common among wind energy projects in New York State because of the visual impact often associated with historic properties or districts.

The architecture-APE has been defined as the those areas which have a view of the project, based on a topography-only model, and are located within 5 miles of the nearest Project element (the 5-mile Ring). The methods used to determine the viewshed are described in the Visual Assessment Report (Appendix E) and the approach to undertaking the survey of historic structures is outlined in the Historic Architectural Resources Investigation (Appendix G).

The starting point for this work was an investigation of those properties already listed on or determined eligible for the NRHP. One hundred resources listed on or determined eligible for the NRHP are located within the architecture-APE, including the Fredonia Commons Historic District (listed), the Fredonia Commons Historic District Expansion (determined eligible), and the [Fredonia] East Main Street Historic District (determined eligible). Locations of NRHP-listed properties are shown in Figure 2 found in Appendix G.

After consultation with the SHPO a comprehensive survey of the architecture-APE was then undertaken by the Applicant to identify those buildings and/or structures within five miles of the project which were potentially eligible to the National Register. The survey of the architecture-APE identified an additional 178 resources that were recommended as potentially eligible to the NRHP, including two recommended historic districts, the Central Avenue Historic District (in Fredonia) and the Sheridan Historic District (in Sheridan). After reviewing the Historic Architectural Resources Investigation, the SHPO has determined that all of these properties are also eligible for inclusion in the NRHP. These are also shown in Figure 2 of Appendix G.

### ***2.6.2 Anticipated Impacts***

#### *2.6.2.1 Construction*

##### *2.6.2.1.1 Archaeological Resources*

Potential construction-related impacts to archaeological resources have been described in the DEIS. The Applicant is committed to avoiding impacts to archaeological resources to the greatest extent practicable as discussed in Section 2.6.3.1. Field surveys of the Project Site are complete. Only one prehistoric site may be impacted by construction. The site is listed and

described in detail in the report submitted to the OPRHP (Appendix F). No historic archaeological sites will be impacted by construction.

*2.6.2.1.2 Architectural Resources*

There will be no direct, construction-related impacts to architectural resources within the Project's architecture-APE. No structures listed on, determined eligible for, or recommended as potentially eligible to the NRHP will be demolished or physically altered in connection with the construction of the Project.

*2.6.2.2 Operations*

*2.6.2.2.1 Archaeological Resources*

Potential operations-related impacts to archaeological resources have been described in the DEIS and remain consistent for this SEIS.

*2.6.2.2.2 Architectural Resources*

Indirect impacts may result from operation of the Project. Operation of the Project could result in changes to the setting of architectural resources listed on, determined eligible for, or recommended as potentially eligible to the NRHP. Results of the fieldwork indicate that at least one element of the Project will likely be visible from 278 properties that are listed in or determined eligible for the NRHP.

### *2.6.3 Mitigation Measures*

*2.6.3.1 Construction*

*2.6.3.1.1 Archaeological Resources*

The Applicant has used the results of the Phase IA and IB investigations to avoid potential archaeological sites in developing the current Project layout. Further, the Applicant has performed additional Phase-IB field surveys, focused on areas characterized as sensitive for the presence of prehistoric period archaeological sites and near historic period map documented structures (MDSs). Phase IA and IB investigations are complete; only one prehistoric site was identified within the Project Site that cannot be avoided. Subsequent Phase-II archaeological (evaluation) investigations will be performed to determine NRHP eligibility of the identified site. If NRHP-eligible sites are identified, and if the Project design cannot be adjusted so that the sites may be avoided, it may be necessary to develop a Memorandum of Agreement (MOA) that would outline steps to be taken to mitigate adverse Project effects. For archaeological effects, mitigation would most likely involve Phase III investigation (data recovery) at NRHP-eligible sites that would be affected directly by the Project.

As discussed in the DEIS, an unanticipated discovery plan will be developed in consultation with the SHPO, town, and other interested parties prior to construction.

#### *2.6.3.1.2 Architectural Resources*

Permanent, direct impacts to architectural resources will not occur because the Project construction will not result in demolition or physical alteration of any property listed on, determined eligible for, or recommended as potentially eligible to the NRHP.

### *2.6.3.2 Operation*

#### *2.6.3.2.1 Archaeological Resources*

Operations related mitigation measures for archaeological resources has been described in the DEIS and those measure remain consistent for this SEIS.

#### *2.6.3.2.2 Architectural Resources*

Since SHPO has determined that the Project will result in adverse visual effects to resources listed in or determined eligible for the NRHP, the Applicant must consider whether the Project's layout can be redesigned to avoid such adverse effects. Since avoidance of visual effects is not possible through minor adjustments to wind turbine locations, the Applicant will consult with the Lead Agency, the USACE, and interested parties to formulate mitigation measures that would be stipulated within an MOA and implemented. This agreement will be forthcoming in the FEIS.

## 2.7 Sound

Potential noise impacts from the proposed Project are evaluated in the Environmental Sound Survey and Noise Impact Assessment (NIA) completed by Hessler Associates, Inc. and included as Appendix H of this SEIS. The acoustic study was conducted in two phases. First, the existing acoustic environment was documented by conducting baseline sound level surveys during both summer (foliate) and winter (defoliate) seasonal periods. The second phase of the study consisted of a computer modeling analysis of future WTG operational sound levels using engineering noise prediction software. Noise contour maps of the Project Site visually presenting the results of the modeling were completed to determine whether the Project will operate in compliance with the applicable state and local guidelines and standards. Construction noise impacts are also qualitatively addressed.

The results of the ambient sound monitoring program and characterization of the existing acoustic environment is presented in Section 2.7.1, future operational sound levels are discussed in Section 2.7.2, and identification of possible candidate noise mitigation options are provided in Section 2.7.3.

### *2.7.1 Existing Conditions*

The purpose of the baseline noise surveys was to determine existing ambient environmental sound levels within the acoustic study area. Measurements were completed during defoliate conditions and during summertime conditions when the trees are fully leafed out. In order to accomplish this, two separate surveys were carried out for the Project to evaluate seasonal differences in existing sound levels: during foliate summertime conditions, from September 9 to September 25, 2007, and during wintertime conditions with trees bare, from November 29 to December 12, 2007. The sound monitoring data was then used to compare existing ambient sound levels to future operational levels and to assess compliance with applicable criteria.

#### *2.7.1.1 Measurement Locations*

The Project Area is rural in nature, consisting of numerous scattered residences, mainly along the principal roads, interspersed with farms of various sizes. Turbines are planned in the largely uninhabited areas between local roads. The Project Site topography is moderately hilly. In terms of vegetation, the area is a largely even mix of open fields and wooded areas. Most of the homes are either near wooded areas or have some trees immediately around the house.

Baseline sound level measurement locations were chosen to evenly cover and represent the entire area as shown in Graphic A (Appendix H). Five positions were used for the summertime survey and an additional three locations (making eight altogether) were used to document the worst-case wintertime defoliate survey. A variety of settings were deliberately chosen to see if ambient sound levels were uniform or variable over the Project Area. For example, some positions are in open fields, some in wooded areas, some near homes, and some in more remote areas.

### *2.7.1.2 Instrumentation*

Documentation of the existing acoustic environment were completed using Rion NL Series broadband sound level meters (NL-06, NL-22, and NL-32) which are rated as either ANSI Type 1 and Type 2, except at measurement Position 1 where a Norsonic 118, ANSI Type 1, 1/3 octave band analyzer was used to record frequency content. Each meter was enclosed in a watertight weather-proof case. The Rion monitors were fitted with a 12-inch microphone boom. A Norsonic Model 1212 environmental microphone protection kit was used at Position 1 for the summertime survey only—in the winter survey a boom and large windscreen was used. The microphones were protected from wind-induced self-noise by oversized 180 mm (7-inch) diameter foam windscreens (ACO Model WS7-80T). The position of the microphone was at a reduced height to further minimize the potential of wind induced microphone noise. All equipment was field calibrated at the beginning of the survey and repeated at the end of each survey.

### *2.7.1.3 Sound Survey Results*

Sound level measurements were taken and data logged in ten minute intervals at all monitoring locations and survey periods. Multiple monitoring locations were used to accurately characterize the existing acoustic environment across the entire Project Site. Meteorological conditions, including wind speed data, were also recorded in concurrent ten minute intervals. Measurement results showed that sound levels over the site area are of the same general order of magnitude, with some increased ambient noise outliers and local variation dependent on several factors, the most prevalent being insect noise during the summer foliate monitoring period.

The wind speeds during the periods of sound data collection ranged from mostly under 8 meters per second (m/s) in the summertime, to up to 14 m/s during the wintertime survey. This range of wind speeds is important with respect to wind turbine sound because turbine sound levels are variable from cut-in (around 3 or 4 m/s), where WTG generated sound is minimal, up to about 8 m/s when the rotor first reaches maximum speed and sound levels are approaching or at maximum levels. Beyond wind speeds of 8 m/s, wind turbine sound generation essentially remains steady and no longer increases with increased wind speed, while ambient noise continues to increase as wind speed increases. The wind turbine sound power levels were normalized to wind speed assuming a representative roughness length coefficient and reported at a reference height of 10 meters in accordance with the International Electrotechnical Commission (IEC) Standard 61400-11.

The sound measurement equipment was programmed to calculate A-weighted sound levels including ambient equivalent sound level ($L_{eq}$) as defined by the NYSDEC and other important statistical descriptors such as the residual ($L_{90}$) and intrusive ($L_{10}$) sound levels. The use of the $L_{eq}$ level is the metric for establishing baseline conditions, as described in the NYSDEC guideline document in Section V B (1) a (7):

"Expression of Overall Sound – Part of the overall assessment of sound is the equivalent sound level ($L_{eq}$) which assigns a single value of sound level for a period of time in which varying levels are experienced over that time period. The $L_{eq}$ value provides an indication of the effects of sound on people. It is also useful in establishing the ambient sound levels at a potential noise source."

From the data collected over the two surveys, ambient $L_{eq}$ sound levels for each seasonality were determined over the entire range of WTG operational wind speeds. During summertime foliate conditions, the ambient $L_{eq}$ will range from 42 decibels on the A-weighted scale (dBA) at 4 m/s, representative of the approximate WTG cut-in wind speed, and increase to 46 dBA at 9 m/s, representative of WTG full rotational speed. Similarly, during wintertime conditions, the ambient $L_{eq}$ was determined to range from 41 dBA at 4 m/s to 49 dBA at 9 m/s. At higher wind speeds, the summer and winter levels are not considerably different with the warm weather levels being just slightly higher. A summary of ambient sound levels at reference wind speeds is shown in Table 2.7-1. These measured $L_{eq}$ data were used to provide the basis for identifying the maximum net increase in ambient sound levels that would occur during the worst-case WTG operational condition.

**Table 2.7-1. $L_{eq}$ Ambient Sound Levels as a Function of Wind Speed Referenced to Standardized Height of 10 meters**

| Wind Speed (m/s) | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|
| Ambient $L_{eq}$ Sound Level, Defoliate (dBA) | 41 | 42 | 44 | 45 | 47 | 49 |
| Ambient $L_{eq}$ Sound Level, Foliate (dBA) | 42 | 43 | 44 | 45 | 46 | 46 |

### *2.7.1.4 Regulatory Standards and Guidelines*

There are currently no federal noise regulations that are directly applicable to this proposed Project. The Town of Arkwright has established a wind energy local law that limits maximum received decibel levels within residential areas. The NYSDEC has issued environmental noise criteria under the SEQRA that is defined as incremental increase criteria relative to existing ambient conditions. This guideline was implemented by the Project to further assess the potential for adverse impacts to occur within the acoustic study area. The Town of Arkwright noise ordinance is considered controlling law for this Project.

#### *2.7.1.4.1 Arkwright Noise Regulations*

The Town of Arkwright has established a local law specifically relating to wind energy facilities (Local Law No. 4 of 2006). The local law limits sound from any wind energy conversion system (WECS) to 50 dBA measured in terms of the $L_{10}$ statistical level at "the nearest residence existing at the time of application." In addition,

> "If the ambient sound level exceeds 50 dBA, the standard shall be ambient dBA plus 5 dBA. Independent certification shall be provided before and after construction demonstrating compliance with this requirement."

A minimum setback of 1,200 feet from all residences is also required in the law. The Town of Arkwright also has a tonal noise provision.

#### *2.7.1.4.2 NYSDEC Noise Guidelines*

In 2001, NYSDEC published Program Guidelines titled *Assessing and Mitigating Noise Impacts* (NYSDEC Guidelines), which describes a methodology for the evaluation of potential community impacts from any new noise sources. The NYSDEC Guidelines focus on an incremental increase in dBA sound levels relative to existing conditions. The NYSDEC Guidelines state the following principle for evaluating when noise impacts that occur at existing residences, or other potentially sensitive receptors (i.e., schools, churches, etc.), may be considered significant:

> "The goal for any permitted operation should be to minimize increases in sound pressure level above ambient levels at the chosen point of sound reception. Increases ranging from 0 to 3 decibels (dB) should have no appreciable effect on receptors. Increases from 3 to 6 dB may have potential for adverse noise impact only in cases where the most sensitive receptors are present. Sound pressure increases of more than 6 dB may require closer analysis of impact potential depending on existing sound pressure levels (SPLs) and the character of surrounding land use and receptors."

Thus, incremental increases of 3 to 6 dBA are considered to have impacts only when the most sensitive receptors are present and no impacts are anticipated from incremental increases below 3 dBA. Cumulative increases in the total ambient sound level of 6 dBA or less are unlikely to constitute an adverse community impact. Because decibels add logarithmically, this threshold means that the Project may generate sound levels that exceed the existing ambient level by up to 5 dBA. For example, an ambient level of 40 dBA plus a Project-only sound level of 45 dBA would equal a total cumulative level of 46 dBA—or a 6 dBA incremental increase above the existing ambient.

### *2.7.2 Anticipated Impacts*

Sound levels associated with both Project construction (Section 2.7.2.1) and Project operation (Section 2.7.2.2) were assessed. Sound levels resulting from construction activities were estimated at the closest non-participating residences. Operating sound impacts were predicted using the CadnaA model and incorporated the proposed Project Site plan, manufacturer WTG source sound power level data, and terrain elevation data. Results were presented visually as noise contour isopleths maps and results compared to the applicable noise criteria limits.

### *2.7.2.1 Construction Noise Impacts*

Noise from construction activities associated with the Project may temporarily result in short-term unavoidable noise impacts at noise sensitive areas within the Project Area. Assessing and quantifying these impacts is difficult because construction activities will constantly be moving from place to place around the site leading to highly variable impacts with time, at any given point. In general, the maximum potential noise impact at any single residence might be analogous to a few days or up to a few weeks for repair or roadway repaving work or to the sound of construction equipment operating on a nearby farm. More commonly (at houses that are some distance away), the sounds from Project construction are likely periodically perceptible noise from diesel-powered earthmoving equipment, specifically variable engine loads, back-up safety alarms, gravel dumping, and the clanking of metal tracks.

The individual pieces of equipment likely to be used and their typical noise levels as reported in the *Power Plant Construction Noise Guide* (Empire State Electric Energy Research Corp.) are tabulated in Table 2.7-2. This table shows the maximum total sound levels that might temporarily occur at the closest non-participating residences (at least 1,200 feet away) and the distance from a specific construction site at which its sound would drop to 40 dBA. Although considered when assessing operational noise, wind speed is irrelevant to the background level during the construction phase, as there will be construction occurring during both calm quiet periods and elevated wind conditions.

**Table 2.7-2. Typical Noise Emission Levels of Construction Equipment**

| Construction Equipment | Sound Level at 50 feet (dBA) | Estimated Maximum Total Level at 50 feet per Phase (dBA) a/ | Maximum Sound Level at a Setback Distance of 1,200 feet (dBA) | Distance Until Sound Level Decreases to 40 dBA (feet) |
|---|---|---|---|---|
| **Road Construction and Electrical Line Trenching** | | | | |
| Dozer, 250-700 hp | 88 | | | |
| Front End Load, 300-750 hp | 88 | 92 | 61 | 5500 |
| Grader, 13-16 ft. blade | 85 | | | |
| Excavator | 86 | | | |
| **Foundation Work, Concrete Pouring** | | | | |
| Piling Auger | 88 | 88 | 57 | 4200 |
| Concrete Pump, 150 cu yd/hr | 84 | | | |
| **Material and Subassembly Delivery** | | | | |
| Off Highway Hauler, 115 ton | 90 | 90 | 59 | 4800 |
| Flatbed Truck | 87 | | | |
| **Erection** | | | | |
| Mobile Crane, 75 ton | 85 | 85 | 54 | 3400 |

a/ Not all vehicles are likely to be in simultaneous operation. Maximum level represents the highest level realistically likely at any given time.

The construction equipment estimated maximum sound levels at 50 feet, given in Table 2.7-2, demonstrate that a maximum allowable sound level of 80 dBA recommended in the NYSDOT construction noise guidelines is only likely to occur within 200 feet of a construction site. Therefore, construction activities at the site of each WTG will result in sound levels that are below 80 dBA at any residence due to the prescribed setback distance of at least 1,000 feet.

Noise from the low volume of vehicular traffic to and from the current site of construction should be negligible in magnitude relative to normal traffic levels (even given the rural nature of the roads in the Project Area) and temporary in duration at any given location.

#### *2.7.2.2 Operational Sound Impacts*

Given the availability of turbine models during the construction period, the NIA considers the GE 1.5 sle, Vestas V90 1.8 MW and Suzlon S88 2.1 MW turbine models. Section 2.7.2.2.1 presents source sound power level data for all models, followed by the determination of the WTG worst-case operational acoustic condition. When evaluating the differences in turbine sound level relative to ambient level, the Suzlon S88 produced a differential equal or greater than that of the Vestas V-90 1.8 MW and GE 1.5 sle for the range of wind speeds. Therefore, modeling of operational sound levels was only completed for the Suzlon S88 WTG, as it is considered the worst-case design model.

The acoustic modeling analysis discussed below accounted for the most recent proposed 44 WTG Project layout. If the Suzlon S88 WTG model is selected, six WTGs will be eliminated from the site plan as fewer WTGs will be needed to satisfy the Project's electrical output requirements. The results of this acoustic impact assessment will be considered when determining which units to remove from the final Project layout.

##### *2.7.2.2.1 Turbine Source Data*

The sound emissions of each model, as a function of wind speed, are known from field tests carried out by independent acoustical engineers in accordance with IEC 61400-11. The values for the GE sle 1.5 unit are reported in a document entitled *Technical Documentation, Wind Turbine Generator System GE 1.5sl/sle 50 & 60 Hz, Noise Emission Characteristics*. For the Vestas turbine, the information is provided in the *General Specification V90-1.8/2.0 MW Optispeed Wind Turbine*. A Suzlon S88 unit was tested at the Sankeri site in Tamil Nadu, India by Deutsches Windenergie – Institut GmbH. These documents are provided in Appendix B of the appended NIA report. For an 80-meter hub height, as is planned for this Project, the following overall sound power levels are published for each model as a function of wind speed at the standardized measurement height of 10 meters (Table 2.7-3).

**Table 2.7-3. Sound Power Levels Correlated with Wind Speed for GE, Vestas, and Suzlon Turbine Models Being Considered for the Project**

| | $L_{max}$ Sound Power Level ($L_W$) at Reference Wind Speed, dBA re 1 pW | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wind Speed (m/s) | 3 m/s | 4 m/s | 5 m/s | 6 m/s | 7 m/s | 8 m/s | 9 m/s | 10 m/s |
| GE 1.5 MW sle | <96 | <96 | 99.1 | 103.0 | 104.0 | 104.0 | 104.0 | 104.0 |
| Vestas V-90 1.8 MW | - | 94.3 | 99.7 | 102.2 | 104.0 | 103.7 | 103.5 | 103.5 |
| Suzlon S88 2.1 MW | - | - | - | 103.9 | 105.1 | 106.2 | 106.8 | 106.5 |

*2.7.2.2.2 Defining WTG Worst-Case Operational Acoustic Condition*

In terms of potential sound impacts, the worst-case combination of background and turbine sound levels would occur at the wind speed where the background level was lowest relative to the turbine sound level. Table 2.7-4 shows that this worst-case situation does not occur at the highest wind speeds when the turbines produce the most sound, but rather at intermediate wind speeds of 6 m/s where the differential between the $L_w$ and the ambient sound level is the greatest. Consequently, ambient levels measured during a 6 m/s wind were used as a basis to calculate the NYSDEC incremental increase threshold guidelines (see Appendix H for further details).

**Table 2.7-4. Comparison of Background and Suzlon S88 Turbine Sound Levels to Determine Critical Design Level (dBA)**

| Wind Speed (m/s) | **6** | **7** | 8 | 9 | 10 |
|---|---|---|---|---|---|
| Suzlon S88 $L_W$ (dBA re 1 pW) | **104** | 105 | 106 | 107 | 107 |
| Ambient $L_{eq}$ Sound Level, Winter Defoliate | **44** | 45 | 47 | 49 | 50 |
| Net Differential | **60** | 60 | 59 | 58 | 56 |
| Ambient $L_{eq}$ Sound Level, Summer Foliate | 44 | 45 | **46** | 46 | 47 |
| Net Differential | 60 | 60 | **61** | 60 | 59 |

* **Bold** type indicates worst-case design wind speed.

Although the design point during the summer foliate period is a wind speed of 8 m/s, the use of the lower 6 m/s wind conditions when the background level is lower is recommended to keep the design basis consistent. The background sound levels measured during 6 m/s wind speed conditions will be used as a basis to calculate the NYSDEC 6 dBA incremental increase guideline for modeling and impact assessment purposes. By using this information and the WTG sound power level at 6 m/s, the assessment approach is conservative as the operational noise will be less prominent at all other wind speeds relative to the background sound level under worst-case winter defoliate conditions.

### *2.7.2.3 Acoustic Modeling Methodology*

Using the design sound power level in Table 2.7-4, sound pressure level contour plots were calculated using the CadnaA (version 3.7) sound modeling program developed by DataKustik, GmbH (Munich). This software enables the Project and its surroundings, including terrain features, to be realistically modeled in three-dimensions. The site plan used in the acoustic modeling analysis is the most recent Project layout as of January 2009, which includes a total of 44 WTGs, although only 38 WTGs will be installed if the Suzlon S88 WTG is used.

The proposed Project also includes an electrical substation, housing a step-up transformer where electrical power output from the Project is connected to the existing transmission line. The electrical substation is located to the west of the Project Area with the closest residence estimated to be approximately 540 feet away. It is not expected that sound generated from the electrical substation would result in adverse noise impacts at the closest residences.

Each Project WTG was modeled at the design hub height of 80 meters above the local ground surface using the proposed Project layout. The receptor height was set at a standard elevation of 1.5 meter above grade, which correlates with the elevation at which the background sound measurements were taken. A somewhat conservative ground absorption coefficient was applied given that all of the intervening ground between the turbines and potentially sensitive receptors is open farm fields, pasture land or wooded areas. In addition, sound attenuation from wooded areas (foliage) has been completely ignored for all calculations since this attenuation would not be present in the wintertime. Further conservatism is introduced by assuming a downwind propagation in all geographical directions *simultaneously*. This approach yields a contour plot that shows the maximum possible sound level at any given point and sometimes also shows levels that are a physical impossibility; for example, sound levels presented at locations between two or more adjacent turbines, since the wind would have to be blowing in two opposing directions at the same time for these worst-case sound levels to occur. These various conservative assumptions in the modeling analysis have been applied to ensure that Project sound levels do not exceed predicted levels under most normal atmospheric and meteorological conditions and also to allow some design margin for times when atmospheric conditions may occasionally favor sound propagation relative to average conditions, such as during temperature inversions. Future operational sound levels are expected to be lower than those presented in the NIA the majority of the time.

### *2.7.2.4 Noise Impact Analysis Results*

Noise modeling was completed for two different scenarios to accurately quantify worst-case sound levels on both an absolute and incremental increase basis to provide a compliance determination with all applicable regulatory criteria. The Project operational modeling results are shown in Plots 1 and 3 of the NIA (Appendix H), where the outermost sound level contour is associated with a specific limit or threshold based on the assumed background level and season. Modeling results have also been tabulated, showing received sound levels by discrete

receptor location (Appendix H). Detailed noise impact analysis results for the Suzlon S88 WTG are provided in Appendix H.

Scenario 1 predicts operational sound levels for the Suzlon S88 at its worst-case operational design wind speed in wintertime conditions. Plot 1 shows the Project sound levels out to a level of 49 dBA, which represents the 6 dBA cumulative increase threshold recommended by the NYSDEC based on the measured average, or $L_{eq}$, sound level (44 dBA) during a 6 m/s wind in the wintertime. The region inside the threshold line represents the area where turbine sound may result in a potential adverse noise impact relative to the measured ambient level. All residences are well outside the NYSDEC 49 dBA threshold isopleths, which occurs at a relatively close distance to each turbine and well short of the minimum 1,200 feet (365 meters) setback limit. This plot demonstrates no significant adverse noise impacts under typical winter defoliate conditions.

Scenario 2 predicts operational sound levels for the Suzlon S88 at its worst-case operation design wind speed in summertime conditions. In Plot 3, the NYSDEC impact threshold of 49 dBA for warm weather conditions is illustrated. Since the equivalent ($L_{eq}$) ambient sound level was found to be the same in the summer as it is in the winter, the small regions of potential impact immediately around each turbine are the same as Plot 1.

Appendix H also presents Plots 2 and 4, which show operational sound levels for the Suzlon S88, which present potential noise impacts based on the residual (or $L_{90}$) background sound level during wintertime and summertime conditions, respectively. Plot 2 shows Project sound levels out to a level 41 dBA and Plot 4 shows Project sound levels out to a level of 44 dBA, which represents the NYSDEC 6 dBA incremental increase guideline above the residual background level. Plot 2 shows that in wintertime, at critical design wind speed and atypical minimum background sound levels, some residents in the Project Area may perceive sound resulting from Project operations. The areas most likely to perceive such levels would be along Center Road between Straight and Ball Roads as well as along a section of Route 83 east and west of its intersection with Center Road.

The Suzlon did not show any predicted exceedances of the cumulative increase threshold recommended by NYSDEC assuming typical ($L_{eq}$) background sound levels, which means a secondary assessment of the potential for adverse impacts is not necessary according to NYSDEC Guidelines. In addition, it is evident from the noise contour plots that a Project-only sound level of 50 dBA or more will not occur at any homes or other sensitive receptors within the Project Area, as required by the Town of Arkwright. However, the Applicant requested a secondary analysis to be performed by Hessler Associates using the much more conservative residual $L_{90}$ statistical descriptor, with results provided for informational purposes in Appendix H.

The noise contour plots conservatively represent each scenario, since for the predicted sound levels to actually occur, the following conditions would be necessary:

- The wind would need to be blowing from all the nearest turbines towards the point of observation.
- The wind would need to be blowing at a speed of 6 m/s (note – the wind blows between 5.5 m/s and 6.5 m/s about 13 percent of the year).
- The ground surface would need to be semi-reflective (as might happen when it is frozen or partially covered with ice or glazed snow).
- No leaves on the trees.
- No presence of insects, cars, motors, machines or other sources of ambient noise
- The predicted sound levels occur outside; interior sound levels would be substantially lower.
- Observer outside.
- Environmental noise temporarily at a minimum (for worst-case impacts).

These conservative assumptions and worst-case conditions have been consciously adopted for the analysis because the perceptibility of turbine sound varies with atmospheric conditions and time of day. Even with conservative assumptions, there may be a small number of times when the actual impact may approach or even exceed the conservatively predicted levels in the plots under certain conditions. Of course, the majority of the time the perceptibility of Project sound will be less than indicated in the graphics because of the conservative assumptions in the noise model. The model predicts that Project sound may be perceptible *outside* (not inside) a number of houses throughout the Project Area, but the circumstances required for the worst-case levels shown in the contour plots would occur infrequently, when all conditions favoring noise propagation are in place (i.e., leaves off trees, observers outside, 6 m/s wind, etc.). In addition, while the results of the modeling scenarios demonstrate that the Project is not expected to generate sound levels in excess of the NYSDEC 6 dBA incremental increase guideline, this threshold does not represent the point of inaudibility. Consequently, received sound levels associated with cumulative increases of less than 6 dBA may occur at residential receptors, falling within the range of 3 to 6 dBA. A 3 dBA cumulative increase would indicate that the Project-only sound level was equivalent to the background sound level.

Modern wind turbines of the type proposed for this Project do not generate low frequency or infrasonic noise to any significant extent and no impact related to low frequency noise is expected. Early wind turbines with the blades downwind of the support tower were prone to producing a periodic thumping noise each time a blade passed the tower wake, but this effect no longer exists with the upwind blade arrangement technology used today. Recently, the results of a carefully controlled field study show that the sound levels of a typical 1.5 MW wind turbine taper down steadily in magnitude towards the low end of the frequency spectrum and that the sound energy below about 40 Hz is actually comparable to or less than the sound energy in the natural rural environment where the measurements were made. Another measure of low frequency noise is the C-weighted sound level, which does not substantially suppress the

lower frequencies to the extent A-weighting does. The maximum (conservatively) predicted C-weighted sound level at any receptor within the site area is 60 dBC, which is well below the minimum threshold of perception of vibrations related to airborne low frequency sound. Operation of the Vestas, GE, or Suzlon wind turbines will not result in a steady state pure tone or impulsive noise conditions at any noise sensitive area location, as per the IEC definitions. Compliance with the local limits and the Arkwright tonal provisions are expected.

### *2.7.3 Mitigation*

#### *2.7.3.1 Project Construction*

Construction noise will occur during site leveling and grading, pile driving, excavation, concrete pouring, and component erection. Noise emitted during the construction phase of the Project is exempted from numerical decibel limits of the Town of Arkwright; however, reasonable measures will be undertaken to reduce the impact of construction noise at nearby residences. The following mitigation measures will be applied to Project construction, as necessary and practicable:

- Construction activity will be limited to daytime hours to reduce the potential impact of construction noise, whenever possible.
- Nearby residents will be advised of significant noise-causing activities and efforts will be made to schedule such activities to create the least disruption to receptors.
- All construction equipment will be maintained in good working condition in order to reduce general noise emissions.
- When practical, heavy equipment will be shut down when not active, to minimize idling noise.
- All internal combustion engines will be fitted with appropriate muffler systems.
- Stationary equipment will be located and oriented so that natural noise screening/dampening features such as cut slopes are used to prevent noise from traveling directly to nearby noise sensitive areas.
- When practicable, temporary noise barriers (e.g., berms, kit-of-parts barriers, and equipment enclosures) will be utilized to obstruct the direct sound pathway between source and noise sensitive areas.

If construction activities are scheduled during nighttime hours (20:00 – 07:00), they will be limited to “quiet” operations when possible, except as necessary for safety reasons. Specific nighttime operations deemed “acceptable” to nearby residents may be modified as construction operations proceed.

### *2.7.3.2 Project Operation*

The Project has been purposely designed to minimize environmental noise by siting wind turbines as far away from existing residential receptor locations as practicable, while keeping the Project economically viable. The Project will operate in full compliance with the applicable noise standards and state guidelines. Despite these findings, the Applicant understands that the control of environmental noise has become increasingly important in the siting and operation of wind energy projects.

Site configuration modifications, including reducing the number of turbines or changing the location of turbines, are not expected as a result of the Project operational modeling showing no exceedances of the applicable noise regulations. Noise assessment analysis results show that mitigative measures will not likely be required other than conducting regular operation maintenance visits to ensure the WTGs are functioning properly; however, as a further mitigative measure, the Applicant has committed to the following, as necessary:

- Offering a good neighbor agreement and corresponding payment to landowners with occupied residences, which would fall within the 41 dBA nominal impact threshold line, based on the final wind turbine layout as eventually shown in the Project FEIS.;
- Implementing the complaint resolution program set forth in (Appendix L of the DEIS) whereby neighboring residents (or others) can contact the Applicant with their concerns. Such complaints will be logged and investigated in order to resolve the identified issue; and
- Complete sound testing after commissioning to ensure WTGs are meeting manufacturer's noise specifications.

## 2.8 Traffic and Transportation

### *2.8.1 Existing Conditions*

The existing traffic and transportation setting and conditions remain unchanged since the DEIS.

### *2.8.2 Potential Impacts*

#### *2.8.2.1 Construction*

Construction-related impacts generally remain unchanged from the DEIS discussion. A more detailed transportation assessment will be completed by the Applicant once the final Project design is completed and will be presented in the FEIS.

#### *2.8.2.2 Operation*

Operation-related transportation impacts associated with the Project are as described in the DEIS. The wind turbines have been sited to avoid obstructions to airspace safety and navigation in accordance with FAA regulations. The FAA has issued Determinations of No Hazard for 43 of the 47 turbine locations submitted as part of the DEIS. Of the four remaining sites, the Applicant removed two locations from the layout (formerly sites 36 & 37 from the DEIS) based on input from the FAA and consultation with local aviation operators. The two remaining sites (34 and 39A) have been determined to be acceptable pending a 2C survey of the site to confirm the horizontal and vertical coordinates. The Applicant does not anticipate the survey will yield any significantly (100 feet or greater) different coordinates since the site contours were mapped to an accuracy of two feet via airplane in 2008. Per FAA regulations, the final site locations will be submitted to the FAA for final approval within six months of construction.

### *2.8.3 Mitigation Measures*

#### *2.8.3.1 Construction*

Mitigation measures are as described in the DEIS. The DEIS contains possible mitigation measures designed to eliminate or minimize any potential impacts to local transportation and traffic should they occur during construction. Additional site-specific mitigation measures will be provided in the transportation assessment provided in the FEIS.

## 2.9 Socioeconomics

### *2.9.1 Existing Conditions*

#### *2.9.1.1 Population and Housing*

Population and housing existing conditions are as described in the DEIS.

#### *2.9.1.2 Property Values*

Existing property values conditions are as described in the DEIS.

#### *2.9.1.3 Economy and Employment*

Economy and employment existing conditions are as described in the DEIS.

#### *2.9.1.4 Municipal Budgets and Taxes*

Municipal budgets and taxes are as described in the DEIS.

### *2.9.2 Anticipated Impacts*

To further evaluate the anticipated socioeconomic impacts and benefits from the Project, an Economic and Fiscal Impact Study was conducted in October 2008 by Camoin Associates and is included in Appendix I. Camoin Associates identified the estimated direct employment opportunities and sources of revenue from the Project and calculated additional indirect and induced effects using input-output economic modeling software. The results of the study are referenced throughout this section.

#### *2.9.2.1 Construction*

##### *2.9.2.1.1 Population and Housing*

Further details regarding impacts to population are provided in the Camoin Associates Economic and Fiscal Impacts Study (Appendix I), which presents further details on the employment generated from construction of the Project. The study estimates that the construction phase will employ between 125 and 200 people. Approximately 100 of these jobs are expected to be filled by residents of the Western New York labor market. As a result, impacts to population and housing remain as described in the DEIS. Temporary construction employees can be accommodated by available housing in the Towns and surrounding communities.

##### *2.9.2.1.2 Property Values*

Construction-related impacts are as described in the DEIS.

##### *2.9.2.1.3 Economy and Employment*

As described in the economic and fiscal impact study in Appendix I, the study estimates that the construction phase will employ between 125 and 200 people and that approximately 100 of these workers will come from the Western New York labor market. As a result, the construction

phase will lead to revenues from money spent by temporary construction employees on daily goods such as food and gasoline, as well as spending on rental properties. The jobs and additional spending will circulate throughout Chautauqua County's economy creating additional indirect economic benefits, such as an estimated additional 103 jobs created indirectly. The report concludes that the construction phase will result in direct and indirect revenues totaling approximately $1.1 million from one-time royalty payments and 203 jobs will be created.

*2.9.2.1.4 Municipal Budgets and Taxes*

Construction-related impacts are as described in the DEIS.

*2.9.2.2 Operation*

*2.9.2.2.1 Population and Housing*

As described in the economic and fiscal impact study in Appendix I, the Project will directly create an estimated 12 permanent jobs and indirectly create an additional 25 jobs during the operational phase of the Project. These job numbers remain consistent with those stated in the DEIS and anticipated impacts to population and housing are as described in the DEIS.

*2.9.2.2.2 Property Values*

Operation-related impacts are as described in the DEIS, both in the body of the text and the study by Cushman & Wakefield in Appendix K. Furthermore, property values are the result of the interaction of several variables. While scenic qualities are one such variable, it is only one localized attribute among several variables that may combine to influence property values. Positive variables that would result from the Project and could potentially increase property values include lower local taxes, improved local infrastructure and local services, and new development of local businesses that will be possible from the revenue to the County, Towns and school districts, as described in the economic and fiscal impact study in Appendix I. The study also provides additional discussion and review of existing literature on impacts to property values.

*2.9.2.2.3 Economy and Employment*

The economic and fiscal impact study in Appendix I provides a discussion of the additional employment opportunities and annual revenues resulting from the Project. The positions created for the operation of the Project would result in over $700,000 of direct and indirect annual wages. The report concludes that, including annual wage changes, annual royalty payments, annual payment-in-lieu of taxes (PILOT) payments, annual community host payments, annual sales tax revenue, and annual fire district payments, the total annual impact of the Project on Chautauqua County is approximately $2.4 million and 37 jobs.

The total revenue from the Project may be greater than the estimates reported by the study due to additional revenue in the form of neighbor agreements that were not included in the study. The neighbor agreements cannot be accurately estimated while the Project layout is still under

review. Once the neighbor payments are determined, they will provide a source of additional revenue to the community.

#### *2.9.2.2.4 Municipal Budgets and Taxes*

The economic and fiscal impact study in Appendix I provides a breakdown of the estimated revenues to local taxing jurisdictions from the PILOT and Community Host Agreements from the Project, as well as estimated revenues from sales taxes on the additional spending on local goods and services. The PILOT program and community host agreements have not been finalized and will be determined in consultation with the Chautauqua County Industrial Development Authority (CCIDA), the Towns of Arkwright and Pomfret, and local taxing jurisdictions.

### ***2.9.3 Mitigation Measures***

#### *2.9.3.1 Construction*

#### *2.9.3.1.1 Population and Housing*

Mitigation is as described in the DEIS; since construction of the proposed Project would not have a significant impact on local population and housing, no mitigation is necessary.

#### *2.9.3.1.2 Property Values*

Mitigation is as described in the DEIS; since construction of the proposed Project would not have a significant impact on property values, no mitigation is necessary.

#### *2.9.3.1.3 Economy and Employment*

Mitigation is as described in the DEIS; since construction of the proposed Project would result in a short-term beneficial impact on local economy and employment, no mitigation is necessary.

#### *2.9.3.1.4 Municipal Budgets and Taxes*

Mitigation is as described in the DEIS; construction-related damage or improvements to County or Town roads will be the responsibility of the Applicant and would be undertaken at no expense to either the affected Towns or County.

#### *2.9.3.2 Operation*

#### *2.9.3.2.1 Population and Housing*

Mitigation is as described in the DEIS; since operation of the proposed Project would not have a significant impact on local population and housing, no mitigation is necessary.

#### *2.9.3.2.2 Property Values*

Mitigation is as described in the DEIS; since operation of the proposed Project is not anticipated to have negative impacts to long-term property values, no mitigation is necessary.

#### *2.9.3.2.3 Economy and Employment*

Mitigation is as described in the DEIS; since potential impacts on the local economy and employment from operation of the proposed Project would be positive, no mitigation is necessary.

#### *2.9.3.2.4 Municipal Budgets and Taxes*

Mitigation is as described in the DEIS; further details on the direct and indirect benefits to municipal budgets and taxes are provided in the fiscal impact study in Appendix I.

## 2.10 Public Safety

### *2.10.1 Existing Conditions*

*2.10.1.1 Gas Infrastructure*

Existing conditions are as described in the DEIS.

*2.10.1.2 Transportation*

Existing conditions are as described in the DEIS.

*2.10.1.3 Electrical*

Existing conditions are as described in the DEIS.

*2.10.1.4 General Wind Energy Facility Concerns*

Existing conditions are as described in the DEIS.

### *2.10.2 Anticipated Impacts*

*2.10.2.1 Construction*

General construction-related impacts are as described in the DEIS.

*2.10.2.1.1 Fire or Explosion*

Anticipated impacts are as described in the DEIS. The layout presented in the SEIS of 44 turbines adheres to the 500-foot setback from gas well infrastructure. The Applicant continues to discuss location of underground wells and appropriate setback and safety measures with gas well owners and operators.

*2.10.2.1.2 Release or Potential Release of Hazardous Materials*

Construction-related impacts are as described in the DEIS.

*2.10.2.1.3 Transportation*

Construction-related impacts are as described in the DEIS.

*2.10.2.2 Operation*

*2.10.2.2.1 Ice Shedding*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.2 Tower Collapse/Blade Failure*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.3 Stray Voltage and Electrical Shock*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.4 Fire*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.5 Lightning Strikes*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.6 Electromagnetic Fields*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.7 Vibration*

Operation-related impacts are as described in the DEIS.

*2.10.2.2.8 Health Effects*

Operation-related impacts are as described in the DEIS.

### *2.10.3 Mitigation Measures*

*2.10.3.1 Construction*

General construction-related mitigation measures are as described in the DEIS.

*2.10.3.1.1 Fire or Explosion*

Mitigation measures are as described in the DEIS. The layout presented in the SEIS of 44 turbines adheres to the 500-foot setback from gas well infrastructure. The Applicant continues to discuss location of underground wells and appropriate setback and safety measures with gas well owners and operators.

*2.10.3.1.2 Release or Potential Release of Hazardous Materials*

Mitigation measures are as described in the DEIS.

*2.10.3.1.3 Transportation*

Mitigation measures are as described in the DEIS.

*2.10.3.2 Operation*

*2.10.3.2.1 Ice Shedding*

Mitigation measures are as described in the DEIS; the SEIS turbine layout adheres to the zoning and safety setbacks as described in the DEIS.

*2.10.3.2.2 Tower Collapse/Blade Failure*

Mitigation measures are as described in the DEIS; the SEIS turbine layout adheres to the zoning and safety setbacks as described in the DEIS.

*2.10.3.2.3 Stray Voltage and Electrical Shock*

Mitigation measures are as described in the DEIS.

*2.10.3.2.4 Fire*

Mitigation measures are as described in the DEIS.

*2.10.3.2.5 Lightning Strikes*

Mitigation measures are as described in the DEIS.

*2.10.3.2.6 Electromagnetic Fields*

Mitigation measures are as described in the DEIS.

*2.10.3.2.7 Vibration*

Mitigation measures are as described in the DEIS; since no adverse impacts to public safety are anticipated due to vibration, mitigation is not required.

*2.10.3.2.8 Health Effects*

Mitigation measures are as described in the DEIS; since no adverse health effects are anticipated as a result of construction and operation of the Project, mitigation is not required.

## 2.11 Community Facilities and Services

### *2.11.1 Existing Conditions*

#### *2.11.1.1 Public Utilities and Private Energy Infrastructure*

Existing conditions related to public utilities and private energy infrastructure are as described in the DEIS.

#### *2.11.1.2 Police Protection*

Existing conditions related to police protection are as described in the DEIS.

#### *2.11.1.3 Fire Protection and Emergency Response*

Existing conditions related to fire protection and emergency services are as described in the DEIS.

#### *2.11.1.4 Health Care Facilities*

Existing conditions related to health care facilities are as described in the DEIS.

#### *2.11.1.5 Educational Facilities*

Existing conditions related to education facilities are as described in the DEIS.

#### *2.11.1.6 Parks and Recreation*

Existing conditions related to parks and recreation are as described in the DEIS.

### *2.11.2 Anticipated Impacts*

#### *2.11.2.1 Construction*

##### *2.11.2.1.1 Public Utilities and Private Energy Infrastructure*

Construction-related impacts are as described in the DEIS. The turbines presented in the SEIS layout have been sited in compliance with the 500-foot setback from gas wells required by the local law. Additional information on water resources is provided in Section 2.2.

##### *2.11.2.1.2 Police Protection*

Construction-related impacts to police protection are as described in the DEIS; the Project will not have significant adverse impacts on the demand for existing police protection during the construction period.

##### *2.11.2.1.3 Fire Protection and Emergency Response*

Construction-related impacts to fire protection and emergency response are as described in the DEIS; the Project will not have significant adverse impacts on the demand for existing fire and emergency response services during the construction period.

*2.11.2.1.4 Health Care Facilities*

Construction-related impacts to health care facilities are as described in the DEIS; the Project should not have an adverse impact.

*2.11.2.1.5 Educational Facilities*

Construction-related impacts to educational facilities are as described in the DEIS; the Project would not adversely impact the local school districts or post-secondary institutions.

*2.11.2.1.6 Parks and Recreation*

Construction-related impacts to parks and recreation are as described in the DEIS.

*2.11.2.2 Operation*

*2.11.2.2.1 Public Utilities and Private Energy Infrastructure*

Operation-related impacts to public utilities and private energy infrastructure are as described in the DEIS.

*2.11.2.2.2 Police Protection*

Operation-related impacts to police protection are as described in the DEIS.

*2.11.2.2.3 Fire Protection and Emergency Response*

Operation-related impacts to fire protection and emergency response are as described in the DEIS.

*2.11.2.2.4 Health Care Facilities*

Operation-related impacts to health care facilities are as described in the DEIS.

*2.11.2.2.5 Educational Facilities*

Operation-related impacts to health care facilities are as described in the DEIS.

*2.11.2.2.6 Parks and Recreation*

Operation-related impacts to parks and recreation are as described in the DEIS. The Applicant will continue discussions with snowmobiling interests regarding any potential impacts associated with snowmobile trails crossing the Project Site.

### *2.11.3 Mitigation Measures*

*2.11.3.1 Construction*

*2.11.3.1.1 Public Utilities and Private Energy Infrastructure*

Mitigation measures are as described in the DEIS, except that, with the reduction in number of turbines from 47 to 44, the Project will provide 79.2 MW of new generation capacity to the New York State grid.

*2.11.3.1.2 Police Protection*

Mitigation measures are as described in the DEIS; construction of the Project will not have a significant impact on police protection and facilities; therefore, no mitigation is needed.

*2.11.3.1.3 Fire Protection and Emergency Response*

Mitigation is as described in the DEIS.

*2.11.3.1.4 Health Care Facilities*

Mitigation is as described in the DEIS; construction of the Project will not have a significant impact on health care facilities; therefore, no mitigation is required.

*2.11.3.1.5 Educational Facilities*

Mitigation is as described in the DEIS.

*2.11.3.1.6 Parks and Recreation*

Mitigation is as described in the DEIS. Continuing discussions with snowmobilers may result in mitigation measures associated with ensuring that snowmobile trail routes are not adversely impacted by the operation of the wind farm.

*2.11.3.2 Operation*

*2.11.3.2.1 Public Utilities and Private Energy Infrastructure*

Mitigation is as described in the DEIS; operation of the Project will not have a significant impact on public and private infrastructure; therefore, mitigation is not required.

*2.11.3.2.2 Police Protection*

Mitigation is as described in the DEIS; operation of the Project will not have a significant impact on police protection; therefore, mitigation is not required.

*2.11.3.2.3 Fire Protection and Emergency Response*

Mitigation is as described in the DEIS.

*2.11.3.2.4 Health Care Facilities*

Mitigation is as described in the DEIS; operation of the Project will not have a significant impact on health care facilities and will not require mitigation.

*2.11.3.2.5 Educational Facilities*

Mitigation is as described in the DEIS; operation of the Project will not have a significant impact on educational facilities and will not require mitigation.

*2.11.3.2.6 Parks and Recreation*

Mitigation is as described in the DEIS.

## 2.12 Communication Facilities

Figure 2.12-1 shows the updated SEIS layout in relation to the beam paths provided in the DEIS. These facilities remain unchanged since the DEIS was released. An analysis of the updated layout was conducted by Comsearch and the Applicant avoided siting wind turbines in the paths of the identified microwave systems.

### *2.12.1 Existing Conditions*

#### *2.12.1.1 Microwave Analysis*

Microwave beam paths are as described in the DEIS.

#### *2.12.1.2 Television Analysis*

Television signals are as described in the DEIS.

#### *2.12.1.3 AM/FM Stations*

AM/FM radio station broadcast areas are as described in the DEIS.

### *2.12.2 Anticipated Impacts*

#### *2.12.2.1 Construction*

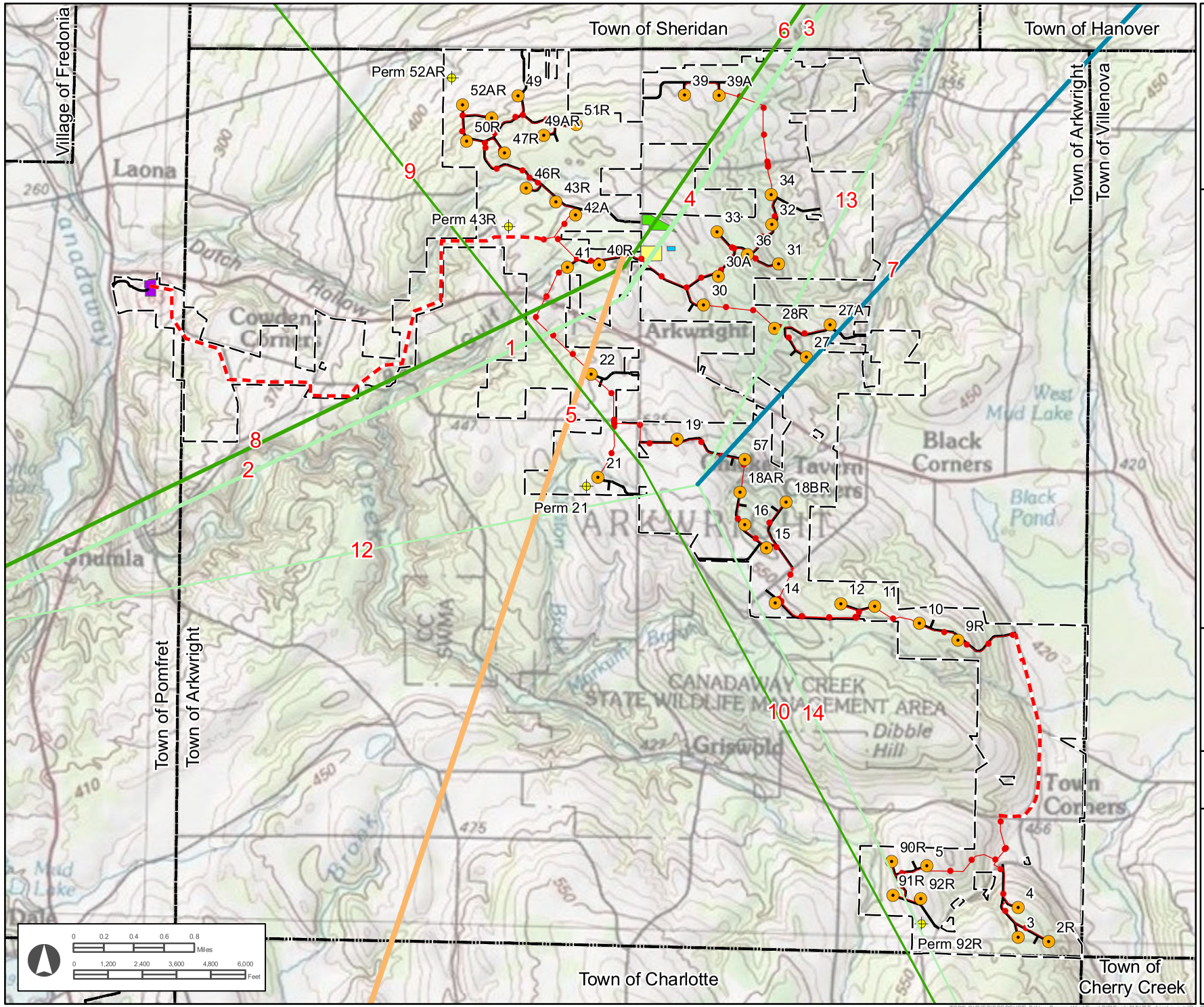
Temporary construction impacts are as described in the DEIS.

#### *2.12.2.2 Operation*

Based on a review of the updated facility layout in relation to the existing communication facilities, no significant change in impacts to existing communication facilities as described in the DEIS are anticipated. While revising the wind turbine layout, the Applicant avoided impacts with all identified microwave and communication facilities by maintaining adequate setbacks from the broadcast corridors.

##### *2.12.2.2.1 Microwave Communication Systems*

Anticipated impacts are as described in the DEIS. The layout presented in the SEIS of 44 turbines adheres to the 45-meter (148 feet) setback from the Worst Case Fresnel Zone (WCFZ) of microwave beam baths that intersect the Project Site, as shown in the microwave report in Appendix K1 of the DEIS. The WCFZ represents the buffer around the microwave beam path where structures may create interference with the microwave beam transmission. The 45-meter setback used as one of the criteria for siting the wind turbines accounts for the 45-meter radius of the rotor blades in order to site the turbine and rotating turbine blades outside of the WCFZ.




TODD.GYS(ECIBOS:DGYST) P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\Rev\Updates_012609\ASWF_Fig2-12-1_Microwave_Paths.mxd 1/26/2009

*2.12.2.2.2 Television Communication Systems*

Impacts are as described in the DEIS.

*2.12.2.2.3 AM/FM Stations*

Impacts are as described in the DEIS.

*2.12.2.2.4 Military Radar*

Impacts are as described in the DEIS.

*2.12.2.2.5 Other Forms of Communication*

Impacts are as described in the DEIS.

### *2.12.3 Mitigation Measures*

*2.12.3.1 Construction*

Mitigation measures area as described in the DEIS.

*2.12.3.2 Operation*

Mitigation measures are as described in the DEIS.

*2.12.3.2.1 Microwave Communication Systems*

Mitigation measures are as described in the DEIS.

*2.12.3.2.2 Television Communication Systems*

Mitigation measures are as described in the DEIS.

*2.12.3.2.3 AM/FM Stations*

Mitigation measures are as described in the DEIS.

*2.12.3.2.4 Military Radar*

Mitigation measures are as described in the DEIS.

*2.12.3.2.5 Other Communication Systems*

Mitigation measures are as described in the DEIS.

## 2.13 Land Use and Zoning

### *2.13.1 Existing Conditions*

Existing land use conditions and local zoning are described in the DEIS, and remain unchanged. Figure 2.13-1 has been updated to show the SEIS facility layout in relation to current zoning areas within the Towns of Arkwright and Pomfret.

#### *2.13.1.1 Regional and Local Land Use*

Existing conditions are as described in the DEIS.

#### *2.13.1.2 Zoning and Other Applicable Local Laws*

Applicable zoning and local laws are as described in the DEIS.

#### *2.13.1.3 Agricultural Land Use*

Existing conditions are as described in the DEIS.

#### *2.13.1.4 Mining and Natural Gas Use*

Existing conditions are as described in the DEIS.

#### *2.13.1.5 Future Land Use*

Existing conditions are as described in the DEIS.

### *2.13.2 Anticipated Impacts*

#### *2.13.2.1 Construction*

Construction related impacts to land use are generally as described in the DEIS. The updated layout presented in the SEIS will continue to be in accordance with the Town of Arkwright's WECS setbacks and standards, including local height restrictions. Temporary disturbance to agricultural land would potentially affect approximately 21.5 acres of cultivated crops as indicated in Table 2.3-5 and an additional 40.1 acres of pasture/hay fields would potentially be affected. This represents a conservative estimate of potential disturbance to agricultural lands since this includes areas that may not be actively managed or are open fields.

##### *2.13.2.1.1 Regional and Local Land Use*

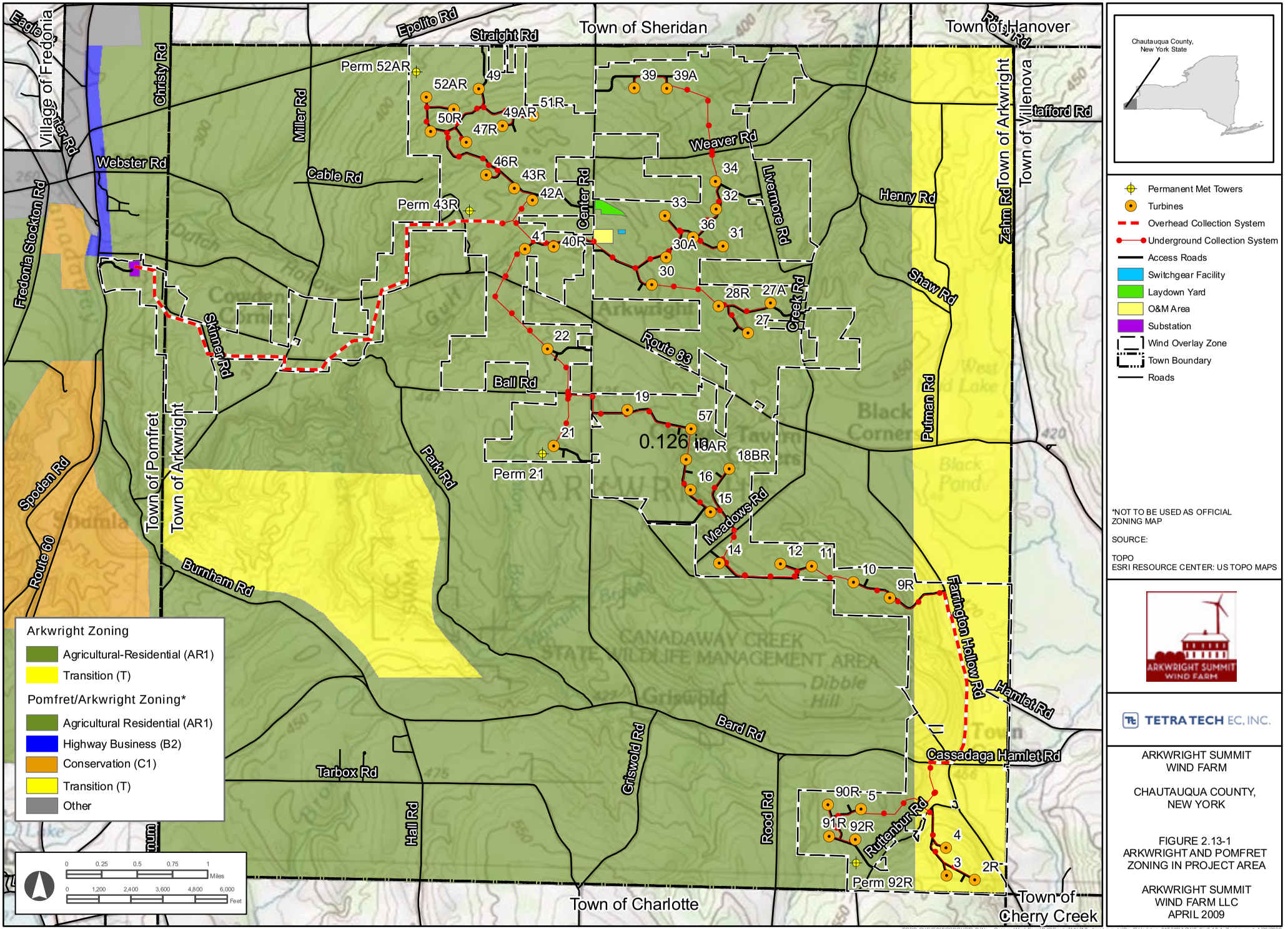
Anticipated impacts are as described in the DEIS.

##### *2.13.2.1.2 Zoning and Other Applicable Laws*

Anticipated impacts are as described in the DEIS.

##### *2.13.2.1.3 Agricultural Land Use*

Anticipated impacts are as described in the DEIS.




TODD.GYS(ECIBOSDGYST) P:\New Grange Wind Farm\GIS\Spatial\MXD\TurbineLayouts\Rev#\Updates_012609\ASWF_Fig2-13-1_Zoning.mxd 1/26/2009

*2.13.2.1.4 Mining and Natural Gas Use*

As stated in the DEIS, the Applicant will conduct an investigation to identify the locations of buried gas lines and natural gas wells prior to the start of construction. The final facility layout presented in the FEIS will be adjusted to avoid or minimize any risks to these resources.

*2.13.2.1.5 Future Land Use*

Anticipated impacts are as described in the DEIS.

*2.13.2.2 Operation*

Operational impacts to land use are as described in the DEIS. Permanent disturbance to agricultural land would potentially affect approximately 8 acres of cultivated crops and 10 acres of pasture/hay fields. This represents a conservative estimate of potential disturbance to agricultural lands since this includes areas that may not be actively managed or are open fields.

*2.13.2.2.1 Regional and Local Land Use*

Anticipated impacts are as described in the DEIS.

*2.13.2.2.2 Zoning and Other Applicable Laws*

Anticipated impacts are as described in the DEIS.

*2.13.2.2.3 Agricultural Land Use*

Anticipated impacts are as described in the DEIS.

*2.13.2.2.4 Mining and Natural Gas Use*

Anticipated impacts are as described in the DEIS.

*2.13.2.2.5 Future Land Use*

Anticipated impacts are as described in the DEIS.

### *2.13.3 Mitigation Measures*

*2.13.3.1 Construction*

Temporary construction-related mitigation measures associated with land use are as described in the DEIS.

*2.13.3.1.1 Regional and Local Land Use*

Mitigation measures are as described in the DEIS.

*2.13.3.1.2 Zoning and Other Applicable Laws*

Mitigation measures are as described in the DEIS.

*2.13.3.1.3 Agricultural Land Use*

Mitigation measures are as described in the DEIS.

*2.13.3.1.4 Mining and Natural Gas Use*

Mitigation measures are as described in the DEIS.

*2.13.3.1.5 Future Land Use*

Anticipated impacts are as described in the DEIS.

*2.13.3.2 Operation*

Operational mitigation measures associated with land use impacts are as described in the DEIS.

*2.13.3.2.1 Regional and Local Land Use*

Mitigation measures are as described in the DEIS.

*2.13.3.2.2 Zoning and Other Applicable Laws.*

Mitigation measures are as described in the DEIS.

*2.13.3.2.3 Agricultural Land Use*

Mitigation measures are as described in the DEIS.

*2.13.3.2.4 Mining and Natural Gas Use*

Mitigation measures are as described in the DEIS.

*2.13.3.2.5 Future Land Use*

Mitigation measures are as described in the DEIS.

# 3.0 UNAVOIDABLE ADVERSE IMPACTS

General siting and resource avoidance measures remain as described in the DEIS. Any specific changes in proposed mitigation measures since the DEIS have been added to the resource sections presented in Section 2 of the SEIS. Additional, specific mitigation measures proposed by the Applicant that will be updated after final design is completed will be incorporated into the FEIS.

## 3.1 General Mitigation Measures

General mitigation measures are as described in the DEIS.

## 3.2 Proposed Mitigation Measures for Long-Term Unavoidable Environmental Impacts

Proposed mitigation measures are as described in the DEIS. Specific mitigation measures and follow-up monitoring programs are described in the separate mitigation sections within Section 2 of the SEIS and in the various appendices, where applicable. In developing its revised facility layout as presented in the SEIS, the Applicant has avoided or minimized many potential environmental impacts attributed to the proposed Project. The Applicant will continue to work with the Towns of Arkwright and Pomfret and regulatory agencies to determine what mitigation programs may be warranted to compensate for long-term unavoidable impacts caused by the proposed wind farm. An update on the status of the Project mitigation measures will be provided in the FEIS.

## 3.3 Environmental Compliance and Monitoring Program

Environmental compliance and monitoring programs proposed by the Applicant are as described in the DEIS. As discussed in Section 3.0 of the DEIS, the Applicant is developing a post-construction avian and bat monitoring plan consultation with the USFWS and the NYSDEC. The Applicant will also continue to work with the Town of Arkwright as well as the agencies referenced above to finalize this plan prior to Project operation.

## 3.4 Conclusion

Based on the SEIS layout and the recommended mitigation measures, the Project is expected to result in positive, long-term overall impacts that will significantly offset any unavoidable adverse effects.

# 4.0 ALTERNATIVES ANALYSIS

## 4.1 No Action

The no action alternative remains as described in the DEIS.

## 4.2 Alternative Project Location

The discussion of how the Applicant chose the proposed wind energy development site is as described in the DEIS. The proposed site continues to offer a significant wind resource with available electric transmission for the power output.

## 4.3 Alternative Project Design/Layout

The Project facility layout described in Section 1 of this SEIS represents the evolution of a detailed siting process. As described in the DEIS, the Applicant chose its initial layout based on a review of wind resource data and available environmental resource data. Additional site-specific studies and refinement of the layout yielded the layout presented in the DEIS. Since that time, the Applicant has conducted extensive field-based studies during the summer and fall of 2008 to determine the location of any sensitive environmental resources within the Project Site, while also evaluating the engineering design of the Project facilities. Consequently, the layout now presented in this SEIS has been reduced in overall impact footprint compared to the DEIS layout and continues to involve a high priority on avoiding or minimizing potential impacts to sensitive resources. New field studies were conducted in 2008 to identify wetlands and waterways, archaeological resources, architecturally historic resources, visual impacts and potential impacts to other conflicting land uses. The results of these studies are presented in Section 2 and the various appendices in this SEIS. The Applicant will continue to refine the layout and seek to further minimize potential environmental impacts as it proceeds in the development of its final design layout, which will be presented in the FEIS.

## 4.4 Alternative Energy Production Technologies

The description of alternative energy production technologies is as stated in the DEIS.

## 4.5 Alternative Turbine Technology

The discussion of alternative turbine technology remains as described in the DEIS. The Applicant continues to propose the use of a Vestas V-90 wind turbine, or comparable model, as a preferred wind turbine for generating wind energy in the proposed Project setting.

## 4.6 Alternative Project Scale and Magnitude

The Applicant has slightly reduced the size of its proposed Project from 47 wind turbines, as presented in the DEIS, to 44 wind turbines. The Applicant proposes to install the Vestas V-90 wind turbine or equivalent model of equal or lesser height and development footprint.

## 4.7 Alternative Project Timing

The proposed Project development schedule is influenced both internally and externally. External factors include securing sufficient equipment, and land and regulatory approvals to allow for development, while internal factors include decisions by the Applicant to prioritize where to focus its available resources. In order to meet the necessary regulatory approvals and to provide sufficient data for final design effort, the Applicant has proposed an updated development schedule, as provided in Table 1.6-1 of Section 1 of this SEIS. The Applicant's current schedule is to construct the Project in 2010 instead of 2009, as indicated in the DEIS. Any updates to this schedule will be provided in the FEIS.

## 4.8 Alternative Mitigation Strategies

Consideration of alternative mitigation strategies is as described in the DEIS. Individual resource mitigation options and proposals have been updated and provided within the mitigation subsections in Section 2 of this SEIS, as well as in the appended resource reports, where applicable.

## 5.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The predicted irreversible and irretrievable commitment of resources associated with the proposed Project is as described in the DEIS.

## 6.0 GROWTH INDUCING IMPACTS

Growth-inducing impacts are as described in the DEIS. Since the filing of the Project DEIS, Noble Environmental Power has filed a DEIS for its proposed Ball Hill wind energy development in the neighboring Towns of Villenova and Hanover. Section 7 of this SEIS provides more information regarding this proposed development. Similar to the Arkwright Summit Wind Farm, this Project proposal seeks to harness the available wind resource in the general area. Although they are not interdependent projects, they demonstrate the strength of the available wind resource for utility-scale wind farm development.

# 7.0 CUMULATIVE IMPACTS AND BENEFITS

This section evaluates the potential cumulative impacts that may arise from interactions between the Project and other known development projects that are under review for approval by local regulators, have been approved for development, and/or are planned for construction in the vicinity of the Project Area. A cumulative impact analysis is required under SEQRA where other projects have been specifically identified and either are part of a single plan or program, or there is a sufficient nexus of common or interactive impacts to warrant assessing such impacts together. Cumulative impacts occur when two or more individual project impacts compound or increase the extent of an impact. Cumulative impacts are most often the result of concurrent actions within the same location or in an overlapping larger impact area. These actions may vary from temporary uses associated with construction (i.e., construction traffic resulting from two or more projects being built at the same time) to more permanent impacts simultaneously affecting the same resource (i.e., cumulative visual impacts resulting from wind turbines from two or more projects within the same viewshed).

## 7.1 Other Development Projects

In order to perform the cumulative analysis for the DEIS filed in February 2008, the Applicant first identified known wind energy development projects within 30 miles of the Project. In addition to researching available resources online and agency records, the Applicant contacted numerous local officials in order to identify developments that may not have been publicly documented as of February 2008. Along with the Towns of Arkwright and Pomfret and Chautauqua County, these contacts included representatives from surrounding communities such as Sheridan, Charlotte, Villanova, Hanover, and Stockton, as well as agencies like the NYSDOT and CCIDA. Projects in the earliest stages of development that had not submitted any formal plans to Town or County regulators were not included in the cumulative impact analysis because of the relative uncertainty of their viability, as well as the lack of sufficient information regarding their locations and construction schedules.

Additionally, the Applicant also reviewed the most recent information available in the NYISO Interconnection Queue (NYISO 2008). The 30-mile radius around the Project Site extends into portions of Pennsylvania to the south and southwest. Nearly half of the study area overlaps Lake Erie, and even extends into Canadian waters to the north. For the purposes of this SEIS, only known projects in the study area within the State of New York were considered for the cumulative impacts analysis, which includes most of Chautauqua County, the western half of Cattaraugus County, and the southwest corner of Erie County.

Through these efforts, the Applicant has identified a few proposed wind energy projects in various stages of development within Chautauqua County and the New York State portion of the 30-mile radius study area. Other existing or announced wind projects within Chautauqua and Erie County are listed in Table 7.1-1 below.

**Table 7.1-1. Existing and Proposed Wind Projects, Erie and Chautauqua County, New York**

| Project Name | Available Project Information |
|---|---|
| Steel Winds Project | An operating wind farm with eight 2.5 MW wind turbines located along Lake Erie shore in Lackawanna (Erie County) – approximately 28 miles northeast of Arkwright. |
| Noble Environmental Power, LLC – Ball Hill Windpark | A Draft EIS was filed for this project in September 2008. The proposed project consists of sixty 1.5 MW wind turbines (90 MW) in the towns of Villenova and Hanover with an interconnection into the Dunkirk-Gardenville 230 kV. Proposed in service date is 2010. This development is located approximately one mile east of the Arkwright Summit Wind Farm. |
| Babcock & Brown, LP – Ripley-Westfield Wind | NYISO request 8/14/07 for 124.8 MW and an interconnection with Ripley-Dunkirk 230 kV. Proposed in service date is 12/2009. No additional information available. This development is located approximately 25 miles from the Arkwright Summit Wind Farm. |
| Babcock & Brown, LP – State Line Wind | NYISO request 12/20/07 for 124.8 MW and an interconnection with Ripley-Dunkirk 230 kV. Proposed in service date is 12/2010. No additional information available. This development is located approximately 30 miles from the Arkwright Summit Wind Farm. |
| Babcock & Brown, LP – Concord Wind | NYISO request 2/28/08 for 101.2 MW and an interconnection with Ripley-Dunkirk 230 kV. Proposed in service date is 9/2011. No additional information available. Information regarding the project location is not currently available. |
| Horizon Wind Energy, LLC – Pomfret | NYISO request 3/27/08 for 73.5 MW and an interconnection with Dunkirk-Falconer 115 kV. There is currently no layout for this project and no applications have been submitted to the Town of Pomfret. This development is located approximately one mile west of the Arkwright Summit Wind Farm. |

Source: NYISO, February 2009.

The Steel Winds Project has been in operation for approximately three years and is located along the Lake Erie shoreline, approximately 25 miles northeast of the Town of Arkwright. The proposed Ball Hill Windpark consists of sixty 1.5 MW wind turbines in the towns of Villenova and Hanover, approximately one mile east of the proposed Arkwright Summit Wind Farm. A Draft EIS for the Noble Environmental Power Ball Hill Windpark (http://www.noblepower.com/our-windparks/BallHill/BallHillDEIS.html) was submitted in September 2008 and is currently undergoing public and agency review.

The Pomfret Wind Farm, which is being proposed by Horizon Wind Energy for a location in the Town of Pomfret, west of the Arkwright Summit Wind Farm, is still in the very early planning stages. That project has not yet progressed to the point at which there is enough information

available to analyze the extent to which its impacts may be cumulative with those of the Arkwright Summit Project. All of the land rights needed for the project have not been secured, and no layout has been developed. Moreover, it remains uncertain that the Pomfret project will be constructed, and its development schedule is currently undetermined. The Pomfret project is not interdependent with the Arkwright Summit Wind Farm: the Arkwright Summit Project is being developed independently of the Pomfret project, and vice versa. However, because of the Pomfret project's relatively close proximity to the Arkwright Summit Project Site, and because the Pomfret project, if built, will interconnect at the same point on the Dunkirk-Falconer 115 kV as the new Arkwright Summit Wind Farm, it appears that there will be at least some cumulative impacts should the Pomfret project be developed. If the Pomfret project is developed, any such cumulative impacts will be analyzed in the environmental impact review process for that project. Such an approach will be fully protective of the environment given the current early stage and speculative nature of the Pomfret project.

The remaining projects listed are assumed to be under development based on their appearance in the NYISO queue, but not enough publicly available information exists yet to perform a comprehensive analysis of their cumulative impacts within the Project study area. Information about the layout of these projects, the turbines that they propose to use, the routes of their transmission interconnections, or their schedules is not currently publicly available.

It is purely speculative at this time that one or more of the proposed projects listed in Table 7.1-1 would complete the NYISO review; complete SEQRA review; complete state, federal, and local permitting and be constructed. However, for purposes of this SEIS, the Applicant assumes that all of these proposed projects will be approved and constructed, and provides the analysis below of potential cumulative impacts to the extent possible, considering the limited information available at this time.

There are no other major industrial or commercial development projects currently being proposed in the Town of Arkwright.

## 7.2 Conclusions

The estimated distance from the Project Site to the sites of these proposed projects ranges from 1 to nearly 30 miles. With the exception of the Ball Hill Windpark and the Pomfret Wind Farm, cumulative impacts to area residences from noise, visual impacts or shadow flicker are not likely. However, broader cumulative impacts to local roads and bridges could be possible due to construction-related transportation activities. Such impacts would only occur if the same transportation routes were used and if construction schedules overlapped. Current schedules for these projects indicate the possibility of some overlap between the construction of the Arkwright Summit Wind Farm and Noble Ball Hill Windpark. Should this situation arise, consultation with the involved project developers would be conducted to coordinate the transportation routes to minimize the extent of the temporary impact and assure road repair and

restoration is accomplished at the appropriate time, in consultation with the affected jurisdictions. Specifically, the use of primary haul roads, Route 83 and Route 60, would need to be coordinated and sequenced to avoid conflicts. As the construction schedules for the two projects continue to be refined, the respective developers will need to ensure communication with each other and with regional transportation authorities to avoid potential conflicts.

No cumulative impact associated with wind turbine noise is anticipated since operational noise impacts will be localized in the vicinity of each wind turbine and will not overlap between projects. The closest distance between proposed wind turbines at the Ball Hill Windpark and the Arkwright Summit Wind Farm is approximately one mile, far enough away to not add additional noise impacts to receptors associated with either project as separately assessed.

Cumulative impacts resulting from the operation of multiple wind projects within Chautauqua County would more likely be those associated with visual resources and community character. The actual impacts would be variable depending upon the number of turbines, proximity to receptors, and how these turbines are situated within the landscape setting. The operation of wind turbines coexists well with the predominating rural and agricultural community setting and land uses. Current rural residential and agricultural land uses will not be precluded by the existence of the wind farms and the supplemental income provided to individual landowners and from increased local tax revenue will enhance the long-term ability of these communities to maintain their agricultural economy and rural character. Since no layout of the Pomfret Wind Farm wind turbines exists, the applicant cannot define any specific cumulative visual impacts from the addition of this project to the visual landscape. However, given its close proximity to the Arkwright Summit Wind Farm, it is likely that cumulative visual impacts will occur in localized areas.

Likewise, the proposed 60-turbine Ball Hill Windpark located approximately one mile east of Arkwright Summit, at its closest point, would produce some cumulative impacts, particularly visual. Section 3 of the Noble Ball Hill Windpark Draft EIS includes a discussion of the cumulative impacts associated with the combined Ball Hill and Arkwright Summit projects. The New Grange Wind Farm (former name of the Arkwright Summit Wind Farm), as described in, that document, considers the proposed project to be 47 wind turbines, as formerly stated in the New Grange DEIS, instead of the 44 turbine project now described in the Arkwright Summit SEIS. In addition, other adjustments to the layout of appurtenant facilities that are described in the SEIS will differ from those indicated in the Ball Hill Windpark cumulative impact section. For the most part, the changes between the Arkwright Summit DEIS and SEIS layouts do not alter the cumulative impact conclusions substantially from those stated in the Ball Hill Windpark cumulative impacts section.

Based on a cumulative visual analysis of the two wind turbine layouts presented in the Ball Hill Windpark Draft EIS, it is concluded that there will be an increase in the number of locations in the area where one or more turbines can be seen and that the degree of visual impact is highly

variable, depending on viewer location, topography and landscape setting. It is not anticipated that the quality of the views will change if multiple wind turbines from both projects are added to the landscape. Generally, visibility of the wind turbines will be greatest at higher elevations along public road corridors or adjacent to more open agricultural lands. In addition, aviation-safety lighting at the two projects will result in red-strobe nighttime lighting at approximately 50 of the approximately 104 wind turbines proposed for the two projects. The exact number and location of wind turbine lights will be determined upon further consultation with the FAA.

Additionally, potential long-term cumulative impacts could be associated with the loss of existing wetlands and wildlife habitat within the development footprint. A quantitative analysis of such impacts is only possible for the Arkwright Summit Wind Farm and the Ball Hill Windpark. The Arkwright Summit Wind Farm will permanently impact 1.27 acres of wetlands and result in the permanent conversion of 0.04 acre of forested wetland to shrub/scrub or emergent wetland. According to the Ball Hill Windpark Draft EIS, this project will result in 0.33 acre of permanent wetland impacts and will also result in the permanent conversion of 5.13 acres of forested wetland to shrub/scrub or emergent wetland. These combined impacts are relatively low and represent a small fraction of the project areas. Additionally, both project applicants will be developing wetland mitigation plans to compensate for unavoidable wetland impacts in association with the permitting of activities in wetlands and waterways by the NYSDEC and USACE.

Direct wildlife impacts associated with alteration of habitat within the cumulative project development footprint are not expected to be significant when compared to the available regional habitat that will still exist after construction. No threatened or endangered species or significant ecological communities are expected to be impacted by the cumulative existence of the projects listed in this section. The cumulative risk to birds and bats produced by the existence of multiple windpower projects is a function of the number of wind turbines and their site-specific locations. Generally, the cumulative risk increases with the number of wind turbines, but is not expected to be biologically significant within the region, particularly in comparison to other avian and bat collision risk opportunities, such as collisions with vehicles or buildings or other localized risks. Should all of the projects listed in Table 7.1-1 become operational, approximately 384 wind turbines would exist in the regional landscape. Based on an Eastern U.S. average of 4.3 bird fatalities per turbine per year (as determined by the National Wind Coordinating Committee), the estimate of potential cumulative avian fatalities would be 1,651 per year. Based on a U.S. average of 3.4 bat fatalities per turbine per year, the cumulative estimate of potential bat fatalities would be 1,306 per year. Post-construction mortality studies associated with each constructed development will eventually yield site-specific information on bird and bat fatalities.

There will be no impacts to archaeological resources caused by the Arkwright Summit and Ball Hill Projects. Field-based surveys will need to be conducted for the other prospective wind

energy facilities listed in this section, and avoidance of any discovered resources would need to be integrated into the respective layouts of these projects. Visual impacts on architectural resources either listed or considered eligible for listing on the National Register of Historic Places that are within the cumulative viewsheds of the prospective projects will vary from property to property. The 5-Mile Ring studies conducted for both the Arkwright Summit and Ball Hill projects indicate the potential viewing opportunities from identified sensitive properties and also includes a commitment to working with local authorities and the State Historic Preservation Office to develop acceptable mitigation measures to address any unavoidable impacts.

Positive cumulative impacts associated with development of the Arkwright Summit and Ball Hill projects are related to air quality improvements through the displacement of other polluting energy sources with windpower, and better meeting the State's RPS requirements and other related federal and state energy policy goals. Further information on the positive cumulative effects on air quality is available in Section 2.4 and Appendix D of this document. Additional cumulative impacts include the economic benefits to the region that may be realized by the addition of income to participating landowners, the increased number of construction and operation employment opportunities, and the monies received by the host community in the form of PILOT payments. Cumulative construction-related economic impacts will be significant for each project, but temporary. Most of the financial benefits derived from the multiple wind energy projects will be long-term in nature by providing steady sources of local income to both individual landowners and municipalities, while strengthening the overall economic vitality of the local and regional communities. Additional discussion of the positive cumulative economic impacts is available in Section 2.9 and Appendix I of this document.

# 8.0 EFFECTS ON USE AND CONSERVATION OF ENERGY RESOURCES

Effects on use and conservation of energy resources are as described in the DEIS. The Project as proposed continues to offer a significant contribution toward meeting the federal and state policies and goals of diversifying our energy resources, increasing renewable energy use, reducing energy-related pollution (from fuel transport, use and disposal) and reducing our collective contribution to greenhouse gases.

Section 2.4 and Appendix D of this SEIS provide more specific information regarding the pollution offsets associated with the proposed Project.

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