

Staff Report of Investigation

Greenwich Windpark

Case Number
13-0990-EL-BGN

April 18, 2014

In the Matter of the Application by 6011 Greenwich Windpark,)	Case Number
LLC. for a Certificate of Environmental Compatibility and)	13-0990-EL-BGN
Public Need for the Greenwich Windpark)	

Staff Report of Investigation

Submitted to the
OHIO POWER SITING BOARD

TABLE OF CONTENTS

ACRONYMS	iv
I. POWERS AND DUTIES	1
Ohio Power Siting Board	1
Nature of Investigation	1
Criteria	4
II. APPLICATION	5
Applicant	5
History of the Application	5
Project Description	6
Project Map	9
III. CONSIDERATIONS AND RECOMMENDED FINDINGS	20
Basis of Need	20
Nature of Probable Environmental Impact	21
Minimum Adverse Environmental Impact	41
Electric Grid	44
Air, Water, Solid Waste, and Aviation	48
Public Interest, Convenience, and Necessity	50
Agricultural Districts	52
Water Conservation Practice	53
IV. RECOMMENDED CONDITIONS OF CERTIFICATE	54
General Conditions	54
Socioeconomic Conditions	55
Ecological Conditions	57
Public Services, Facilities, and Safety Conditions	59
Air, Water, Solid Waste, and Aviation Conditions	65
APPENDIX	67
1. Docketing Record	67

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

In the Matter of the Application by 6011 Greenwich Windpark)	
LLC. for a Certificate of Environmental Compatibility and)	Case Number
Public Need for the Greenwich Windpark)	13-0990-EL-BGN

Members of the Board:

Chairman, Public Utilities Commission	Ohio House of Representatives
Director, Development Services Agency	Ohio Senate
Director, Department of Health	
Director, Department of Agriculture	
Director, Environmental Protection Agency	
Public Member	

To the Honorable Power Siting Board:

In accordance with provisions of the Ohio Revised Code (ORC) Section 4906.07(C), and the Board's rules, the Staff has completed its investigation in the above matter and submits its findings and recommendations in this staff report for consideration by the Ohio Power Siting Board (Board).

The *Staff Report of Investigation* has been prepared by the Staff of the Public Utilities Commission of Ohio. The findings and recommendations contained in this report are the result of Staff coordination with the Ohio Environmental Protection Agency, the Ohio Department of Health, the Ohio Development Services Agency, the Ohio Department of Natural Resources, and the Ohio Department of Agriculture. In addition, the Staff coordinated with the Ohio Department of Transportation, the Ohio Historic Preservation Office, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the Federal Aviation Administration.

In accordance with ORC Sections 4906.07 and 4906.12, copies of this staff report have been filed with the Docketing Division of the Public Utilities Commission of Ohio on behalf of the Ohio Power Siting Board staff and served upon the Applicant or its authorized representative, the parties of record, and the main public libraries of the political subdivisions in the project area.

The staff report presents the results of the Staff's investigation conducted in accordance with ORC Chapter 4906 and the rules of the Board, and does not purport to reflect the views of the Board nor should any party to the instant proceeding consider the Board in any manner constrained by the findings and recommendations set forth herein.

Respectfully submitted,


Klaus Lambeck, Chief
Facilities, Siting, & Environmental Analysis Division

ACRONYMS

BES	bulk electric system
BMP	best management practices
dBA	decibels (A-weighted)
DOW	ODNR Division of Wildlife
DPL	Dayton Power & Light
FAA	Federal Aviation Administration
HDD	horizontal directional drill(ing)
kV	kilovolts
MW	megawatts
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OAC	Ohio Administrative Code
ODA	Ohio Department of Agriculture
ODSA	Ohio Development Services Agency
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OPSB	Ohio Power Siting Board
ORC	Ohio Revised Code
PUCO	Public Utilities Commission of Ohio
SPCC	Spill Prevention, Containment, and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
USFWS	U.S. Fish and Wildlife Service

I. POWERS AND DUTIES

OHIO POWER SITING BOARD

The Ohio Power Siting Board (Board or OPSB) was created in 1972, by amended Substitute House Bill 694. The Board is a separate entity housed within the Public Utilities Commission of Ohio (PUCO). The authority of the Board is outlined in Ohio Revised Code (ORC) Chapter 4906.

The Board is authorized to issue certificates of environmental compatibility and public need for the construction, operation, and maintenance of major utility facilities as defined in ORC Section 4906.01. Included within this definition are: electric generating plants and associated facilities designed for, or capable of, operation at 50 megawatts (MW) or more; electric transmission lines and associated facilities of a design capacity greater than or equal to 125 kilovolts (kV); and gas and natural gas transmission lines and associated facilities designed for, or capable of, transporting gas or natural gas at pressures in excess of 125 pounds per square inch. In addition, per ORC Section 4906.20, the Board authority applies to economically significant wind farms, defined in ORC 4906.13(A) as wind turbines and associated facilities with a single interconnection to the electrical grid and designed for, or capable of, operation at an aggregate capacity of five MW or greater but less than 50 MW.

Membership of the Board is specified in ORC Section 4906.02(A). The voting members include: the Chairman of the PUCO who serves as Chairman of the Board; the directors of the Ohio Environmental Protection Agency (Ohio EPA), the Ohio Department of Health (ODH), the Ohio Development Services Agency (ODSA), the Ohio Department of Agriculture (ODA), and the Ohio Department of Natural Resources (ODNR); and a member of the public, specified as an engineer, appointed by the Governor from a list of three nominees provided by the Ohio Consumers' Counsel. Ex-officio Board members include two members (with alternates) from each house of the Ohio General Assembly.

NATURE OF INVESTIGATION

The OPSB has promulgated rules and regulations, found in Chapter 4906 of the Ohio Administrative Code (OAC), which establish application procedures for major utility facilities and wind farms.

Application Procedures

Any person that wishes to construct a major utility facility or economically significant wind farm in this state must first submit to the OPSB an application for a certificate of environmental compatibility and public need.¹ The application must include a description of the facility and its location, summary of environmental studies, a statement explaining the need for the facility and how it fits into the applicant's energy forecasts (for transmission projects), and any other information the OPSB may consider relevant.²

¹ ORC 4906.04 and 4906.20

² ORC 4906.10(A)(1) and 4906.20(B)(1)

Within 60 days of receiving an application, the OPSB must determine whether the application is sufficiently complete to begin an investigation.³ If an application is considered complete, the Chairman of the OPSB will cause a public hearing to be held 60 to 90 days after the official filing date of the completed application. At the public hearing, any person may provide written or oral testimony and may be examined by the parties.⁴ Parties include the Applicant, the Board's staff, public officials, and any person who has been granted a motion of leave for intervention.⁵

Staff Investigation and Report

The Chairman will also cause each application to be investigated and a report published by the Board's staff not less than 15 days prior to the public hearing. The report sets forth the nature of the investigation and contains the findings and conditions recommended by Staff. The Board's Staff, which consists of career professionals drawn from the Staff of the PUCO and other member agencies of the OPSB, coordinates its investigation among the agencies represented on the Board and with other interested agencies such as the Ohio Department of Transportation (ODOT), the Ohio Historical Society, and the U.S. Fish and Wildlife Service (USFWS).

The technical investigations and evaluations are conducted under guidance of the OPSB rules and regulations in OAC Chapter 4906. The recommended findings resulting from the Staff's investigation are described in the staff report pursuant to ORC Section 4906.07(C). The report does not represent the views or opinions of the OPSB and is only one piece of evidence that the Board may consider when making its decision. Once published, the report becomes a part of the record and is served upon all parties to the proceeding and is made available to any person upon request.⁶ A record of the public hearings and all evidence, including the staff report, may be examined by the public at anytime.⁷

Board Decision

The OPSB may approve, modify and approve, or deny an application for a certificate of environmental compatibility and public need. If the OPSB approves, or modifies and approves an application, it will issue a certificate subject to conditions. The certificate is also conditioned upon the facility being in compliance with standards and rules adopted under the ORC.⁸

Upon rendering its decision, the OPSB must issue an opinion stating its reasons for approving, modifying and approving, or denying an application for a certificate of environmental compatibility and public need.⁹ A copy of the OPSB's decision and its opinion is memorialized upon the record and must be served upon all parties to the proceeding.¹⁰ Any party to the proceeding that believes its issues were not adequately addressed by the OPSB may submit

³ OAC 4906-5-05(A)

⁴ ORC 4906.07

⁵ ORC 4906.08(A)

⁶ ORC 4906.07(C) and 4906.10

⁷ ORC 4906.09 and 4906.12

⁸ ORC 4906.10(A) and (B)

⁹ ORC 4906.11

¹⁰ ORC 4906.10(C)

within 30 days an application for rehearing.¹¹ An entry on rehearing will be issued by the OPSB within 30 days and may be appealed within 60 days to the Supreme Court of Ohio.¹²

¹¹ ORC 4903.10 and 4906.12

¹² ORC 4903.11, 4903.12, and 4906.12

CRITERIA

The recommendations and conditions in this *Staff Report of Investigation* were developed pursuant to the criteria set forth in ORC Section 4906.10(A), which reads, in part:

The Board shall not grant a certificate for the construction, operation, and maintenance of a major utility facility, either as proposed or as modified by the Board, unless it finds and determines all of the following:

- (1) The basis of the need for the facility if the facility is an electric transmission line or gas or natural gas transmission line;
- (2) The nature of the probable environmental impact;
- (3) That the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations;
- (4) In the case of an electric transmission line or generation facility, that the facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems and that the facility will serve the interests of electric system economy and reliability;
- (5) That the facility will comply with Chapters 3704., 3734., and 6111. of the Revised Code and all rules and standards adopted under those chapters and under Sections 1501.33, 1501.34, and 4561.32 of the Revised Code. In determining whether the facility will comply with all rules and standards adopted under Section 4561.32 of the Revised Code, the Board shall consult with the ODOT Office of Aviation of the Division of Multi-Modal Planning and Programs of the Department of Transportation under Section 4561.341 of the Revised Code.
- (6) That the facility will serve the public interest, convenience, and necessity;
- (7) In addition to the provisions contained in divisions (A)(1) through (A)(6) of this section and rules adopted under those divisions, what its impact will be on the viability as agricultural land of any land in an existing agricultural district established under Chapter 929. of the Revised Code that is located within the site and alternative site of the proposed major utility facility. Rules adopted to evaluate impact under division (A)(7) of this section shall not require the compilation, creation, submission, or production of any information, document, or other data pertaining to land not located within the site and alternate site.
- (8) That the facility incorporates maximum feasible water conservation practices as determined by the Board, considering available technology and the nature and economics of the various alternatives.

II. APPLICATION

APPLICANT

Greenwich Windpark, LLC (Applicant), based in Ann Arbor, Michigan, is a subsidiary of Windlab Developments USA, Limited (“Windlab”). Windlab Systems Proprietary Limited is the sole owner of Windlab. Windlab Systems Proprietary Limited is a global wind energy development company based in Canberra, Australia with projects in various countries and regions, including Australia, Southern Africa, the United States, and Canada. Internationally, Windlab’s total portfolio includes more than 7,000 MW of potential capacity.

HISTORY OF THE APPLICATION

On April 19, 2013, the Applicant filed a pre-application notification letter and requested waivers from the following: providing an extensive site selection study to the extent that the Applicant is unable to describe all information specified in OAC 4906-17-04(A); providing a map of vegetative cover specified in OAC 4906-17-05(A)(3)(g) and instead submitting a general narrative of the vegetation cover that may be disturbed during construction; providing maps and cross-sectional views of test borings specified in OAC 4906-17-05(A)(4) and instead submitting the appropriate test borings prior to construction; and providing grade elevations around the turbine foundations and a map showing modifications in grade elevations during construction specified in OAC 4906-17-05(B)(2)(h) and instead submitting the proposed foundation and grade elevations when the construction drawings are submitted. The Applicant’s waiver request was subsequently granted on June 13, 2013.

On May 22, 2013, the Applicant held a public information meeting at South Central High School in Greenwich, Ohio.

On December 23, 2013, the Applicant filed an application for a Certificate of Environmental Compatibility and Public Need.

On January 9, 2014, the Ohio Farm Bureau Federation filed a petition for leave to intervene in the case.

On February 19, 2014, the Applicant’s application was deemed complete in accordance with OAC 4906-5-05.

On March 10, 2014, the Administrative Law Judge issued an Entry granting the Applicant’s waiver request, granting the Ohio Farm Bureau Federation’s motion to intervene, and scheduling a local public hearing and an adjudicatory hearing. The local public hearing was scheduled for May 6, 2013 at 6:00 p.m. at South Central High School, 3305 Greenwich Angling Road, Greenwich, Ohio 44837. The adjudicatory hearing was scheduled to commence on May 19, 2014 at 10:00 a.m. at the offices of the Public Utilities Commission of Ohio, Hearing Room 11-C, 180 East Broad Street, Columbus, Ohio 43215-3793.

PROJECT DESCRIPTION

The Applicant proposes to construct and operate the Greenwich Windpark with up to 25 wind turbines for a total generating capacity of up to 60 megawatts (MW) in Huron County near Greenwich, Ohio.¹³

Project Area

The facility would be located in Greenwich Township, Huron County, Ohio. The project area is comprised of approximately 4,650 acres of leased private lands involving 26 landowners. The project area and proposed facilities are shown on the maps in this report.

Wind Turbines

The Applicant proposes to use 25 Nordex model N117 turbines which are rated at 2.4 MW. The Nordex structures would consist of a three-bladed horizontal axis turbine and nacelle on top of a white tubular conical steel tower. The total structural maximum height would be up to 490.5 feet with a turbine hub height of 298 feet and a maximum rotor diameter of 383 feet.¹⁴

The Applicant expects that the annual energy production for the Greenwich Windpark would be approximately 210,000 megawatt hours (MWh).

Turbine Foundations and Assembly

The Applicant would prepare a wind turbine assembly area by grading and removing vegetation within a maximum radius of 150 feet around each turbine location. The Applicant would adjust the turbine assembly area in order to avoid environmentally sensitive resources. The foundation construction process would generally proceed from hole excavation, mud mat installation, outer form setting, rebar and bolt cage assembly, casting and finishing of concrete, backfilling and compacting, through to site restoration.

Test borings for the site-specific geotechnical investigation would be performed during the final design stage. The Applicant is considering two types of foundations, including the spread footing foundation and rock anchored pile-supported foundation. These are commonly used foundation designs for wind turbines and are reasonable to use at this proposed facility. Final turbine foundation design would be chosen upon the results of the full site-specific geotechnical investigation.

Based on the preliminary geological assessment of the project area, the Applicant does not anticipate that blasting would be necessary for foundation construction. Should site-specific conditions warrant blasting, the Applicant shall submit a blasting plan to OPSB Staff for review and acceptance in advance of any blasting.

Electric Collection System and Collection Switching Substation

A 34.5 kV underground electric collection system would be installed to transfer the power from each wind turbine location to a step-up transformer in a new 69 kV single breaker

¹³ *Application to the Ohio Power Siting Board for a Certificate of Environmental Compatibility and Public Need: Greenwich Windpark, Case No. 13-0090-El-BGN*, (Application), 6011 Greenwich Wind Park, LLC., December 23, 2013.

¹⁴ In meters, the total maximum turbine height would be up to 149.5 meters, the hub height of each turbine would be 91 meters, and the maximum rotor diameter would be 117 meters.

interconnection switching station facility. This transformer would transform the voltage to 69 kV and would connect to AEP's Willard-South Greenwich 69 kV distribution line and the PJM grid. The collection switching substation would be located at the northwest corner of the intersection of State Route 13 and Plymouth East Road. The 34.5 kV collection system would consist of 13.9 miles of underground cable buried at a depth of three feet.¹⁵

Operations & Maintenance Building

An approximately 6,000 square foot Operations and Maintenance (O&M) building would be utilized to house operations personnel, provide for parking, and store equipment and materials. The Applicant expects to make use of an existing structure, but it is possible that a new building would be constructed to serve the above-listed purposes. If a new O&M building is constructed, the Applicant indicates that it would require a permanent land disturbance less than 3 acres. The Applicant further indicates that any new O&M building would be aesthetically comparable to agricultural buildings in the area. The proposed location for the O&M building is located at the northwest corner of the intersection of State Route 13 and Plymouth East Road.

Permanent Meteorological Towers

The Applicant has installed a permanent meteorological tower to monitor wind resources in the project area. A second, identical meteorological tower may be installed at a later date. The existing tower is 262 feet in height. The sites for the permanent meteorological tower and the potential second tower are shown in the maps in this report.

Access Roads

Approximately 9.1 miles of access roads would be constructed to support the facility. The access roads would be up to 40 feet wide during construction. After construction, most access roads would be reduced to a width of 16 feet.

Construction Laydown Areas

The Applicant generally intends to deliver materials directly to each turbine construction site, to the extent practicable. The Applicant also plans to use a temporary 10-acre laydown yard, to be located at the northwest corner of the intersection of Base Line Road East and Olivesburg-Greenwich Road, for construction staging. This laydown yard would accommodate equipment/material storage, construction trailers, and construction worker parking. The potential site for the temporary laydown area is shown in the maps in this report.

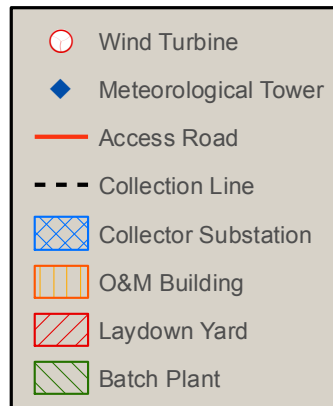
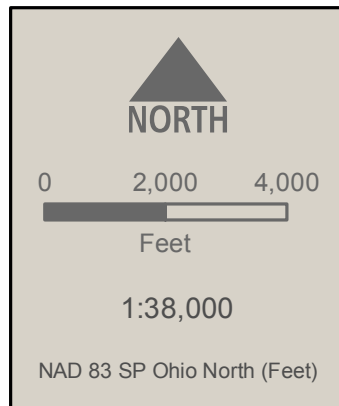
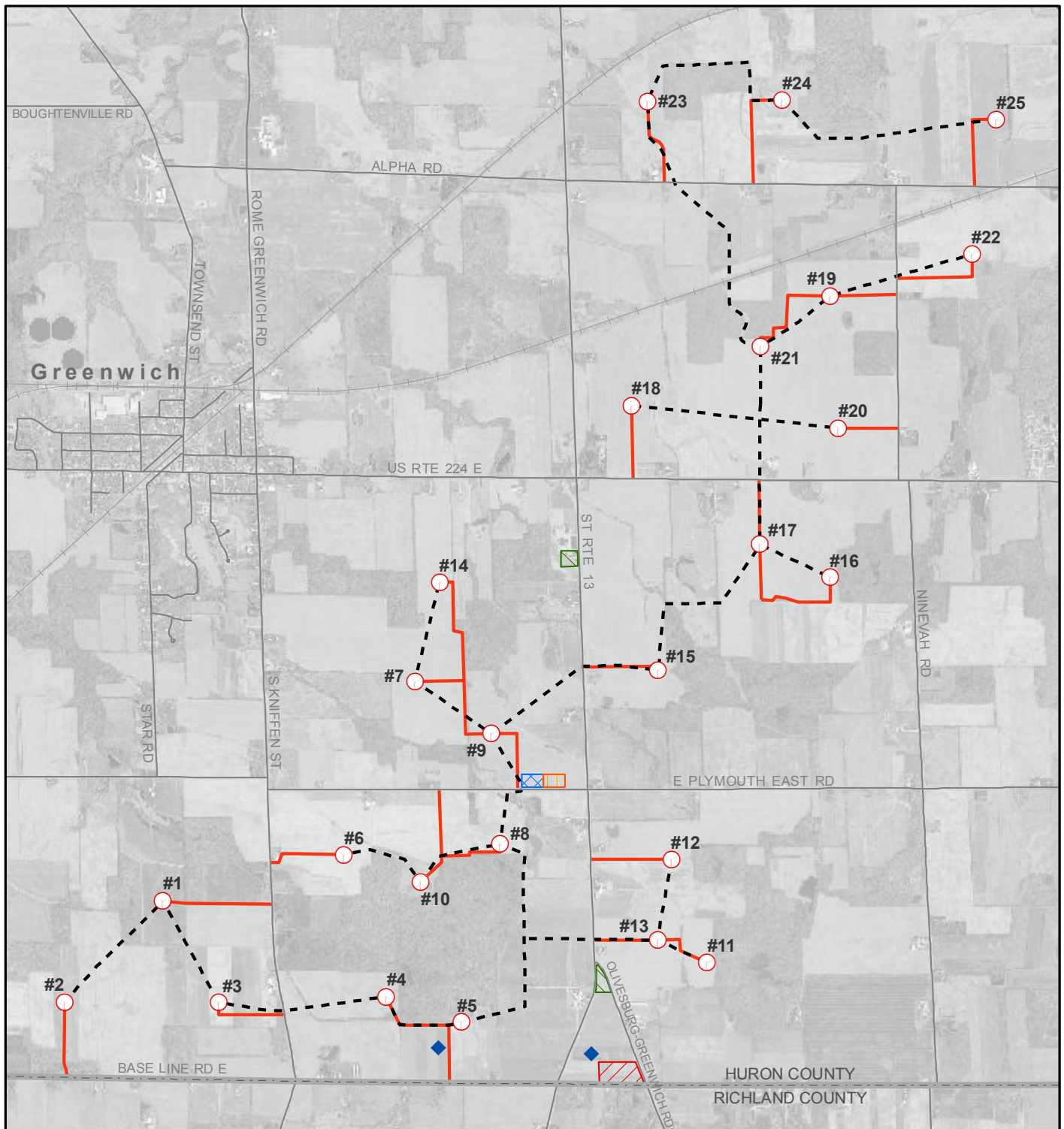
Concrete Batch Plant

To the extent possible, the Applicant would use local companies to supply concrete for the wind turbine foundations. In case local supplies are insufficient, the Applicant would construct a temporary on-site concrete batch plant. It is unlikely to be needed, but the Applicant is considering two potential sites for the concrete batch plant if needed. One proposed site is near the intersection of State Route 13 and Olivesburg Greenwich Road, and the other site is at the southwest corner of the intersection of State Route 13 and U.S. Highway 224.

¹⁵ Application, Figure 05-4

Schedule

The Applicant anticipates that final designs and detailed construction drawings would be completed between August 2014 and January 2015. Construction is anticipated to begin in the second quarter of 2015 and be completed within 4 to 6 months. The facility would be placed in service upon completion of construction, anticipated for the fourth quarter of 2015.

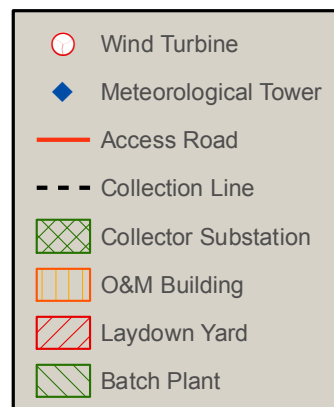
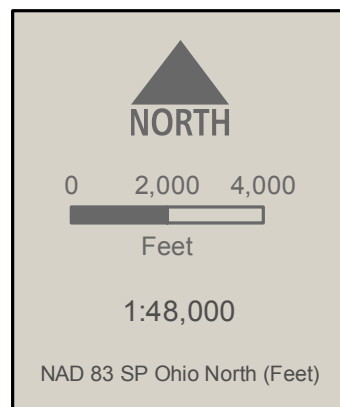
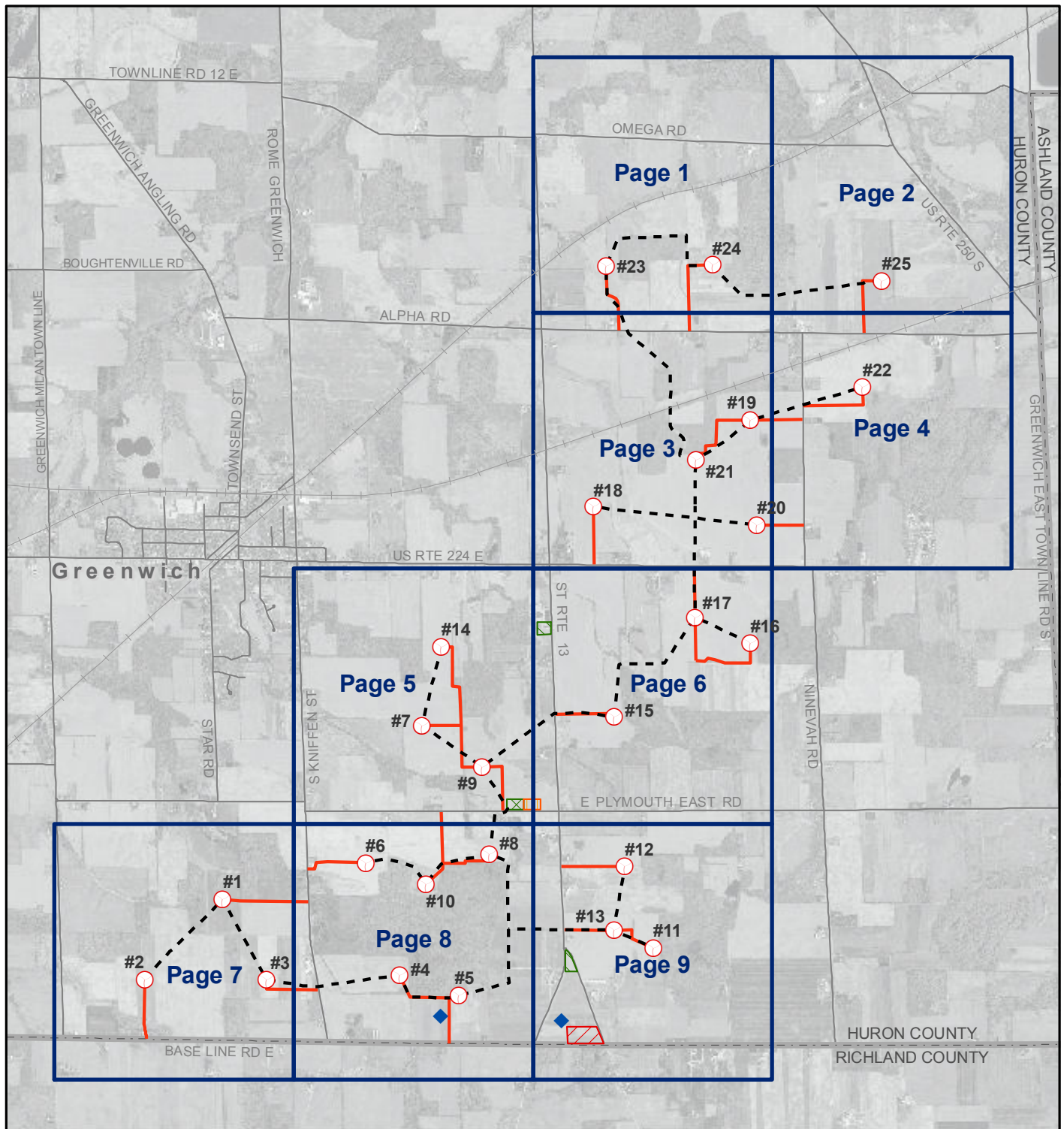


Overview Map

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.

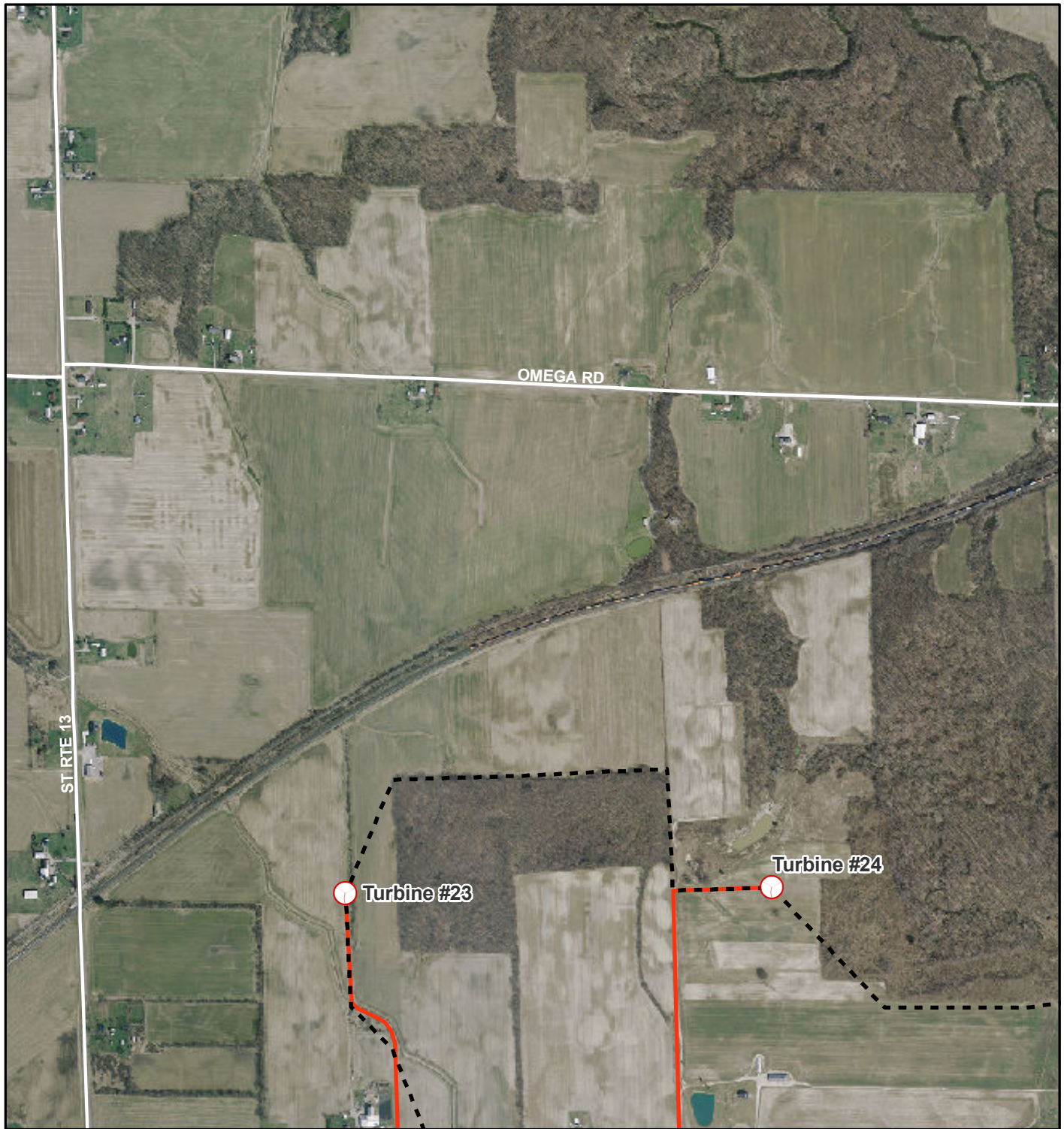


Map Index

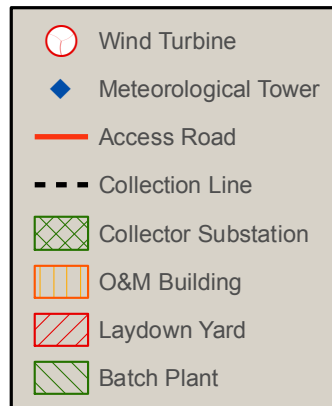
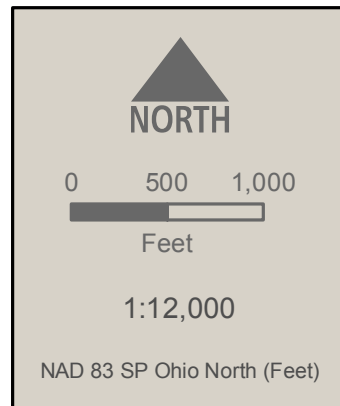
13-0990-EL-BGN

**Greenwich Park
Wind Farm**

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Page Index			1	2
			3	4
	5	6		
7	8	9		



Map Page 1

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



**Page
Index**

	1	2
	3	4
5	6	
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

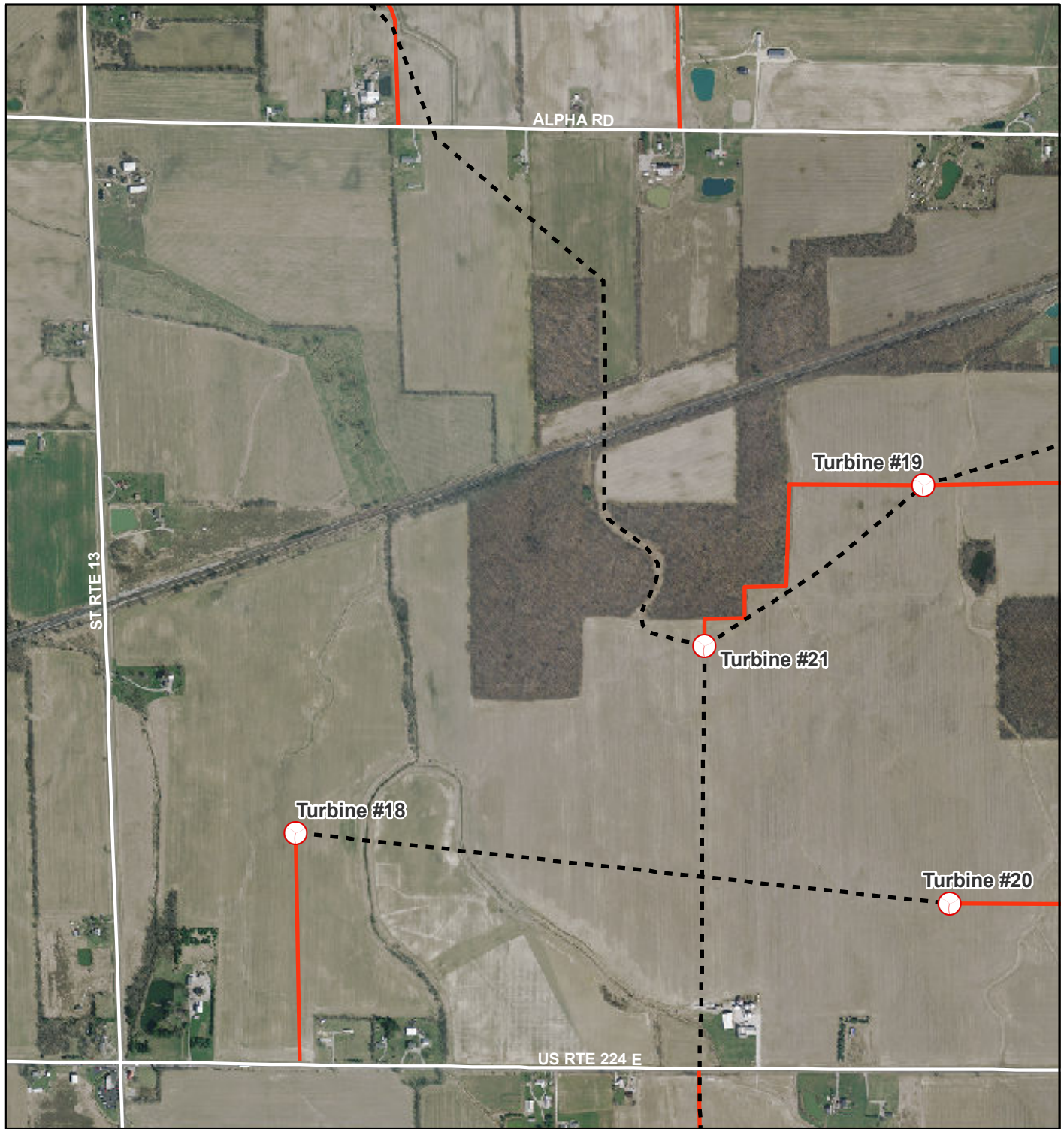
- Wind Turbine
- Meteorological Tower
- Access Road
- Collection Line
- Collector Substation
- O&M Building
- Laydown Yard
- Batch Plant

Map Page 2

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Page
Index







	1	2
	3	4
5	6	
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

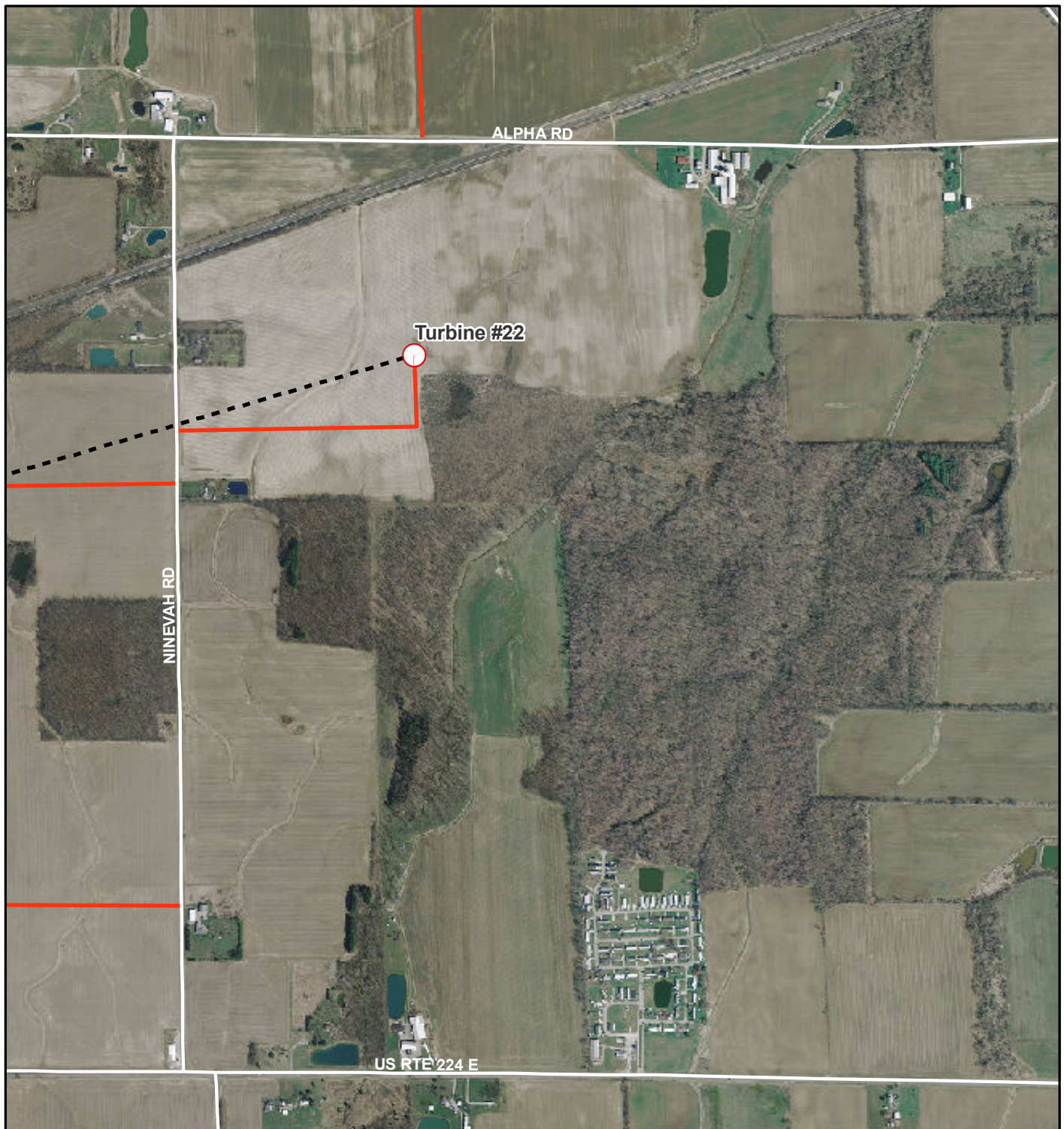
-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 3

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.










**Page
Index**

	1	2
	3	4
5	6	
7	8	9



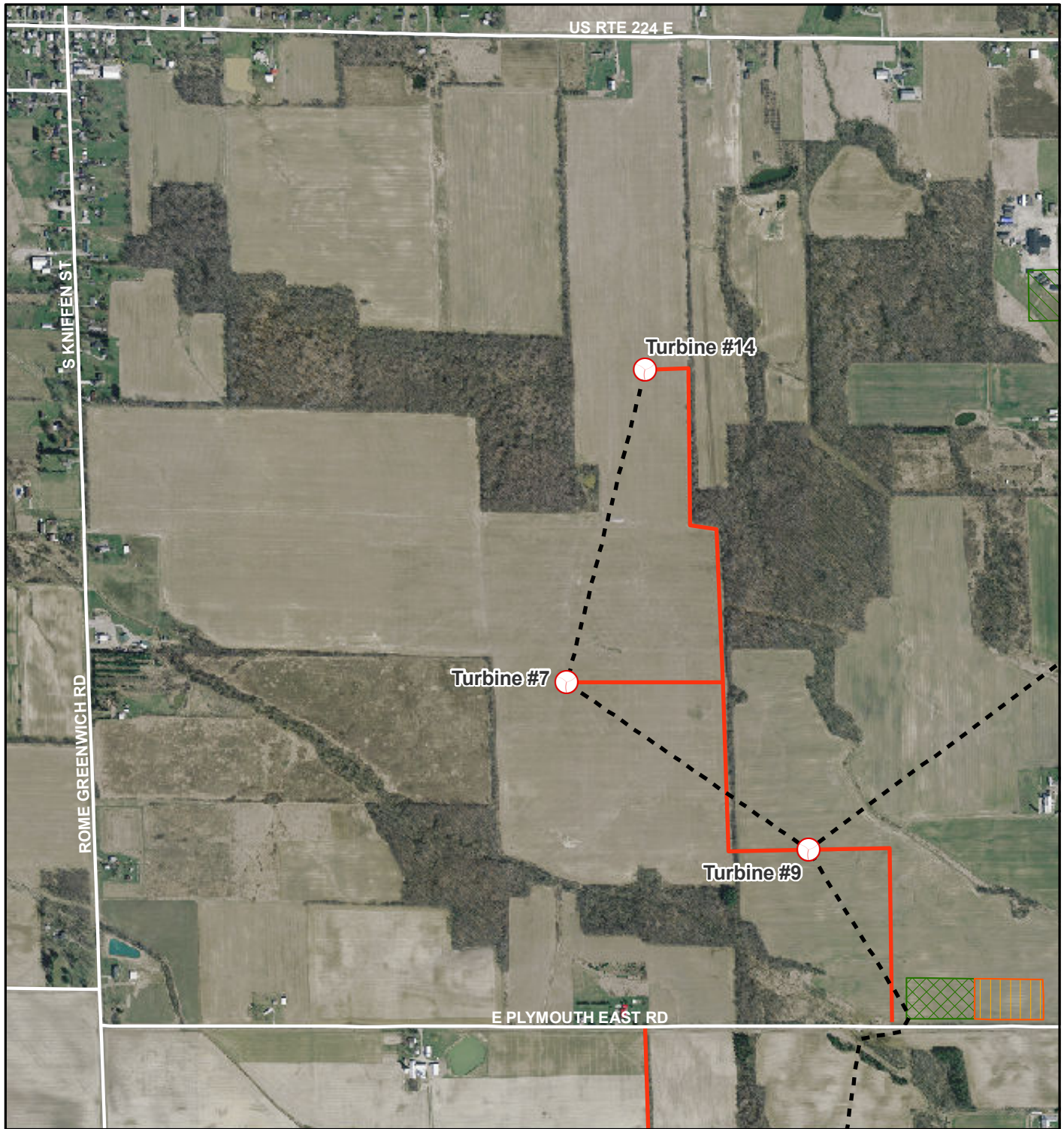
1:12,000

NAD 83 SP Ohio North (Feet)

-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 4
13-0990-EL-BGN
Greenwich Park
Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Page
Index







	1	2
	3	4
	5	6
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 5

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Page
Index






	1	2
	3	4
5	6	
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

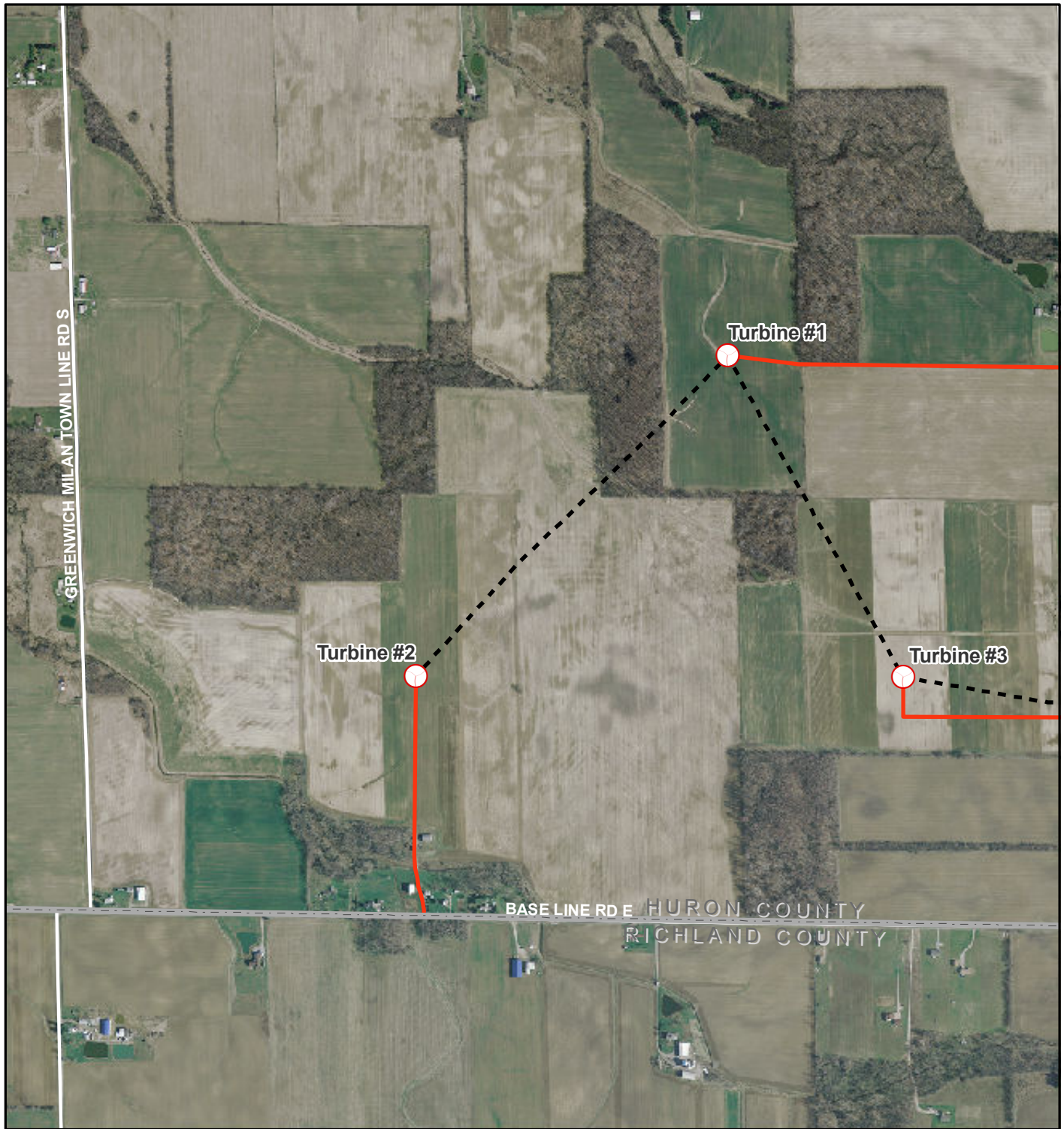
-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 6

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



**Page
Index**







	1	2
	3	4
5	6	
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

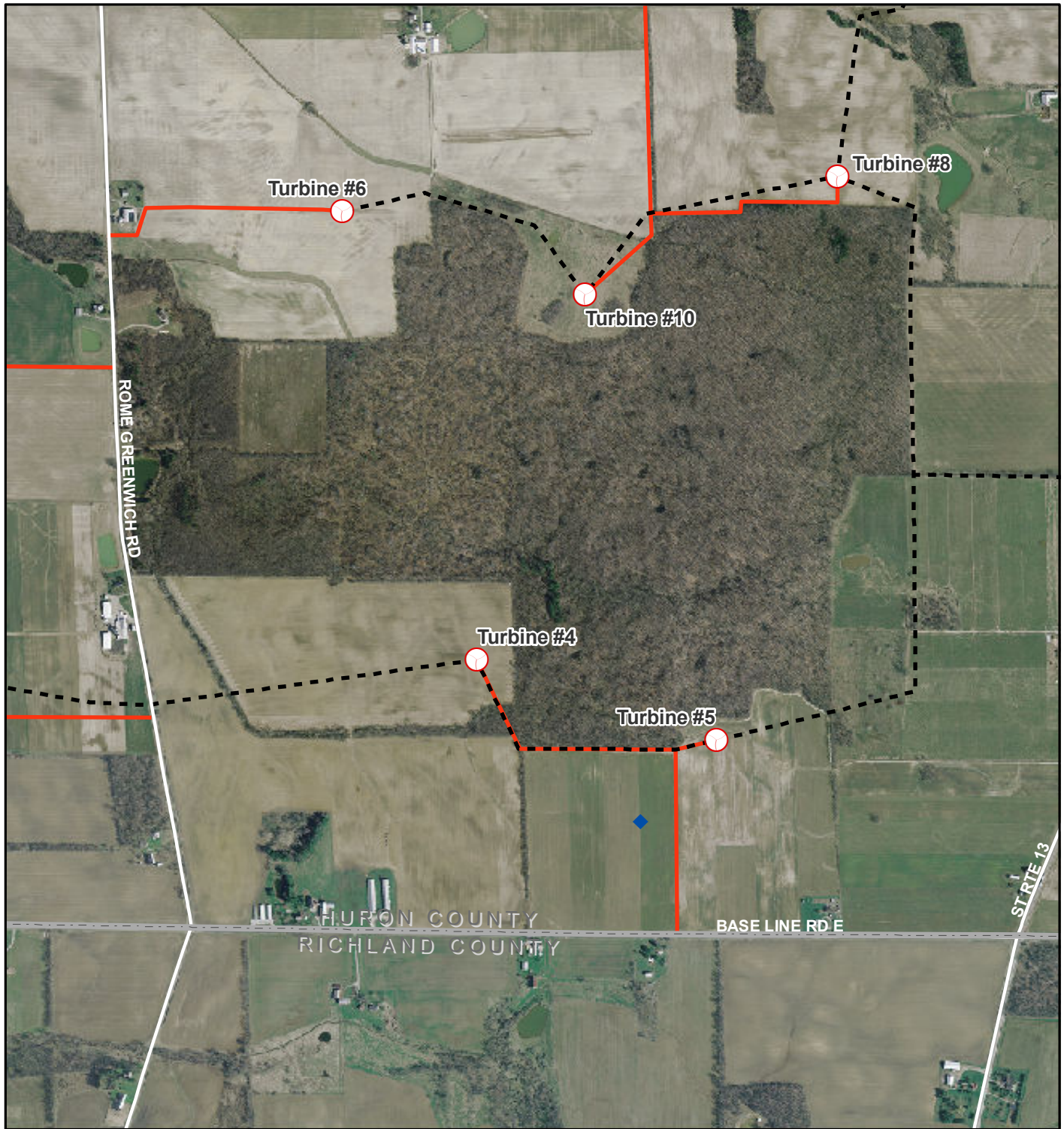
-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 7

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Page
Index







	1	2
	3	4
	5	6
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

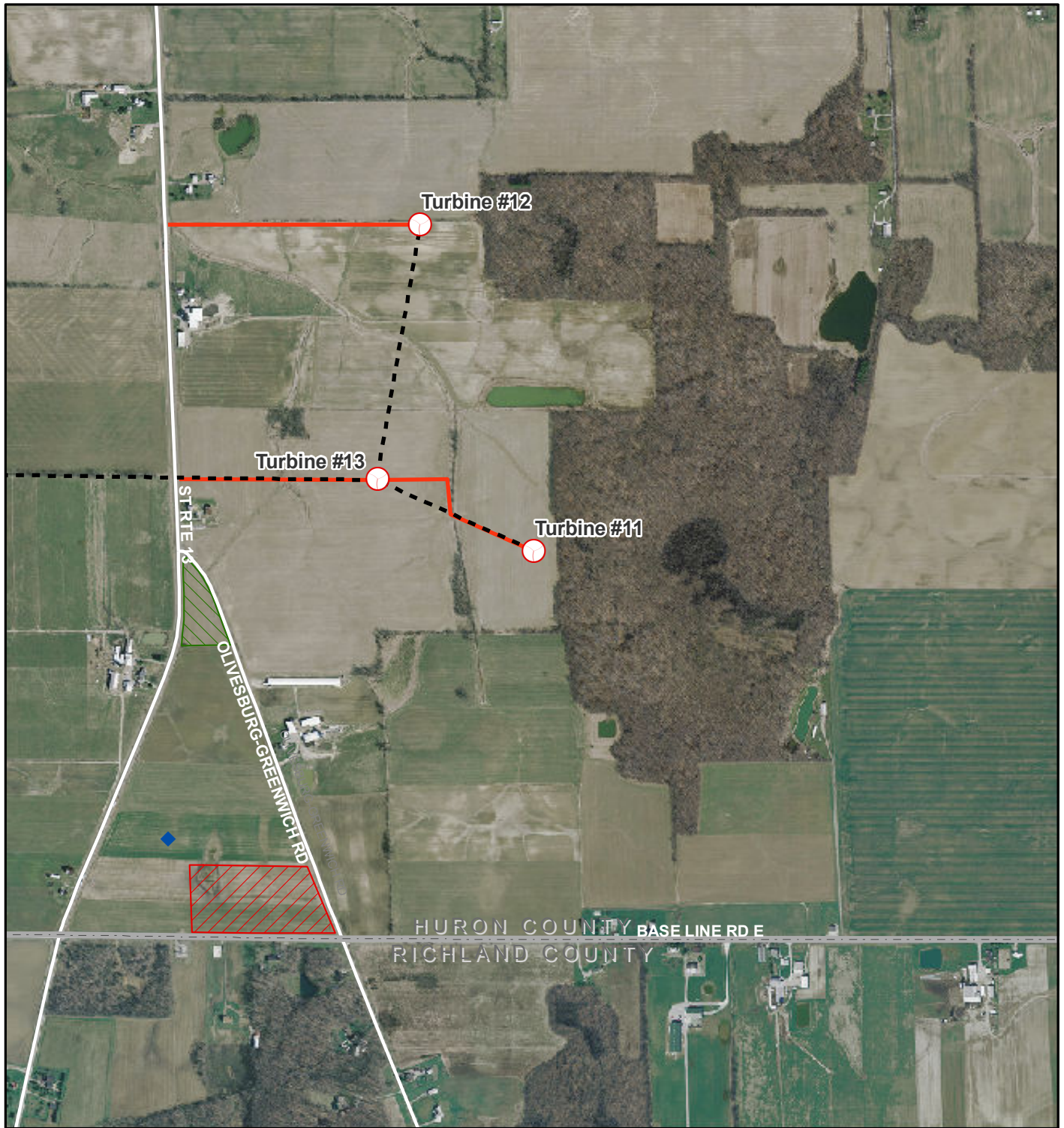
-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 8

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Page
Index






	1	2
	3	4
5	6	
7	8	9



0 500 1,000
Feet

1:12,000

NAD 83 SP Ohio North (Feet)

-  Wind Turbine
-  Meteorological Tower
-  Access Road
-  Collection Line
-  Collector Substation
-  O&M Building
-  Laydown Yard
-  Batch Plant

Map Page 9

13-0990-EL-BGN

Greenwich Park Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.

III. CONSIDERATIONS AND RECOMMENDED FINDINGS

In the matter of the application of Greenwich Windpark, LLC., the following considerations and recommended findings are submitted pursuant to ORC Section 4906.07(C) and ORC Section 4906.10(A).

Considerations for ORC Section 4906.10(A)(1)

BASIS OF NEED

The basis of need as specified under ORC Section 4906.10(A)(1) is not applicable to this electric generating facility project.

Recommended Findings

Staff recommends that the Board find that 4906.10(A)(1) is not applicable to this electric generating facility project.

Considerations for ORC Section 4906.10(A)(2)

NATURE OF PROBABLE ENVIRONMENTAL IMPACT

Pursuant to ORC Section 4906.10(A)(2), the Board must determine the nature of the probable environmental impact of the proposed facility. Staff has found the following with regard to the nature of the probable environmental impact:

Socioeconomic Impacts

Demographics

The proposed facility is located in Huron County, approximately 15 miles north of Mansfield, Ohio. According to the U.S. Census Bureau, in 2010 the population of Huron County was 59,626, the population density was 120.9 people per square mile, and the average household size was 2.6 people per household. In 2010, the population of Ohio was 11,536,502, the population density was 282.3 people per square mile, and the average household size was 2.5 people per household.

The demographics of the project area are not expected to change significantly over the next 20 years. According to Ohio Development Services Agency population projections, Huron County is projected to experience a population decrease of 4.5 percent over this time period.¹⁶ This is in contrast to the projected 0.68 percent increase in population of Ohio over the same time period.

The Applicant provided an analysis for population projections within a five mile radius of the project area. This analysis included three villages: Greenwich and New London in Huron County, and Shiloh in Richland County. The Applicant's analysis also included population projections for eight townships: Greenwich, Fitchville, New London, Ripley, and Fairfield in Huron County; Butler and Blooming Grove in Richland County; and Ruggles in Ashland County.

Based on population projections, population densities, and population center distributions, the facility is unlikely to limit future population growth or have a measurable impact on the demographics of the region.

Land Use

The proposed facilities would be located on approximately 4,650 acres of leased land. The installation of wind turbines, access roads, substations, and other ancillary structures would convert 28.4 acres of land from its current use to permanent facility use. The primary land use in the project area is agriculture. Approximately 90 percent, or 25.5 acres, of converted land is currently used for agricultural production. During construction, some temporary loss of crop production would occur. Other permanently impacted land uses would include forest (1.6 acres) residential (1 acre), farmstead (0.2 acre), and wetlands (0.1 acre).

The facility is not anticipated to impact commercial and industrial development in the project area. Various economic impacts would be expected to occur in the form of worker employment and local expenditures such as facility materials, improvements to local infrastructure, and lease payments.

¹⁶ "Ohio County Profile: Huron County," Ohio Development Service Agency: Office of Policy, Research, and Strategic Planning.

The Applicant identified seven recreational areas within three miles of the project area: Crall Woods in Ashland County; Greenwich Reservoir Park, Millstone Hills Golf Course, Freedom Valley Campground, New London Recreation Park, and the New London Upground Reservoir in Huron County; and Fowler Woods Nature Preserve in Richland County. The nearest turbine is approximately 1.13 miles from the Greenwich Reservoir Park. Greenwich Reservoir Park is located in the Village of Greenwich. The park facilities include picnic areas, activity areas and fishing access.

Wind turbines would be visible from various vantage points at the recreational areas discussed herein. While visual impacts would be reduced to varying degrees by vegetative screening, the size of the turbines limits the extent to which they can be totally obscured from view. The wind farm, however, would not alter the land use of any recreational land.

Residents in the project area are likely to experience temporary noise and traffic impacts associated with project construction activities. Long-term operational impacts to residents are discussed later in this report.

Cultural and Archaeological Resources

The Applicant conducted a cultural resources records review and assessment for the area within a 5-mile radius of the project. The records review revealed five National Register of Historic Places (NRHP) listed properties, one historic district, 103 Ohio Historic Inventory Resources historic structures, 83 Ohio Archaeological Inventory Resources, and 37 cemeteries identified by the Ohio Genealogical Society. Other cultural resources include five individual properties previously determined eligible for listing in the NRHP and one Ohio Historic Bridge Inventory site. These cultural resources have been previously identified in Ohio Historic Preservation Office (OHPO) databases within five miles of the direct Area of Potential Effect (APE). There are no National Historic Landmarks located within the 5-mile study area.

Based on the information provided in the application, Staff concludes that direct physical impacts to known cultural resources would be minimal.¹⁷ Relatively few previously recorded cultural resources were identified in the immediate vicinity of the project. The Applicant does state, however, that the literature review indicated that much of the study area has not been systematically surveyed for the presence of cultural resources.¹⁸ Further, based on the prehistoric context of the area, unidentified prehistoric archaeological sites may be located in or near lands leased for the facility.¹⁹ As such, and in order to avoid potential impacts to cultural resources within the project area, the Applicant intends to conduct a targeted Phase I field study program to further analyze the impacts that this facility may have on above ground and below ground cultural resources within the APE. The Applicant shall perform the applicable field work and develop avoidance and/or mitigation plans as necessary for impacts on cultural resources as a result of this project prior to construction.

Aesthetics

The project, specifically the overall dimensions of the proposed turbines, would create visual and aesthetic impacts to surrounding residences.

¹⁷ Application, 205; Exhibit L

¹⁸ Ibid., 206.

¹⁹ Ibid.

The Applicant provided renderings from various vantage points within and surrounding the project area. The renderings illustrate the visual and aesthetic impacts within a 5-mile radius of each turbine location and encompass a total study area of 165 square miles.²⁰

Based on the Nordex N117 model the Applicant has indicated it would construct, the total turbine height for the project would be 490.5 feet. The turbine tower, nacelle, and blades would be white in color and equipped with a single, flashing red light per Federal Aviation Administration (FAA) standards. The aesthetic impact would be location-specific and would vary depending on the distance between the viewer and the turbines, the number of turbines visible, the amount of screening, atmospheric conditions, and the presence of other vertical elements such as utility poles and communication towers. Visual impacts vary greatly for each viewer depending on the value each viewer places on the existing landscape and their personal attitude toward wind power.

The project would also incorporate up to two free-standing meteorological towers that would be approximately 262 feet tall.²¹ The Applicant intends to utilize an existing building for operations and maintenance, however, if a new building would be constructed, it would be less than 6,000 square feet in size and aesthetically blend to the agricultural buildings prevalent within the project area. The proposed substation would have minor visual impacts, as the rural characteristic of the project area limits the number of residences nearby. Further, some wooded areas would provide screening to some nearby residences. Other visual impacts would be associated with construction and would be temporary in nature.

Economics

The proposed facility would have an overall positive impact on the local economy through the increase in construction spending, wages, purchasing of goods and services, annual lease payments to the local landowners, and local tax revenues.

The estimated capital and intangible costs for the project are approximately \$119,906,000 or \$1,998 per kilowatt (kW). The project costs are consistent with the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy "2012 Wind Technologies Market Report," which indicates that the capacity-weighted average installed cost for wind projects was approximately \$1,940/kW in 2012.²² A tabulation of present worth and annualized capital costs were not provided by the Applicant, because all capital costs would be incurred within twelve months following the start of construction. The estimated annual operation costs would be \$215,000 per year for the first two years. Maintenance costs are estimated to range between \$1,320,464 and \$1,923,082 per year.

The capacity-weighted average O&M costs are estimated to be approximately \$18.42/MWh, which falls in between the average for projects installed in the 1990s (\$23/MWh) and the average for projects installed since 2000 (\$10/MWh), based on available data.²³

²⁰ Application, Exhibit Q, 6-8.

²¹ Ibid., 54

²² Wiser, Ryan and Mark Bolinger. "2012 Wind Technologies Market Report," U.S. Department of Energy, Energy Efficiency & Renewable Energy. http://www.windpoweringamerica.gov/pdfs/workshops/2013_summit/wiser.pdf

²³ Wiser, Ryan and Mark Bolinger. "2012 Wind Technologies Market Report," U.S. Department of Energy, Energy Efficiency & Renewable Energy. http://www.windpoweringamerica.gov/pdfs/workshops/2013_summit/wiser.pdf

The estimated cost of delaying the project is between \$5,000 and \$50,000 per month, though these costs can increase significantly during construction based on a number of variables. Construction of the facility is projected to take 4 to 6 months, and the Applicant estimates construction employment at approximately 100 people for the construction crew, with an estimated payroll of \$8 million. The Applicant intends to hire approximately half of the construction crew locally. Once the facility is operational, approximately three to four employees would be hired to support the direct operation of the facility, with an estimated payroll of \$215,000.

All OPSB Staff recommendations for the requirements discussed in this section can be found under the **Socioeconomic Conditions** heading of the Recommended Conditions of Certificate.

Ecological Impacts

Surface Waters

Construction of the facility would impact five streams, with a total of approximately 133 linear feet of stream impacts proposed for the project. Of the 133 linear feet of streams impacted, 53 linear feet would be permanently impacted by the construction of new access roads. The remaining 80 linear feet would be temporarily impacted from the construction of crane pathways (56 linear feet) and access roads (24 linear feet).

Most of the water resource impacts would be limited to manmade agricultural or roadside ditches. To minimize surface water impacts, the Applicant would install the electric collection lines using horizontal directional drilling (HDD). Due to the use of HDD, Staff would require the Applicant to submit a detailed frac-out contingency plan for Staff review and approval.

The turbine pads, O&M building, construction laydown, concrete batch plant, and substation have been sited to avoid wetland resources, but linear components such as access roads, crane paths, and collection lines would result in a total temporary wetland impact of approximately 0.5 acres. The permanent impact to wetlands would be approximately 0.1 acres.

The Applicant is currently coordinating with the Ohio Environmental Protection Agency (Ohio EPA) and the United States Army Corps of Engineers (USACE) to ensure that all anticipated wetland and stream impacts are properly permitted. The Applicant anticipates coverage under the USACE Nationwide Permit 51 for proposed impacts to surface water resources.

Additional measures to reduce water quality impacts would be taken through the development of a Storm Water Pollution Prevention Plan (SWPPP), as part of the Ohio EPA issued National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge associated with construction activities, to help control potential sedimentation, siltation, and run-off. No ponds or lakes would be impacted by the facility during construction or operation. No proposed facility components are within the 100-year floodplain.

Threatened and Endangered Species

The Applicant requested information from the Ohio Department of Natural Resources (ODNR) and the U.S. Fish and Wildlife Service (USFWS) regarding state and federally listed threatened and endangered plant and animal species. Additional information was provided through field

assessments and review of published ecological information. The following table of federal and state listed species known to occur in Huron County reflects the results of the information requests, field assessments, and document review.

BIRDS				
Common Name	Scientific Name	Federal Status	State Status	Presence in Project Area
bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA & MBTA ²⁴	N/A	Observed during avian pre-construction surveys.
blackburnian warbler	<i>Dendroica fusca</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
brown creeper	<i>Certhia americana</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
dark-eyed junco	<i>Junco hyemalis</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
green-winged teal	<i>Anas crecca</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
golden-crowned kinglet	<i>Regulus satrapa</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
hermit thrush	<i>Catharus guttatus</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
least flycatcher	<i>Empidonax minimus</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
Northern bobwhite	<i>Colinus virginianus</i>	N/A	Species of Concern	Observed during avian pre-construction surveys.
Northern harrier	<i>Circus cyaneus</i>	N/A	Endangered	Observed during avian pre-construction surveys.
purple finch	<i>Carpodacus purpureus</i>	N/A	Species of Interest	Observed during avian pre-construction surveys.
sharp-shinned hawk	<i>Accipiter striatus</i>	N/A	Species of Concern	Observed during avian pre-construction surveys.
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	N/A	Species of Concern	Observed during avian pre-construction surveys.

²⁴ Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act of 1918.

MAMMALS				
Common Name	Scientific Name	Federal Status	State Status	Presence in Project Area
Indiana bat	<i>Myotis sodalis</i>	Endangered	Endangered	Known range. Not caught during pre-construction bat mist-net surveys.
big brown bat	<i>Eptesicus fuscus</i>	N/A	Species of Concern	Caught during pre-construction bat mist-net surveys.
Eastern red bat	<i>Lasiurus borealis</i>	N/A	Species of Concern	Caught during pre-construction bat mist-net surveys.
little brown bat	<i>Myotis lucifugus</i>	N/A	Species of Concern	Caught during pre-construction bat mist-net surveys.
Northern long-eared bat	<i>Myotis septentrionalis</i>	Proposed Endangered	Species of Concern	Caught during pre-construction bat mist-net surveys.
tri-colored bat	<i>Perimyotis subflavus</i>	N/A	Species of Concern	Caught during pre-construction bat mist-net surveys.

REPTILES & AMPHIBIANS				
Common Name	Scientific Name	Federal Status	State Status	Presence in Project Area
Eastern massasauga rattlesnake	<i>Sistrurus catenatus</i>	Candidate	Endangered	Known range. Due to the location, the lack of habitat present, and the type of work planned, this facility is not likely to impact this species.

FRESH WATER MUSSELS				
Common Name	Scientific Name	Federal Status	State Status	Presence in Project Area
black sandshell	<i>Ligumia recta</i>	N/A	Threatened	Known range.
fawnsfoot	<i>Truncilla donaciformis</i>	N/A	Threatened	Known range.
pondhorn	<i>Unio merus tetralasmus</i>	N/A	Threatened	Known range.

The Applicant has coordinated with the ODNR Division of Wildlife (DOW) and USFWS on the siting and pre-construction surveys for the proposed project since 2011. During this period of coordination, the Applicant conducted required pre-construction wildlife surveys as requested by DOW. These pre-construction surveys following DOW protocols included diurnal raptor migration surveys (fall 2011 and spring 2012), raptor nest survey (2012), bat mist-netting survey (2011), bat acoustic surveys (2012), passerine migration surveys (fall 2011 and spring 2012), owl

surveys (winter 2012), and bald eagle nest monitoring (2012).²⁵ Results from the standardized pre-construction surveys on birds and bats are intended to document the level and timing of species activity, diversity, and abundance. Results of these studies are used by DOW to provide biological assessments of perceived risks that a proposed turbine facility may have either directly through mortalities or indirectly through avoidance behaviors or removal of habitat.

The proposed facility is within the range of several state-listed species and one federally-endangered species, the Indiana bat. The project would be within the range of one federally-listed candidate species, the Eastern massasauga, and the proposed federally-endangered northern long-eared bat. In addition, bald eagles were discovered nesting just outside of the project boundaries during raptor nesting surveys in 2012.

The Applicant has coordinated with USFWS and DOW on wildlife protocols and study expectations. The Applicant will continue to coordinate with USFWS and DOW on minimizing wildlife impacts. The Applicant is working with USFWS to apply for an Incidental Take Permit (ITP) by joining the Region 3 Habitat Conservation Plan (HCP), as required by Section 10 of the Endangered Species Act. The Region 3 HCP represents a regional effort to develop a wind power HCP document to address Indiana bats and other listed species, including bald eagles. The HCP document is still in the process of being developed, and is expected to be completed in approximately three years.

Bald Eagles are no longer a federally listed species, but are protected under the Migratory Bird Treaty Act, and are afforded additional legal protection under the Bald and Golden Eagle Protection Act. Bald eagles discovered nesting just outside of the project boundaries could be impacted during operation. USFWS models for predicting impacts have suggested a high or moderate risk to eagles with opportunity to mitigate impacts. However, this model is based on golden eagles and has a relatively high amount of uncertainty in its output. The results represent a conservative approach to modeling eagle fatality and inferring eagle risk. The Applicant is currently coordinating with USFWS on avoidance/minimization measures, and would continue to coordination until an ITP is obtained.

The area is primarily agricultural and provides minimal high quality wildlife habitat. However, presence of habitat does not seem to be a good predictor of bat mortality during fall migration. As an interim measure until the Applicant has obtained an ITP, the Applicant would sign a technical assistance letter with USFWS to protect bats during migratory seasons. Additionally, Staff recommends that the turbine blades be feathered (i.e., remain stationary or nearly stationary) at least until the manufacturer-set cut-in speed is reached. This measure should not affect energy generation, but may measurably reduce bat mortality.

As a tree-roosting species, during the non-winter months, the Indiana bat could be negatively impacted by tree clearing associated with construction and maintenance of the project. Limiting tree-removal, particularly in areas identified as potential Indiana bat habitat, would help reduce potential impacts to this species. In order to reduce potential negative impacts to the Indiana bat, the Applicant shall adhere to seasonal cutting dates of October 1 through March 31 for removal of suitable Indiana bat habitat trees, if avoidance measures cannot be achieved. If it is not

²⁵ ODNR Division of Wildlife protocols for wind generation facilities may be found in *On-shore Bird and Bat Pre and Post-Construction Monitoring Protocols for Commercial Wind Energy Facilities in Ohio 2009, amended 2011*.

practical for the Applicant to adhere to the seasonal cutting restrictions, then the Applicant shall coordinate with USFWS and ODNR for clearance.

Bird migration surveys within the project area revealed the presence of 100 bird species (more than 8,000 individuals) that include several state-listed species. Although no Northern harrier nests were located, the species was detected in the spring and fall surveys; therefore, it is possible that nesting birds could exist within the project area. Harriers nest and forage in large, open habitat such as marshes and grasslands. If this type of habitat would be impacted, DOW recommends that construction should not occur in this habitat during the species nesting period (May 15 to August 1). Operation of the facility would likely not affect this species, because it forages low to the ground.

According to DOW, there is the potential for the black sandshell, fawnsfoot, pondhorn, and other mussel species to exist in the project area. Therefore, DOW recommends the Applicant provide documentation that mussel impacts would not occur at stream crossings, and other stream impact sites. The Applicant will consult with DOW to determine which streams in the project area could provide suitable habitat for mussels and follow DOW recommendations to minimize impacts to streams as it relates to mussels. If common or state-listed mussels are located during construction activities, then Staff recommends that DOW immediately be consulted for further action.

Sixty days prior to the first turbine becoming commercially operational, the Applicant would submit a post-construction avian and bat monitoring plan for DOW and OPSB Staff review and approval. The Applicant would also provide the monitoring plan to and seek confirmation from the USFWS. The Applicant's plan would be consistent with the ODNR-approved, standardized protocol, as outlined in ODNR's On-Shore Bird and Bat Pre-and-Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio. The Applicant would obtain the necessary permits from ODNR and USFWS to collect bat and migratory bird carcasses. The post-construction monitoring would begin within two weeks of operation and be conducted for a minimum of two seasons (April 1 to November 15), which may be split between calendar years. If monitoring is initiated after April 1 and before November 15, then portions of the first season of monitoring would extend into the second calendar year. The Applicant may request that the second monitoring season be waived at the discretion of ODNR and OPSB Staff.

The monitoring start date and reporting deadlines would be provided in DOW's approval letter and the OPSB concurrence letter. If it is determined that significant mortality, as defined in ODNR's approved, standardized protocols, has occurred to birds and/or bats, the Applicant understands that DOW and OPSB Staff would require the Applicant to develop a mitigation plan. If required, the Applicant would submit a mitigation plan to DOW and OPSB Staff for review and approval within 30 days from the date reflected on ODNR letterhead.

Vegetation

The following table reflects the different vegetative communities present in the project area and associated impact for the facility.

Vegetation Community Type	Total Disturbance (Acres)	Temporary Disturbance (Acres)	Permanent Loss (Acres)
Forestland	12.7	11.1	1.6
Wetlands	0.6	0.5	0.1
Agricultural Lands	221.5	195.8	25.7
Total	234.8	207.4	27.4

Facility construction would result in minimal temporary and permanent impacts to vegetative communities within the project area. Construction activities that may result in impacts to vegetation include site preparation, earthmoving, excavation, and backfilling activities associated with construction of the laydown area, access roads, crane paths, foundations, and underground collection system. These construction activities would result in cutting and clearing of vegetation and soil disturbance and exposure. No significant impacts are expected to any specific plant species as a result of this project.

Staff recommends that the Applicant have a Staff-approved environmental specialist on-site during construction activities that may affect sensitive areas, as mutually agreed upon between the Applicant and Staff, and as shown on the Applicant's final approved construction plan. Sensitive areas include, but are not limited to, areas of vegetation clearing, areas of herbicide application, designated wetlands and streams, and locations of threatened or endangered species or their identified habitat. The environmental specialist must be familiar with water quality protection issues and potential threatened or endangered species of plants and animals that may be encountered during project construction.

Staff recommends that the Applicant be required to provide a vegetation management plan for review prior to the preconstruction conference, as outlined in the conditions. The plan would identify all areas of proposed vegetation clearing for the project, specifying the extent of the clearing, and describing how such clearing work would be done as to minimize removal of woody vegetation. The plan would also describe how trees and shrubs along access routes, at construction staging areas, during maintenance operations, and in proximity to any other project facilities would be protected from damage.

All OPSB Staff recommendations for the requirements discussed in this section can be found under the **Ecological Conditions** of the Recommended Conditions of Certificate.

Public Services, Facilities, and Safety

Setbacks

ORC Section 4906.20(B)(2) delineates how minimum setbacks for "economically significant wind farms" are to be determined. These minimum setback requirements are further codified in rule OAC Section 4906-17-08(C)(1)(c), and indicated that such minimum setbacks are applicable to all wind generation under OPSB jurisdiction. Effective September 29, 2013, ORC Section 4906.20(B)(2) was amended by Ohio House Bill 59 from the 130th General Assembly.

The minimum distance from a wind turbine to the exterior of the nearest habitable residential structure located on an adjacent property at the time of the application must be no less than 1,125 feet in horizontal distance from the tip of the turbine's blade at 90 degrees to the structure. The maximum rotor diameter of turbines under consideration for the facility is approximately 383 feet. Using the maximum blade lengths assumed in the application, this minimum setback calculates to 1,312 feet from the turbine base to the exterior of the nearest habitable residential structure.

One residential structure is currently under construction on property owned by a participating landowner. Turbine 9 is 1,117.5 feet from this structure. The location of this residential structure was determined by the participating landowner after lease agreements were executed, and the landowner was aware of the proposed infrastructure associated with the project. The Applicant intends to execute a waiver of the minimum setback with this landowner. If a waiver is not executed, the turbine shall not be built.

The minimum distance from a turbine's base to the property line of the wind farm facility must be at least 1.1 times the total height of the turbine as measured from its base to the tip of the blade at its highest point. Assuming a maximum turbine height of 490.5 feet as proposed in the application, this minimum property line setback equates to a distance of 539.55 feet.

For 16 of the 25 proposed turbine locations, the minimum setback of 1.1 times the structure height to the nearest adjacent property boundary is penetrated.²⁶ The adjacent landowners to each of these turbines are participating landowners in the project, who have leased parcels to the Applicant. The Applicant has executed a waiver of the minimum property line setback with each of these landowners.

Roads and Bridges

The Applicant extensively evaluated the roadways and transportation infrastructure of the project area. The existing condition of roads, bridges, and culverts within the project area and along potential delivery routes varies. In some places, improvements would be needed to accommodate the construction of a wind facility.

The Applicant has engaged the Huron County Engineer's office to reach an agreement for the use, repair, and improvement of roads within the project area. This agreement includes pre-construction infrastructure inspections and the provision of financial assurance to Huron County through bond or surety to ensure that any damage during the construction period would be adequately repaired.²⁷

Preliminary surveys of the project area roads indicate that some improvements would be required prior to the construction of the facility. Specifically, six intersections would be expanded with gravel and culverts. Further, the Applicant would conduct a pre-construction inspection of the potential delivery routes. The Applicant has identified a minimum of eight areas along the tertiary routes of the project area that would be surveyed in consideration of grade constraints. Any improvements deemed necessary by the pre-construction inspection of the roads would be implemented by the Applicant under the terms and conditions of an agreement with the county engineer.

²⁶ This includes turbine numbers 1, 3, 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 17, 21, 22, and 25.

²⁷ Application, Exhibit Z, "Huron County Road Agreement – Draft Document"

The Applicant identified 133 culverts and 23 bridge structures along the potential delivery routes. These crossings have been evaluated by the Applicant and deemed to be, on average, in “good” or “fair” condition.²⁸ Two culverts were identified for potential improvement prior to the delivery of materials at the discretion of the pending road use agreement. Further, five CSX railroad crossings and two Sunoco petroleum pipeline crossings were identified along the potential delivery routes, and the Applicant would facilitate any necessary coordination with those private infrastructures.

During the construction period, the Applicant would utilize conventional trucks and concrete trucks to transport foundation materials, cranes for the assembly of turbines, and trailer vehicles to deliver turbine components. The maximum length of the delivery vehicles would be 206 feet.²⁹ The Applicant has studied the delivery of the turbine components extensively and has considered the length, height, and turning radii of the vehicles along various delivery routes. These load characteristics would require the Applicant to obtain a Special Hauling Permit from ODOT.

Interstate 71 and U.S. Highway 224 would be the primary routes utilized during the construction of the facility. Additionally, the Applicant would utilize local routes including, but not limited to, State Route 13, Baseline Road, Rome Greenwich Road, Plymouth East Road, Nineveh Road, and Alpha Road. The existing condition of these tertiary roadways has been documented by the Applicant and further, structural investigation would need to be completed prior to commencement of construction.³⁰ The Applicant would return all roadways to their pre-construction condition, or better, as the road use agreement would outline.

Geology

The geologic setting of the project area within Greenwich Township consists of unconsolidated glacial deposits overlying bedrock. This location lies within the Galion Glaciated Low Plateau Section of the Central Lowland Physiographic Province. The Galion Glaciated Low Plateau is a rolling upland transitional area between the gently rolling till plains and hilly glaciated Allegheny plateau. Surficial glacial materials within the district are of Late Wisconsinan-age.

The majority of glacial deposits within the project area consist of clayey till in the form of end moraines, which occur as hummocky ridges higher than the adjacent terrain in the southern half of the project area and ground moraines, in the northern half, which is flat to gently undulating. The Galion Glaciated Low Plateau is mantled with thin to thick drift covering bedrock. Moderate relief is present in the district with ground elevations between 800-1400 feet above mean sea level. Surface elevations of the project area range from a low of approximately 950 feet above mean sea level in the northern section of the project area to 1,180 feet above mean sea level in the southernmost part of the study area.

Bedrock underlying the project area is primarily shale, which forms the bedrock surface in Greenwich Township. These shale units include the Berea Sandstone and Bedford Shale, the Sunbury Shale, and the Cuyahoga Formation. Depth-to-bedrock within the study area was approximated based on information obtained from the ODNr water well drilling log database for

²⁸ Application, Exhibit E “Preliminary Delivery Route Evaluation”

²⁹ Ibid., 222

³⁰ Application, Exhibit E “Preliminary Delivery Route Evaluation”

wells installed within the study area. Bedrock depths documented in the water well drilling logs in the vicinity of the project area range from 21 to 123 feet.

The Applicant requested and received a waiver of the requirement relating to cross-sectional views and test borings and maps as set forth in Ohio Adm. Code 4906-17-05(A)(4) which permits the Applicant to submit the appropriate test borings and locations prior to construction. The Applicant has committed to performing a geotechnical investigation and test borings prior to construction to confirm final foundation design and engineering. The geotechnical engineer, or a designated representative, would examine foundation designs and compatibility with the supporting soils and approve the work prior to placement of the foundations components. The Applicant would fill all boreholes and all borehole abandonment would comply with state and local regulations. The Applicant would provide copies of all geotechnical boring logs to Staff and to the ODNR Division of Geological Survey prior to construction.

A review of documented geologic structural and seismic information was conducted for the project area by the Applicant. Seismic information was obtained from the ODNR, Division of Geological Survey, and Ohio Seismic Network. The study area contains no fault zones. Historically, there have been two earthquake epicenters near the project area approximately three miles to the west in Ripley Township.³¹ These historical earthquakes prove to be inconsequential to the proposed facility.

Pedology

The surface soils in the study area are comprised mostly of Bennington and Cardington silt loams. The soil survey information indicates that Bennington silt loams are poorly drained, have low to moderately high capacity to transmit water, with the depth to water table being approximately 12 to 30 inches. Cardington silt loams are moderately well drained, have low to moderately high capacity to transmit water, with the depth to water table being approximately 18 to 36 inches. The soil surveys also indicate that the soils do not frequently flood or pond surface water runoff. Adequate surface water runoff drainage would be established and properly controlled at each proposed construction site to minimize any increase in the moisture content of the subgrade material. These limitations do not render the project area unsuitable for the construction of turbine foundations, buildings or access roads.³²

Additionally, it is not asserted that any underground or surface mines are located in the project area. There is no indication of former gravel pits or quarries in the project area.

Based on the earthwork in the region, conventional, shallow foundations may be able to support turbines and the substation. This assumption would need to be confirmed by a detailed geotechnical exploration and evaluation for each turbine-site and the substation location. If it is determined that shallow foundations are not suitable for structural support, other suitable foundation types may be utilized according to their compatibility with the geotechnical parameters of the specified turbine-site and substation.

³¹ In 1998, a 3.2 magnitude earthquake occurred in Ripley Township and in 2001, a 2.7 magnitude earthquake occurred with an epicenter less than a mile away from the 1998 earthquake.

³² USDA Soil Conservation Soil Survey, Huron County

The geotechnical engineer, or a designated representative, should examine foundation designs and compatibility with the supporting soils and approve work prior to placement of foundation components.

Based on a review of the soil survey information, the soils should be suitable for grading, compaction, and drainage when each turbine-site is prepared as discussed in this report and the guidance provided in a Geotechnical Exploration Report for each individual turbine location. Due to the anticipated depth to bedrock, it is anticipated that conventional excavation equipment could be used for excavating and that bedrock blasting would probably not be necessary; however, this assumption must be confirmed with geotechnical test boring prior to construction. If bedrock blasting is required, it would be performed in accordance to all applicable laws and regulations.

Public and Private Water Supplies

The project area lies within the rural areas of Huron County. Residents within the project area rely upon private wells for their domestic water supply. The Applicant does not anticipate any disruption or adverse effect to public and private water supplies during the construction or operation of the facility.

The project area is within the vicinity of one area designated as a Source Water Supply Area (SWPA), as defined and approved by the Ohio EPA for the protection of drinking water sources. The SWPA is associated with the Village of Greenwich. The Ohio EPA and the Ohio Department of Commerce Bureau of Underground Storage Regulations have adopted regulations that restrict specific activities within these designated areas. Restricted activities include concentrated animal feeding operations, sanitary, industrial, or residual waste landfills, land application of biosolids, and voluntary brownfield cleanups. The Applicant has concluded that the construction of the facility would not have any effect on the groundwater or surface water protected by the SWPA.

The final design for the wind turbine foundation would be determined once the Applicant conducts its geotechnical investigation at the proposed wind turbine locations. The final design for the turbines would take into account the proximity to private water supplies and depth to the water table.

The Applicant would comply with any drinking water source protection plan for any part of the facility that is located within drinking water source protection areas of the local villages and cities.

Pipeline Protection

Staff recommends a minimum setback distance from gas pipelines of at least 1.1 times the total height of the turbine structure as measured from its tower's base, excluding the subsurface foundation, to the tip of the its highest blade. Based on the tallest turbine proposed for this project with a tip height of 490.5 feet, the recommended pipeline setback is 539.55 feet. Staff has found that there are at least two pipelines in the project area; these are owned or operated by Columbia Gas Transmission Corp. and Inland Corporation doing business as Sunoco Logistics. Staff recommends that the Applicant show that the recommended pipeline setback has been met before the start of construction.

Blade Shear

Blade shear occurs when a wind turbine blade, or segment, separates from the rotor and is thrown or drops from the tower. The Applicant asserts that past incidences of blade shear at other sites have generally been the result of design defects during manufacturing, poor maintenance, control system malfunction, or lightning strikes. Turbine design certification by the wind industry has led to reductions in the incidence of blade failure. Wind turbines have multiple safety features to address blade shear: two fully independent braking systems, a pitch control system, and turbine shut-offs in the event of excessive wind speeds, excessive blade vibration, or stress. These safety features and the use of setbacks minimize the potential for blade shear impacts to humans, animals, land, and structures. The Applicant has incorporated a wind turbine layout with an adjacent property residential setback distance of 1,312 feet and a property line setback of 539.55 feet.

High Winds

Wind turbines are designed to withstand high wind speeds. The Nordex N117, selected by the Applicant for this project, is designed to meet the standards of the International Electrotechnical Commission (IEC)-61400 series. The IEC is an organization that prepares and publishes international standards for all electrical, electronic, and related technologies including wind turbines. The Nordex N117 is designed to automatically shut down and stop producing energy at its cut-out speeds, which is 20 meters per second (m/s), or 44 miles per hour (mph). The Nordex N117 is certified by the International Electrotechnical Commission (IEC) as a Class IIIa wind turbine designed to withstand annual average wind speeds of up to 7.5 m/s (17 mph) and extreme 10-minute average wind speeds of up to 37.5 m/s (84 mph). These IEC standards represent minimum design values.

The Applicant should continuously monitor for forecasted meteorological conditions in the area and take appropriate precautions in the event of extreme weather. The Applicant states that the turbines have the following safety features in the event of high winds: a supervisory control and data acquisition control system to monitor weather, anemometers on each turbine, two independent braking systems, and an automatic turbine shut down mechanism at excessive wind speeds or vibrations.³³ Installing and utilizing these safety control mechanisms minimizes potential impacts from high winds.

Ice Throw

Ice throw occurs when accumulated ice on the wind turbine blades separates from the blade and falls, or is thrown from the blade. The Applicant indicates that the proposed turbines would have ice detection equipment and safety features that would shut down a turbine if the buildup of ice causes excess vibration or the speed to power ratio to become too high.

The Applicant conducted an ice throw study that indicates that 90 percent of ice throw events would result in ice being thrown less than 623 feet from the turbine base. The maximum throw distance would be approximately 853 feet from a turbine base.

³³ Application, p. 66.

Construction Noise

Various activities associated with construction of the facility would have noticeable, but temporary, noise impacts. Noise impacts would primarily be associated with the operation of construction and delivery equipment, such as dozers, excavators, trenchers, pumps, cranes, graders, and trucks. The Applicant provided estimates of sound levels associated with the operation of construction equipment. Many of the construction activities would generate noise levels greater than the current agricultural setting produces. The adverse impact of construction noise would be minimal, because construction activities would be temporary and intermittent, would primarily occur away from most residential structures, and would generally be limited to normal daytime working hours.

Operational Noise

A 2001 New York State Department of Environmental Conservation (NYSDEC) document states that “in non-industrial settings the noise level should probably not exceed ambient noise by more than 6 dBA at the receptor (residence). An increase of 6 dBA may cause complaints. There may be occasions where an increase in noise levels of greater than 6 dBA might be acceptable.”³⁴ The NYSDEC recommends that, while it may be acceptable in some non-industrial settings, an increase in ambient noise levels of greater than 6 dBA warrants further study of potential impacts. A threshold of 5 dBA over average nighttime ambient noise levels (L_{EQ}) has been applied in recent wind farm certificates in Ohio.³⁵

The noise impact of the proposed wind farm is related to the existing ambient noise level of the project area. In order to characterize the existing ambient noise level, two acoustic surveys of the project area were conducted by the Applicant between June 5 and 17, 2013. Six survey locations were sampled. Based on these surveys, the Applicant found that average ambient noise levels (L_{EQ}) across the project area ranged from 51 to 63 dBA during the day and from 46 to 62 dBA at night. The data provided by the Applicant equates to an average project area daytime L_{EQ} of 55 dBA and an average project area nighttime L_{EQ} of 52 dBA. However, due to a noise measurement location in the vicinity of an active rail line, the Applicant proposes using a daytime L_{EQ} of 51 dBA and a nighttime L_{EQ} of 46 as a very conservative representation of ambient L_{EQ} of the project area.

In order to determine the ambient noise level at which wind turbine noise would likely be most noticeable, the Applicant compared turbine-generated noise levels and average ambient nighttime noise levels at various wind speeds. In order to estimate the potential noise impact associated with the proposed facility, the model used the maximum sound power from the Nordex N117. The Applicant modeled the facility noise output using DataKustic GmbH's Cadna/A[®] noise modeling software. OPSB precedent for wind generating facilities calls for the facility to be operated so that the facility noise contribution does not result in noise levels at the exterior of any currently existing non-participating sensitive receptor that exceed the project area ambient nighttime L_{EQ} (46 dBA) by 5 dBA, which in this case would be 51 dBA. The Applicant's noise model shows that the noise impact at non-participating sensitive receptors would be 44 dBA or less.

³⁴ “Assessing and Mitigating Noise Impacts.” NYSDEC. Albany, New York, February 2, 2001. Retrieved: http://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf, 14.

³⁵ L_{EQ} refers to the equivalent continuous sound level, or average sound level, over a specific period of time.

Based on Staff's review, the Applicant's proposed turbine layout is not likely to generate unacceptable levels of noise for non-participating residents. Staff is aware that this representation is based on model results, and actual sound output levels could be different when the wind farm is in operation. Therefore, Staff recommends that the certificate be conditioned upon the requirement that the Applicant adhere to the OPSB precedent goal of 51 dBA, which is nighttime L_{EQ} plus 5 dBA, except when, during daytime operation, the Applicant can demonstrate that slightly higher noise levels do not exceed validly measured L_{EQ} at the receptor by more than 5 dBA. Additionally, Staff recommends that the Applicant establish a complaint resolution process through which complaints related to facility noise can be resolved.

Shadow Flicker

Shadow flicker can occur when moving turbine blades pass in front of the sun, thereby creating alternating changes in light intensity. International studies and guidelines have suggested 30 hours of shadow flicker per year as the threshold of significant impact, or the point at which shadow flicker is commonly perceived as an annoyance. This 30-hour standard is used in at least four other states, including Michigan, New York, Minnesota, and New Hampshire, and has been the threshold applied in recent wind farm certificates in Ohio. Accordingly, Staff considers a threshold of 30 hours of shadow flicker per year to be a reasonable limitation.

Shadow flicker frequency is related to the wind turbine's rotor blade speed and the number of blades on the rotor. Shadow flicker at certain frequencies may potentially affect persons with epilepsy. For about three percent of epileptics, exposure to flashing lights at certain intensities or to certain visual patterns may trigger seizures. This condition is known as photosensitive epilepsy. The frequency or speed of flashing light that is most likely to cause seizures varies from person to person. Flashing lights most likely to trigger seizures are between the frequency of five to 30 flashes per second, or hertz (Hz).³⁶ This project's maximum wind turbine rotor speed translates to a blade pass frequency of approximately 0.8 Hz and therefore would not be likely to trigger seizures.³⁷

The Applicant conducted a shadow flicker analysis of the facility to calculate the yearly shadow flicker impact to receptors within approximately 1,170 meters of turbines. The Applicant used the following inputs to calculate shadow flicker impact: turbine coordinates, turbine specifications, shadow receptor coordinates, monthly sunshine probabilities, wind speed probability distribution, wind direction data, and elevations for each residence. The model developed for this facility included 298 receptors.

The position of the sun relative to the turbine rotor disk and the resulting shadow is calculated in time intervals of one minute throughout a complete year. If the shadow of the rotor disk, which in the calculation is assumed solid, casts a shadow on a receptor at any time, then this step is registered as one minute of potential shadow impact. The model's calculations take into account the wind turbine location, elevation, and dimensions, and the receptor location and elevation. The model showed that five non-participating receptors would be exposed to more than 30 hours of shadow flicker per year by the facility. Of those five receptors, three were determined to not exceed the 30 hour limit after further evaluation using actual site-specifics conditions such as

³⁶ "Photosensitivity." Epilepsy Foundation of America. <http://www.epilepsyfoundation.org/about/photosensitivity>.

³⁷ $16 \text{ RPM} = 0.267 \text{ Hz} \times 3 \text{ blades} = 0.8 \text{ Hz}$.

obstacles that would mitigate shadow flicker exposure. The Applicant has stated that any turbine forecasted prior to construction to create in excess of 30 hours per year of shadow flicker at a non-participating receptor within 1,000 meters would be subject to shadow flicker minimization measures and possible mitigation. Mitigation would be completed before commercial operation commences and consist of either reducing the turbine's forecasted impact to 30 hours per year, or other measures confirmed by Staff to be in compliance with this commitment.

This representation is based on model results, and actual shadow flicker levels may differ when the wind farm is in operation. Therefore, Staff recommends that the certificate be conditioned upon the requirement that the Applicant operate the facility so that no more than 30 hours of shadow flicker per year are actually experienced at any non-participating receptor. Additionally, Staff recommends that the Applicant establish a complaint resolution process through which complaints related to shadow flicker from the facility can be resolved.

Communications

The Applicant expects the project to impact off-air television signals. Specific impacts to television reception could include interference, reduced picture quality, and signal loss. If facility operations results in impacts to existing off-air television coverage, the Applicant has committed to investigating methods of improving the television reception system. If improvements cannot be made, then the Applicant would resolve the issue by offering cable television service or direct broadcast satellite reception systems to affected receptors. With this provision, all potential television reception impacts would be mitigated by the Applicant.

Potential problems with AM broadcast coverage can occur when stations with directive antennas are located within two miles of turbines or when stations with non-directive antennas are located within 0.5 miles. All AM stations are located well outside the project area, with the closest station located approximately 12.6 miles from the nearest proposed turbine site. No impact on AM coverage is expected.

FM stations are not subject to degradation at distances greater than 2.5 miles. The closest operational station, WLRD, is located more than 5.5 miles from the nearest proposed turbine location. No impact to AM or FM broadcast stations is expected.

Microwave communication systems are wireless point-to-point links that communicate between two antennas and require clear line-of-sight conditions between each antenna. The Applicant identified one licensed microwave path and three proposed microwave paths intersecting the project area. A Worst Case Fresnel Zone (WCFZ) was calculated for each of the microwave paths identified. The WCFZ represents the area or path in which a turbine or other structure might cause a deflection of microwave signals. None of the turbine locations would obstruct these paths. However, the study was limited to a database of licensed systems, using locations based on Federal Communications Commission (FCC) coordinates rather than as-built facilities. As a result, known microwave systems, including some that are critical to maintaining reliable electric service in the area, may not have been evaluated in the study. The Applicant has initiated contact with electric service providers in the area and begun conversations to determine potential microwave signal interference. Staff recommends that the Applicant study potential impacts to all known microwave communication systems, using survey-quality data, as outlined in the Recommended Conditions of Certificate.

The Applicant analyzed the potential impact of wind turbines on cable and satellite sites in and around the project area. The satellite structures are outside the project area, and the Applicant does not anticipate impacts to these services.

Cable television headend facilities may have an off-air television reception antenna on-site.³⁸ The Applicant expects that television stations that are being transmitted from east and northeast (primarily from Cleveland and Akron) may have their signals obstructed by the wind turbines. This would result in degradation of the television signal being received at the cable headend site. The Applicant would notify all local cable providers and instruct them that if degradation occurs to discuss an alternate method for headend facility reception.

The Applicant analyzed the potential impact of wind turbines on cellular telephone operations in and around the project area. This analysis evaluated the registered frequencies for emergency, business, industrial, and government agencies. Land mobile and emergency services data were derived from the FCC's Universal Licensing System and the FCC's Public Safety and Homeland Security Bureau. The Applicant determined a 254 foot buffer between wind turbines and license sites to avoid interference. For this project, the closest turbine is 1,181 feet away. The Applicant expects very little change to cellular coverage after wind turbines are constructed.

The Applicant analyzed the potential impact of the Greenwich Windpark on the operation of Doppler weather radar systems within 155 miles (250 kilometers) of the project area. If wind turbines are in the line-of-sight of a Doppler radar system, then the wind farm has the potential to block radar systems which would produce false targets, clutter, and lost coverage. The Applicant found that the wind farm is in the line-of-sight of two Doppler radar systems. Specifically, these two radar systems are known as WPPB343 and WPSH792. Greenwich Windpark's turbines would create clutter on these two Doppler radar systems. Staff recommends that the Applicant implement the following mitigation: provide maps of the clutter sectors to the radar operators so that they are aware of the potential lost coverage area, provide a switchable blanking capability in the sectors where the radar antennas would have line-of-sight to the wind turbines, or relocate the affected radar systems so their operation would not be degraded by the wind turbines.³⁹ The wind farm has recently contacted the owners/operators of these two Doppler radar systems to determine what mitigation is needed.

Wind turbines can interfere with civilian and military radar in some scenarios. Potential interference is highly site-specific and depends on local features, the type of radar, and wind farm characteristics. The Applicant sent a notification letter to the National Telecommunications and Information Administration (NTIA) on March 23, 2010. Upon receipt of notification, the NTIA provided plans for the proposed facility to the federal agencies represented in the Interdepartment Radio Advisory Committee. This committee did not identify any concerns regarding blockage of radio frequency transmission systems.

No impacts to AM or FM radio, mobile phone, cable television, or satellite systems are expected. The Applicant would mitigate television reception impacts to the satisfaction of the affected receptor. Staff recommends that the Applicant be required to mitigate any impacts to

³⁸ *Headend facility* – receives and processes broadcast and satellite television signals for distribution to cable television subscribers.

³⁹ *Switchable blanking capability* – shuts off the radar transmitter at those directions so that clutter and false targets do not appear on the radar displays.

communication and Doppler weather radar systems, if they are observed during operation of the facility, as outlined in the Recommended Conditions of Certificate.

Decommissioning

Megawatt-scale wind turbine generators typically have a life expectancy of 20 to 25 years. The current industry trend is to upgrade older turbines with more efficient ones while retaining existing tower structures. If not upgraded, turbines typically go into a period of non-operation, where no expectation of re-operation exists, and are generally decommissioned at such time.

Decommissioning megawatt-scale wind turbines in a utility-scale project involves the reclamation and restoration of the project area's topography that existed prior to construction. Decommissioning activities include, but are not limited to, removal of turbine structures, flattening of turbine foundations, and removal of associated facility components. Additionally, the turbine foundation areas must be graded, top soiled, and re-seeded.

The Applicant has proposed a decommissioning plan that includes the removal of the facility components and provides financial assurance to ensure that funds would be available to decommission the project.⁴⁰

At the termination of a lease, or if the project has not generated electricity for a continuous period of twelve months, the Applicant would decommission the project by removing all physical materials from the project area. Thirty days prior to decommissioning the project, the Applicant would submit a decommissioning plan to Staff. This plan would include the Applicant's intent to excavate the turbine foundations to a depth of 60 inches below grade and remove any other facility components buried at a depth of less than 36 inches.⁴¹ The Applicant intends to remove all access roads and any other improvements, unless a landowner requests that those components remain in place and provided that allowing those facilities to remain does not violate any permit or legal requirement regulating the Applicant.⁴²

To ensure that these decommissioning activities take place, the Applicant would post financial assurance. This total amount would be calculated by an independent, registered Ohio professional engineer, and reflect an aggregate cost of removing all turbines and facilities constructed and would not include the salvage value of the equipment.⁴³ Further, the Applicant proposes that the decommissioning costs would be estimated every five years and that, as necessary, the financial surety would be updated and adjusted.

Staff recommends several conditions to ensure sufficient funds for decommissioning would be available before the start of construction.

All OPSB Staff recommendations for the requirements discussed in this section can be found under the **Public Services, Facilities, and Safety Conditions** of the Recommended Conditions of Certificate.

⁴⁰ Application, Exhibit Y, "Decommissioning Plan."

⁴¹ The Applicant would not remove underground collection and utility lines below the ground, if buried deeper than four feet below the surface.

⁴² Application, 225.

⁴³ Application, 226; Exhibit Y, 7-8.

Recommended Findings

The Staff recommends that the Board find that the nature of the probable environmental impact has been determined for the proposed facility, and therefore complies with the requirements specified in ORC Section 4906.10(A)(2), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for ORC Section 4906.10(A)(3)

MINIMUM ADVERSE ENVIRONMENTAL IMPACT

Pursuant to ORC Section 4906.10(A)(3), the proposed facility must represent the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, along with other pertinent considerations.

Site Selection

The site for the Greenwich Wind Farm was selected based on the quality of the wind resource, proximity to major transportation routes and electric transmission, compatible land uses, interested landowners willing to lease their land, limited population, appropriate geotechnical conditions, and the low risk of impacting sensitive ecological and cultural resources. The locations of individual turbines were based on maximizing energy yield, avoidance of sensitive ecological and cultural resources, limiting impacts to agriculture, noise and shadow flicker constraints, and land use constraints. The Applicant's site selection criteria minimize the potential impact of the project while achieving the project's goal of generating renewable electricity.

Minimizing Impacts

The Applicant has sited and designed the Greenwich Wind Farm to minimize potential impacts. Of the 4,650 acres of leased land, 28.4 acres would be permanently converted into built facilities. Agricultural land accounts for approximately 90 percent of all land that would be impacted by the proposed facility. The Applicant has no plans to remove any existing structures during construction of the facility.

The proposed facility aligns with regional development planning and would have minimal impacts on local public services. Comprehensive plans for Huron County and neighboring Richland and Ashland counties signal a continuance of agricultural production in the region that includes the project area. The installation of a wind facility would coincide with agricultural production and thus not impede regional plans.

Relatively few previously recorded cultural resources were identified in the immediate vicinity of the project. Direct physical impacts to known cultural resources should be minimal. In order to avoid potential impacts to cultural resources within the project area, the Applicant intends to conduct a targeted Phase I field study program to further analyze the impacts that this facility may have on above ground and below ground cultural resources. Staff also recommends the Applicant conduct a targeted architectural survey of the project area.

The proposed facility would have an overall positive impact on the local economy due to the increase in construction spending, wages, purchasing of goods and services, annual lease payments to the local landowners, and local tax revenues. The increase in local tax revenues is estimated to be up to \$540,000 annually for a 60 MW facility.

To minimize impacts to wetlands and streams, the Applicant has committed to using HDD to install the underground electric collection cable under all streams and wetlands as an avoidance measure, where possible. To minimize impacts related to frac-out, the Applicant would be

required to provide a frac-out contingency plan. Construction of the facility would require work within mapped 100-year floodplains.

The Applicant would consult with DOW to determine which streams in the project area could provide suitable habitat for mussels and follow DOW recommendations to minimized impacts to streams as it relates to mussels. The Applicant has acknowledged that construction, operation, maintenance, and decommissioning of the project may result in incidental take of listed birds and bats. The Applicant has coordinated with USFWS and DOW on wildlife protocols and study expectations. The Applicant will continue to coordinate with USFWS and DOW on minimizing wildlife impacts. The Applicant is working with USFWS to apply for an ITP by joining the Region 3 HCP and would sign a technical assistance letter with the USFWS that would stay in effect until an ITP can be obtained. If tree clearing is necessary, the Applicant would adhere to seasonal cutting dates of October 1 through March 31.

Several turbines are within the minimum property line setbacks. The adjacent landowners to each of these turbines are participating landowners in the project, with leased parcels, and have signed waivers of the minimum setback. One residential structure is currently under construction on property owned by a participating landowner, and is within the residential setback (1,117 feet away from the proposed turbine). The Applicant is currently in the process of executing a waiver of the minimum setback with this landowner. The Applicant has indicated that various safety control mechanisms would be utilized to minimize the potential for blade shear and ice throw impacts.

The Applicant's proposed turbine layout is not likely to generate unacceptable levels of noise for non-participating residents. The Applicant modeled shadow flicker impacts with respect to the proposed facility. Two non-participating receptors would be exposed to more than 30 hours of shadow flicker per year by the facility. The Applicant is expected to provide mitigating measures to the two non-participating residents so that they receive no more than 30 hours of exposure to shadow flicker. Providing the mitigating measures to these non-participating residents would present the minimum adverse shadow flicker impact.

During the construction period, local, state, and county roads would experience a temporary increase in truck traffic due to deliveries of equipment and materials. A final delivery route plan will be developed through discussions with the Huron County Engineer and performed in conjunction with the ODOT special hauling permit process and within an agreement signed between the Applicant and the county engineer.

No impacts to AM or FM radio or radar systems are expected. The Applicant would mitigate television reception impacts to the satisfaction of the affected receptor. Further study is recommended for potential impacts to microwave communication systems and mobile phones. Mitigation may be required for possible impacts to communication and Doppler weather radar systems determined during operation.

Because the project impacts such a large area, it is imperative that the Applicant secure a financial instrument that best reflects the ability to completely decommission the facility. Because the project would not create revenue until it is operational, it is necessary that the decommissioning funds be available at the start of construction. The decommissioning requirements outlined in the conditions would ensure that the project meets the minimum adverse environmental impact.

Conclusion

Staff concludes that the proposed project would result in both temporary and permanent impacts to the project area and surrounding areas. Due to the low potential to impact land use, cultural resources, streams, wetlands, wildlife, communications, non-participating residents, and Staff's recommended conditions to mitigate these impacts, Staff concludes that the project represents the minimum adverse environmental impact.

Recommended Findings

The Staff recommends that the Board find that the proposed facility represents the minimum adverse environmental impact, and therefore complies with the requirements specified in ORC Section 4906.10(A)(3), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for ORC Section 4906.10(A)(4)

ELECTRIC GRID

Pursuant to ORC Section 4906.10(A)(4), the Board must determine that the proposed electric facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, and that the facility will serve the interests of electric system economy and reliability.

The purpose of this section is to evaluate the impact of interconnecting the proposed facility into the existing regional electric transmission system. The Applicant plans to use a 34.5 kV collection system, which would gather the wind generators output at the project substation. The project substation would transform the voltage from 34.5 kV to 69 kV, and be the point of interconnection. The project substation would connect the proposed facility to the regional grid via American Electric Power's (AEP) Willard-South Greenwich 69 kV transmission line.

PJM Interconnection

PJM is the regional transmission organization charged with managing the Ohio regional transmission system and the wholesale electricity market. In addition, PJM administers the interconnection process of new generating facilities connecting to the system. Generators wanting to interconnect to the bulk electric transmission system located in the PJM control area are required to submit an interconnection application for review of system impacts. 6011 Greenwich Wind, LLC submitted the proposed facility to PJM on August 29, 2011. PJM assigned the application a queue number of X3-023.

PJM studied the interconnection to be tapped between the Greenwich and South Greenwich substations on the Willard-South Greenwich 69 kV line. AEP has future plans to modify the Willard 69 kV station to operate as a ring bus. In order for the proposed wind farm to be reliably interconnected to the grid, the Applicant would be required to upgrade the Willard 69 kV station, which would require land and equipment purchases.

The Applicant requested that PJM study the proposed facility at a maximum output of 60 MW. PJM business rules allow for wind-powered projects to qualify for capacity credits that can be offered in PJM's three year forward capacity market auction. PJM's allow 13 percent of a wind project's maximum output to be offered as capacity credit. The Applicant plans to ask for 7.8 MW of the project to be assigned as capacity credits. Capacity represents the need to have adequate generating resources to ensure that the demand for electricity can be met at all times. In PJM's case, that means that a Load Serving Entity (LSE) is required to have sufficient capacity resources to meet its load demand, plus a reserve margin amount. LSE's can meet that requirement with capacity resources they own, with capacity purchased from others under contract, or with capacity obtained through PJM's capacity market auctions.

PJM has completed the Feasibility Study and System Impact Study for the proposed facility, which includes local and regional transmission system impacts.^{44,45} These studies summarized

⁴⁴ PJM, *Feasibility Study*, Queue Number X3-023. <http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx> (Mar 4, 2014).

⁴⁵ PJM, *System Impact Study*, Queue Number X3-023. <http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx> (Mar 4, 2014).

the impacts of adding the proposed wind farm to the regional bulk electric system and identified any transmission system upgrades caused by the project that would be required to maintain reliability. The Applicant has not yet signed a Construction Service Agreement or an Interconnection Service Agreement with PJM for the proposed facility. Signature on the Interconnection Service Agreement would need to be obtained before PJM will allow the Applicant to interconnect the proposed facility to the bulk electric transmission system.

Staff reviewed the System Impact Study report prepared by PJM. The study was evaluated for compliance with reliability criteria for 2015 summer peak load conditions.⁴⁶ The studies revealed network transmission facilities would not be overloaded under normal or contingency conditions. However, the studies did reveal the proposed facility may experience curtailments at summer peak conditions. More details can be found below in the section of this report titled “Delivery of Energy Portion - New System Reinforcements.”

Transmission Planning Requirements

The North American Electric Reliability Corporation (NERC) is responsible for the development and enforcement of the federal government’s approved reliability standards, which are applicable to all owners, operators, and users of the bulk power system. NERC requires planners of the bulk electric transmission system to meet Reliability Standards TPL-001-0.1 through TPL-004-0a under transmission outage conditions for categories A, B, C, and D contingencies.⁴⁷ According to NERC, a contingency is an unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch, or other electrical element. Below is a list of the NERC categories and their meanings:

- Category A (no contingencies, normal system conditions);
- Category B (single contingency outage, n-1), the planning authority and transmission planner shall demonstrate that the interconnected transmission system can operate to supply projected customer demands and firm transmission service at all demand levels over the range of forecast system demand;
- Category C (multiple contingency outages, n-1-1), the planning authority shall demonstrate that the interconnected transmission system can operate to supply projected customer demands and firm transmission service at all demand levels over the range of forecast system demand and may rely upon the controlled interruption of customers or curtailment of firm transmission service; and,
- Category D (extreme events resulting in multiple elements removed or cascading out of service), the planning authority shall demonstrate that the interconnected transmission system is evaluated for the risks and consequences of a number of each of the extreme contingencies that are listed in the standard.

PJM and AEP Transmission System Impacts

PJM analyzed the bulk electric system (BES) with the facility interconnected to the electric grid, for compliance with NERC reliability standard TPL-001-0.1 through TPL-004-0a. A 2015

⁴⁶ PJM, System Impact Study, Queue Number X3-023. <http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx> (Mar 4, 2014).

⁴⁷ North American Electric Reliability Corporation, *Reliability Standards*, Transmission Planning (TPL-001-0.1-TPL-004-0a). <http://www.nerc.com/pa/Stand/Pages/ReliabilityStandards.aspx> (Mar 4, 2014).

summer peak power flow model was used to evaluate the regional reliability impacts. The system was studied for impacts at both full energy output (60 MW) and for the capacity portion (7.8 MW). AEP planning criteria requires the transmission system meets single contingency performance criteria. The regional studies revealed no network problems under normal system conditions or during the loss of one or more BES elements, when the output was at capacity level or below.

The study did reveal that operational restrictions may be experienced during certain system conditions. These overload issues are discussed under the heading named “Delivery of Energy Portion - New System Reinforcements.” The results of the PJM System Impact Study for the AEP local and PJM regional footprint are as follows.⁴⁸

Local and Regional Network Systems Impacts

Category A - No Contingencies and System Normal	
<i>Plant Output: Capacity Level – 7.8 MW</i>	No problems identified
<i>Plant Output: Maximum – 60 MW</i>	Operational Restrictions
Category B - Single Contingency Outage	
<i>Plant Output: Capacity Level – 7.8 MW</i>	No problems identified
<i>Plant Output: Maximum – 60 MW</i>	Operational Restrictions
Category C and D - Multiple Contingency Outages	
<i>Plant Output: Capacity Level – 7.8 MW</i>	No problems identified
<i>Plant Output: Maximum – 60 MW</i>	Operational Restrictions

Short Circuit Analysis

The short circuit analysis study, which is part of the System Impact Study, evaluates the interrupting capabilities of circuit breakers impacted by the proposed wind farm addition. The results identified no short circuit problems.⁴⁹

Stability Analysis

The stability analysis study, which is part of the System Impact Study, evaluates the ability of the power system to withstand disturbances (contingencies) and maintain stable operation of the bulk electric system.⁵⁰ The study was conducted at 2015 summer light load and peak load conditions, with the facility at maximum output. No stability problems were identified.

⁴⁸ PJM, System Impact Study, Queue Number X3-023. <http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx> (Mar 4, 2014).

⁴⁹ PJM, System Impact Study, Queue Number X3-023. <http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx> (Mar 4, 2014).

⁵⁰ PJM, System Impact Study, Queue Number X3-023. <http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx> (Mar 4, 2014).

Delivery of Energy Portion – New System Reinforcements

PJM studied the delivery of the energy portion at the full 60 MW output of the proposed facility injected into the electric grid. Eight overloads were identified. The Applicant can choose whether or not to make these upgrades. If the upgrades are not made, the proposed facility may be susceptible to curtailments during summer peak loading conditions.

Contribution to Previously Identified Overloads – Network Impacts

PJM studied overloading to determine if the proposed facility may have earlier projects in the PJM Queue. No overloads were identified.

Conclusion

PJM analyzed the bulk electric system, with the facility interconnected to the transmission grid, for compliance with AEP, NERC, and PJM reliability criteria. The studies did not reveal any reliability problems on the local or regional bulk electric system.

While studying the delivery of the energy portion at 60 MW, PJM did find several problems that may cause operator to curtail output during certain system conditions, if upgrades were not made. The Applicant can choose to mitigate these curtailments by upgrading equipment on the transmission system. These upgrades are not required for system reliability, and therefore, the Applicant can choose to complete the upgrades or have the output curtailed under certain system conditions. Any output over 7.8 MW's may be subjected to curtailment.

The proposed facility is expected to provide reliable generation to the bulk electric transmission system, is consistent with plans for expansion of the regional power system, and would serve the interests of electric system economy and reliability. The facility would serve the public interest, convenience, and necessity by providing additional electrical generation to the regional transmission grid.

Recommended Findings

The Staff recommends that the Board find that the proposed facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, and that the facility would serve the interests of electric system economy and reliability. Therefore, the facility complies with the requirements specified in ORC Section 4906.10(A)(4), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for ORC Section 4906.10(A)(5)

AIR, WATER, SOLID WASTE, AND AVIATION

Pursuant to ORC Section 4906.10(A)(5), the facility must comply with specific sections of the ORC regarding air and water pollution control, withdrawal of waters of the state, solid and hazardous wastes, and air navigation.

Air

The operation of the facility would not produce air pollution; therefore, there are no applicable air quality limitations or air permits required for the operation of facility.

The Applicant will comply with fugitive dust rules by the use of water spray or other appropriate dust suppressant measures whenever necessary.

Construction and operation of the facility, as described in the application and data request responses and in accordance with the conditions included in this *Staff Report of Investigation*, would be in compliance with air emission regulations in ORC Chapter 3704, and the rules and laws adopted under this chapter.

Water

Neither construction nor operation of the proposed facility would require the use of significant amounts of water, thus requirements under ORC 1501.33 and 1501.34 are not applicable to this project. The Applicant has indicated it would seek the following permits:

- The Ohio National Pollutant Discharge Elimination System (NPDES) construction storm water general permit, Ohio EPA Permit No. OHC000004
- A Nationwide Permit 51 under Section 404 of the Clean Water Act
- An Ohio Permit to Install on-site sewage treatment under OAC 3745-42 (if necessary)

In order to obtain the NPDES, an Ohio EPA Notice of Intent (NOI) application would be submitted 21 days before construction. Included with the NOI is the Storm Water Pollution Prevention Plan (SWPPP).

The Applicant would remove all temporary gravel and construction materials after the completion of construction activities, unless otherwise directed by the landowner. Impacted areas would be restored to preconstruction conditions in compliance with the NPDES permit(s) obtained for the project and the approved SWPPP created for this project. The Applicant would not dispose of gravel or any other construction material during or following construction of the facility by spreading such material on agricultural land. All construction debris and all contaminated soil would be promptly removed and properly disposed of in accordance with Ohio EPA regulations.

With these measures, construction and operation of this facility would comply with requirements of ORC Chapter 6111, and the rules and laws adopted under this chapter.

Solid Waste

The Applicant is unaware of any waste removal necessary prior to construction. Waste generated during construction would consist of a limited amount of plastic, wood, cardboard, and metal packing/packaging materials, construction debris, and general refuse. The solid waste generated during the construction or operation of the facility would be secured and removed from the project area and disposed of at a licensed disposal facility. The operation and maintenance facilities would utilize local solid waste recycling and disposal services. With these measures, the Applicant's solid waste disposal plans comply with solid waste disposal requirements in ORC Chapter 3734, and the rules and laws adopted under this chapter.

Aviation

No public airports are located in the vicinity of the project area. The former Mindzak Airstrip was located approximately 1.15 miles from the project area at the intersection of Plymouth East Road and Town Line Road along the Huron-Ashland county border. This private grass airfield has been removed and is now completely crop land. Neither the construction nor operation of the proposed facility is expected to have any significant impact on airports or the existing air travel network.

The FAA conducted aeronautical studies of the proposed turbine layout under the provisions of Title 49 of the U.S. Code, Section 44718, and applicable Title 14 of the Code of Federal Regulations, part 77 and section 4561.32 of the Ohio Revised Code respectively. The aeronautical studies conducted for the proposed facility concluded that all of the turbines in the preliminary layout do not exceed obstruction standards and would not be a hazard to air navigation. A Determination of No Hazard has been issued by the FAA for all of the 25 preliminary turbine locations evaluated.

ODOT issued a Construction/Alteration permit for the project and stated that the proposed construction exceeds obstruction standards adopted under Section 4561.32 of the Ohio Revised Code, but will not affect the safe and efficient use of the airports nor affect the safety of persons and property on the ground.

In accordance with ORC Section 4561.32, Staff contacted the ODOT Office of Aviation during review of this application in order to coordinate review of potential impacts the facility might have on public use airports. When creating the recommended conditions for the certificate, Staff implemented FAA and/or ODOT Office of Aviation recommendations where deemed justified through conversation and exchange with subject matter experts.

All OPSB Staff recommendations for the requirements discussed in this section can be found under the **Air, Water, Solid Waste, and Aviation Conditions** heading of the Recommended Conditions of Certificate.

Recommended Findings

The Staff finds that the proposed facility complies with the requirements specified in ORC Section 4906.10(A)(5), provided that any certificate issued by the Board for the certification of the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for ORC Section 4906.10(A)(6)

PUBLIC INTEREST, CONVENIENCE, AND NECESSITY

Pursuant to ORC Section 4906.10(A)(6), the Board must determine that the facility will serve the public interest, convenience, and necessity.

Public Interaction

The Applicant has engaged community members, elected officials, and the media through a variety of ways and means. Communication began in the spring of 2010 when the Applicant held a public meeting and began executing lease agreements with property owners. In the winter of 2011, the Applicant held a second public meeting to update community members about the progress of the project. On May 22, 2013, a public informational meeting was held at the South Central High School, in accordance with OAC 4906-5-08(B).

The Applicant maintains a website for the project, www.greenwichwindpark.com, which features an overview of the project and extensive information about wind energy development. Community members can also contact the Applicant and its representatives by phone. Finally, the Applicant has employed and identified a project manager who frequents the project area and serves as a point of contact for any questions or concerns from the community.

Liability Insurance

A certificate application must include a description of any insurance programs for providing liability compensation for damages to the public during construction or operation of the proposed facility. According to the Applicant, it would maintain an insurance policy to cover any potential personal injury, death, and property damage associated with the operation of the proposed facility that would insure against claims of, at a minimum, \$1 million per occurrence and \$2 million in the aggregate. In addition, the Applicant would maintain an umbrella insurance policy, which would cover potential personal injury, death, and property damage liabilities in excess of the primary insurance policy, throughout the construction and operation of the facility that would insure against claims of, at a minimum, \$10 million per occurrence and \$10 million in the aggregate.

Alternative Energy Portfolio Standard

The alternative energy portfolio standard (AEPS) contained within Section 4928.64, Ohio Revised Code, requires a portion of the electricity sold to retail customers in Ohio to come from renewable energy resources. This requirement, which began in 2009, includes annually increasing renewable benchmark through 2024. Renewable energy resources, as defined by statute, include wind generating technologies. At least 50 percent of the annual renewable energy requirement must be satisfied with resources located within the State of Ohio. Electric distribution utilities or competitive retail electric service companies have several options for demonstrating compliance with the AEPS, including entering into renewable power supply agreement or through the use of renewable energy credits (RECs).

To be eligible for use towards a renewable benchmark, RECs must originate from a renewable energy resources facility certified by the PUCO as an eligible energy generating facility. Thus, the proposed facility would likely qualify as an in-state renewable energy resource under the

AEPS, and therefore, it could contribute to assisting affected entities compliance with statutory requirements under the AEPS.

State and Local Tax

The project is anticipated to increase annual tax revenue for the local tax base, which includes Huron County, Greenwich Township, the Village of Greenwich, and the South Central School District. The Applicant is currently working with the Huron County Board of Commissioners in order to achieve compliance with the statutory requirements, set forth in Ohio Revised Code Chapter 5727.75, in order to qualify for an exemption on tangible personal property and real property as a qualified energy project. If exempted, the annual service payment in lieu of taxes is expected to be \$9,000 per megawatt of installed capacity, which would increase annual tax revenues by \$540,000 for a 60 MW facility.

Recommended Findings

Staff recommends that the Board find that the proposed facility would serve the public interest, convenience, and necessity, and therefore complies with the requirements specified in ORC Section 4906.10(A)(6), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for ORC Section 4906.10(A)(7)

AGRICULTURAL DISTRICTS

Pursuant to ORC Section 4906.10(A)(7), the Board must determine the facility's impact on the agricultural viability of any land in an existing agricultural district within the project area of the proposed utility facility. The agricultural district program was established under ORC Chapter 929. Agricultural district land is exempt from sewer, water, and electrical service tax assessments. Agricultural land can be classified as an agricultural district through an application and approval process that is administered through local county auditors' offices. Eligible land must be devoted exclusively to agricultural production or be qualified for compensation under a land conservation program for the preceding three calendar years. Furthermore, eligible land must be at least 10 acres or produce a minimum average gross annual income of \$2,500.

Approximately 26.6 acres of agricultural district land would be temporary disturbed by the construction of the facility and 4.4 acres of agricultural district land would be permanently converted from its current land use to house facility components. Staff notes that this agricultural district land is unremarkable comparable to contiguous parcels of land. Approximately 195.8 acres of land that is currently cultivated for agricultural production or utilized as pastureland would be temporarily impacted by the construction of the facility. 25.7 acres of such lands would be permanently converted from its current land use to house facility components.

Recommended Findings

The Staff recommends that the Board find that the impact of the proposed facility on the viability of existing agricultural land in an agricultural district has been determined, and therefore complies with the requirements specified in ORC Section 4906.10(A)(7), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this report entitled Recommended Conditions of Certificate.

Considerations for ORC Section 4906.10(A)(8)

WATER CONSERVATION PRACTICE

Pursuant to ORC Section 4906.10(A)(8), the proposed facility must incorporate maximum feasible water conservation practices, considering available technology and the nature and economics of the various alternatives.

Wind-powered electric generating facilities do not utilize water in the process of electricity production. Therefore, water consumption associated with the proposed electric generation equipment does not warrant specific conservation efforts. A potable water supply would be provided to the O&M building for project and personal needs of the employees using the facility, but the amount of water consumed for these purposes would be minimal.

Recommended Findings

The Staff recommends that the Board find that the requirements specified in ORC Section 4906.10(A)(8) are not applicable to this project.

IV. RECOMMENDED CONDITIONS OF CERTIFICATE

Following a review of the application filed by Greenwich Windpark, LLC and the record compiled to date in this proceeding, Staff recommends that a number of conditions become part of any certificate issued for the proposed facility. These recommended conditions may be modified as a result of public or other input received subsequent to issuance of this report.

GENERAL CONDITIONS

Staff recommends the following conditions to ensure conformance with the proposed plans and procedures as outlined in the case record to date, and to ensure compliance with all conditions listed in this staff report:

1. The Applicant shall install the facility, utilize equipment and construction practices, and implement mitigation measures as described in the application and as modified and/or clarified in supplemental filings, replies to data requests, and recommendations in this *Staff Report of Investigation*.
2. That the Applicant shall not commence construction of the Facility until it has a signed Interconnection Service Agreement with PJM, which includes construction, operation, and maintenance of system upgrades necessary to reliably and safely integrate the proposed generating Facility into the regional transmission system. The Applicant shall provide a letter stating that the Agreement has been signed or a copy of the signed Interconnection Service Agreement to the OPSB Staff.
3. The Applicant shall conduct a preconstruction conference prior to the start of any construction activities. Staff, the Applicant, and representatives of the primary contractor and all subcontractors for the project shall attend the preconstruction conference. The conference shall include a presentation of the measures to be taken by the Applicant and contractors to ensure compliance with all conditions of the certificate, and discussion of the procedures for on-site investigations by Staff during construction. Prior to the conference, the Applicant shall provide a proposed conference agenda for Staff review. The Applicant may conduct separate preconstruction meetings for each stage of construction.
4. All changes outside the environmental survey areas and any changes within environmentally-sensitive areas shall be subject to staff review and approval prior to construction in those areas and shall be provided to staff in hard copy and as geographically-referenced electronic data.
5. Within 60 days after the commencement of commercial operation, the Applicant shall submit to Staff a copy of the as-built specifications for the entire facility. If the Applicant demonstrates that good cause prevents it from submitting a copy of the as-built specifications for the entire facility within 60 days after commencement of commercial operation, it may request an extension of time for the filing of such as-built specifications. The Applicant shall use reasonable efforts to provide as-built drawings in both hard copy and as geographically-referenced electronic data.

6. The certificate shall become invalid if the Applicant has not commenced a continuous course of construction of the proposed facility within five years of the date of journalization of the certificate.
7. As the information becomes known, the Applicant shall provide to Staff the date on which construction will begin, the date on which construction was completed, and the date on which the facility begins commercial operation.
8. Prior to the commencement of construction activities that require permits or authorizations by federal or state laws and regulations, the Applicant shall obtain and comply with such permits or authorizations. The Applicant shall provide copies of permits and authorizations, including all supporting documentation, to Staff within seven days of issuance or receipt by the Applicant. The Applicant shall provide a schedule of construction activities and acquisition of corresponding permits for each activity at the preconstruction conference.
9. At least 30 days before the preconstruction conference, the Applicant shall submit to Staff, for review and acceptance, one set of detailed engineering drawings of the final project design, including the facility, temporary and permanent access roads, any crane routes, construction staging areas, and any other associated facilities and access points, so that Staff can determine that the final project design is in compliance with the terms of the certificate. The final project layout shall be provided in hard copy and as geographically-referenced electronic data. The final design shall include all conditions of the certificate and references at the locations where the Applicant and/or its contractors must adhere to a specific condition in order to comply with the certificate.
10. If construction has commenced at a turbine location and it is determined that the location is not a viable turbine site, that site shall be restored to its original condition within 30 days.

SOCIOECONOMIC CONDITIONS

Staff recommends the following conditions to address the impacts discussed in the **Socioeconomic Impacts** section of the Nature of Probable Environmental Impact:

11. The Applicant shall avoid, where possible, or minimize to the maximum extent practicable, any damage to field tile drainage systems and soils resulting from construction, operation, and/or maintenance of the facility in agricultural areas. A log of all field tile drainage systems damaged resulting from the construction, operation, and/or maintenance of the facility shall be maintained with coordinates of each location. Damaged field tile systems shall be promptly repaired to at least original conditions at the Applicant's expense. If applicable, excavated topsoil shall be segregated and restored in accordance with the Applicant's lease agreement with the landowner. Severely compacted soils shall be plowed or otherwise de-compacted, if necessary, to restore them to original conditions unless otherwise agreed to by the landowner.
12. That prior to commencement of construction, the Applicant shall finalize a Phase I cultural resources survey program for archaeological work at turbine locations, access roads, substations, collection lines and laydown areas acceptable to Staff. If the resulting

survey work discloses a find of cultural or archaeological significance, or a site that could be eligible for inclusion on the National Register of Historic Places, then the Applicant shall submit an amendment, modification, or mitigation plan for Staff's acceptance. Any such mitigation effort, if needed, shall be developed in coordination with the Ohio Historic Preservation Office with input from applicable local preservation officials and submitted to Staff for review and acceptance.

13. That prior to the commencement of construction, the Applicant shall conduct a targeted architectural survey of the project area. The Applicant shall finalize a work program that outlines areas to be studied in the project area in coordination with OPSB Staff and the Ohio Historic Preservation Office. If the architectural survey discloses a find of cultural or architectural significance, or a structure that could be eligible for inclusion on the National Register of Historic Places, then the Applicant shall submit an amendment, modification, or mitigation plan for Staff's acceptance. Any such mitigation effort, if needed, shall be developed in coordination with the Ohio Historic Preservation Office with input from applicable local preservation officials and submitted to Staff for review and acceptance.
14. No commercial signage or advertisements shall be located on any turbine, tower, or related infrastructure. If vandalism should occur, the Applicant shall remove or abate the damage within 30 days of discovery or as extended by OPSB Staff for good cause shown, to preserve the aesthetics of the project. Any abatement other than the restoration to pre-vandalism condition is subject to review by Staff to ensure compliance with this condition.
15. The facility shall be operated so that the facility noise contribution does not result in noise levels at the exterior of any currently existing non-participating sensitive receptor that exceed the project area ambient nighttime L_{EQ} (46 dBA) by five dBA. During daytime operation only (7:00 a.m. to 10:00 p.m.), the facility may operate at the greater of: (a) the project area ambient nighttime L_{EQ} (46 dBA) plus five dBA; or, (b) the validly measured ambient L_{EQ} plus five dBA at the location of the sensitive receptor. After commencement of commercial operation, the Applicant shall conduct further review of the impact and possible mitigation of all facility-related noise complaints through its complaint resolution process.
16. The facility shall be operated so that the facility shadow flicker contribution does not result in shadow flicker levels that exceed 30 hours per year for any non-participating sensitive receptor. The Applicant shall confirm with staff that minimization measure or mitigation has been completed for the two receptors that the model and site specific analysis showed to be in excess of 30 hours per year of shadow flicker. The analysis shall show how modeled shadow flicker impacts have been reduced to 30 or fewer hours per year for each such receptor. The analysis shall be provided to Staff at least 30 days prior to the preconstruction conference, for review and confirmation that it complies with this condition. This analysis may incorporate shadow flicker reductions from trees, vegetation, buildings, obstructions, turbine line of sight, operational hours, wind direction, sunshine probabilities, and other mitigation confirmed by Staff to be in compliance with this condition. After commencement of commercial operation, the

Applicant shall conduct further review of the impact and possible mitigation of all facility-related shadow flicker complaints through its complaint resolution process.

17. General construction activities shall be limited to the hours of 7:00 a.m. to 7:00 p.m., or until dusk when sunset occurs after 7:00 p.m. Impact pile driving, hoe ram, and blasting operations, if required, shall be limited to the hours between 10:00 a.m. to 5:00 p.m., Monday through Friday. Construction activities that do not involve noise increases above ambient levels at sensitive receptors are permitted outside of daylight hours when necessary. If the Applicant seeks to conduct construction activities on an emergency basis between the hours of 7:00 p.m. or from dusk when sunset occurs after 7:00 p.m. to 7:00 a.m., that will involve noise increases above ambient levels, the Applicant shall submit for Staff approval a plan that includes, but is not limited to, the following, a description of planned construction activities, the length of time for the emergency construction, noise model results for affected non-participating receptors, a list of affected non-participating receptors, a mitigation plan for non-participating receptors that will be impacted by noise increases above ambient levels, and a plan for noise monitoring at affected non-participating receptors. The Applicant shall notify property owners or affected tenants within the meaning of OAC Rule 4906-5-08(C)(3), of upcoming construction activities including potential for nighttime construction activities.
18. The Applicant shall develop a complaint resolution process that shall include procedures for responding to complaints during construction and operation of the facility. The complaint resolution process shall include procedures by which complaints can be made by the public, how complaints will be tracked by the Applicant, steps that will be taken to interact with the complainant and respond to the complaint, steps that will be taken to verify the merits of the complaint, and steps that will be taken to mitigate valid complaints. Mitigation, if required, shall consist of either reducing the impact so that the facility contribution does not exceed the requirements of the certificate, or other means of mitigation reviewed by Staff for confirmation that it complies with this condition.

ECOLOGICAL CONDITIONS

Staff recommends the following conditions to address the impacts discussed in the **Ecological Impacts** section of the Nature of Probable Environmental Impact:

19. The Applicant shall have a construction access plan based on final plans for the access roads, and types of equipment to be used, that addresses the concerns outlined in this Staff Report of Investigation. Prior to commencement of construction, the Applicant shall submit the plan to Staff, for review and confirmation that it complies with this condition.
20. The Applicant shall have a vegetation management plan that addresses the concerns outlined in this Staff Report of Investigation. Prior to commencement of construction, the Applicant shall submit this plan to Staff, for review and confirmation that it complies with this condition.
21. For both construction and maintenance, the Applicant shall limit, to the greatest extent possible, the use of herbicides in proximity to surface waters. Individual treatment of tall-growing woody plant species is preferred, while general, widespread use of herbicides

during initial clearing or maintenance should only be used where no other options exist, and with prior approval from the Ohio EPA. Prior to commencement of construction, the Applicant shall submit a plan to Staff for review and confirmation that it complies with this condition, describing the planned herbicide use for all areas in or near any surface waters during initial project construction and/or maintenance.

22. The Applicant shall have a Staff-approved environmental specialist on site during construction activities that may affect sensitive areas, as mutually agreed upon between the Applicant and Staff, and as shown on the Applicant's final approved construction plan. Sensitive areas include, but are not limited to, areas of vegetation clearing, designated wetlands and streams, and locations of threatened or endangered species or their identified habitat. The environmental specialist shall be familiar with water quality protection issues and potential threatened or endangered species of plants and animals that may be encountered during project construction.
23. The Applicant shall contact Staff, ODNR, and the USFWS within 24 hours if state or federal species are encountered during construction activities. Construction activities that could adversely impact the identified plants or animals shall be halted until an appropriate course of action has been agreed upon by the Applicant, Staff, and ODNR in coordination with the USFWS. Nothing in this condition shall preclude agencies having jurisdiction over the facility with respect to wildlife from exercising their legal authority over the facility consistent with law.
24. Construction in Northern harrier preferred habitat types shall be avoided during the species' nesting period of May 15 to August 1.
25. The Applicant shall adhere to seasonal cutting dates (October 1 through March 31) to avoid clearing of habitat when breeding birds would be present and during bat maternity season.
26. Turbine blades shall be feathered (i.e., remain stationary or nearly stationary) at least until the manufacturer-set cut-in speed is reached, as a measure to minimize bat strikes at operating turbines.
27. Staff recommends that the Applicant consult with DOW to determine which streams in the project area could provide suitable habitat for mussels and follow DOW recommendations to minimize impacts to streams as it relates to mussels. If common or state-listed mussels are located during construction activities, the Staff recommends that DOW immediately be consulted for further action.
28. Sixty days prior to the first turbine becoming commercially operational, the Applicant shall submit a post-construction avian and bat monitoring plan for DOW and OPSB Staff review and acceptance. The Applicant shall also provide the monitoring plan to and seek confirmation from the USFWS. The Applicant's plan shall be consistent with ODNR-approved, standardized protocol, as outlined in ODNR's On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio. The Applicant shall obtain the necessary permits from ODNR and USFWS to collect bat and migratory bird carcasses. The post-construction monitoring shall begin within two weeks of operation and be conducted for a minimum of two seasons (April 1 to

November 15), which may be split between calendar years. If monitoring is initiated after April 1 and before November 15, then portions of the first season of monitoring will extend into the second calendar year (e.g., start monitoring on July 1 and continue to November 15; resume monitoring April 1 and continue to June 30). The Applicant may request that the second monitoring season be waived at the discretion of ODNR and OPSB Staff. The monitoring start date and reporting deadlines shall be provided in the DOW approval letter and the OPSB concurrence letter. If it is determined that significant mortality, as defined in ODNR's approved, standardized protocols, has occurred to birds and/or bats, the Applicant understands that the DOW and OPSB Staff will require the Applicant to develop a mitigation plan. If required, The Applicant shall submit a mitigation plan to the DOW and OPSB Staff for review and approval within 30 days from the date reflected on ODNR letterhead, in coordination with OPSB Staff, in which the DOW is requiring the Applicant to mitigate for significant mortality to birds and/or bats. Mitigation initiation timeframes will be outlined in the DOW approval letter and the OPSB concurrence letter

29. At least 60 days prior to the first turbine becoming operational, the Applicant shall obtain a technical assistance letter from the USFWS. The technical assistance letter shall include feathering of turbines during low wind speed conditions at night during migratory seasons. This documentation shall be reviewed by Staff to confirm compliance with this condition.

PUBLIC SERVICES, FACILITIES, AND SAFETY CONDITIONS

Staff recommends the following conditions to address the impacts discussed in the **Public Services, Facilities, and Safety** section of the Nature of Probable Environmental Impact:

30. The Applicant shall complete a full detailed geotechnical exploration and evaluation at each turbine site to confirm that there are no issues to preclude development of the wind farm. The geotechnical exploration and evaluation shall include borings at each turbine location to provide subsurface soil properties, static water level, rock quality description (RQD), percent recovery, and depth and description of the bedrock contact and recommendations needed for the final design and construction of each wind turbine foundation, as well as the final location of the transformer substation and interconnection substation. The Applicant must fill all boreholes, and borehole abandonment must comply with state and local regulations. The Applicant shall provide copies of all geotechnical boring logs to Staff and to the ODNR Division of Geological Survey prior to construction.
31. The Applicant shall adhere to a setback distance of at least 1.1 times the total height of the turbine structure, as measured from its tower's base (excluding the subsurface foundation) to the tip of its highest blade, from any gas or hazardous liquid pipeline in the ground at the time of commencement of construction.
32. The Applicant shall comply with the turbine manufacturer's most current safety manual and shall maintain a copy of that safety manual in the O&M building of the facility.
33. At least 30 days before the preconstruction conference, the Applicant shall submit to Staff for review and confirmation that it complies with this condition, a proposed

emergency and safety plan to be used during construction, to be developed in consultation with the fire department(s) having jurisdiction over the area.

34. Before the first turbine is operational, the Applicant shall submit to Staff for review and confirmation that it complies with this condition, a fire protection and medical emergency plan to be used during operation of the facility, which shall be developed in consultation with the first responders having jurisdiction over the area.
35. The Applicant shall instruct workers on the potential hazards of ice conditions on wind turbines and install and utilize an ice warning system that may include an ice detector installed on the roof of the nacelle, manufacturer warranted ice detection software for the wind turbine controller, or an ice sensor alarm that triggers an automatic shutdown.
36. Within six months of commencement of operation of the facility. The Applicant shall register the as-built locations of all underground collection lines with the Ohio Utilities Protection Service. The Applicant shall also register with the Ohio Oil and Gas Producers Underground Protection Service, if it operates in the project area. Confirmation of registration(s) shall be provided to Staff.
37. Should site-specific conditions warrant blasting, the Applicant shall submit a blasting plan, at least 60 days prior to blasting, to Staff for review and confirmation that it complies with this condition. The Applicant shall submit the following information as part of its blasting plan:
 - A. The name, address, and telephone number of the drilling and blasting company.
 - B. A detailed blasting plan for dry and/or wet holes for a typical shot. The blasting plan shall address blasting times, blasting signs, warnings, access control, control of adverse effects, and blast records.
 - C. A plan for liability protection and complaint resolution.
38. The blasting contractor shall utilize two blasting seismographs that measure ground vibration and air blast for each blast. One seismograph shall be placed at the nearest dwelling and the other placed at the discretion of the blasting contractor.
39. At least 30 days prior to the initiation of blasting operations, the Applicant must notify, in writing, all residents or owners of dwellings or other structures within 1,000 feet of the blasting site. The Applicant or explosive contractor shall offer and conduct a pre-blast survey of each dwelling or structure within 1,000 feet of each blasting site, unless waived by the resident or property owner. The survey must be completed and submitted to Staff at least 10 days before blasting begins.
40. Prior to the use of explosives, the Applicant or explosive contractor shall obtain all required local, state, and federal licenses/permits. The Applicant shall submit a copy of the license or permit to Staff within seven days of obtaining it from the local authority.
41. The Applicant shall monitor the microwave paths to ensure there are no adverse impacts. At least 30 days prior to the preconstruction conference, the Applicant shall conduct a microwave path study that identifies all existing microwave paths that intersect the

selected route, and a worst-case Fresnel zone analysis for each path. A copy of this study shall be provided to the path licensee(s), for review, and to Staff for review and confirmation that the Applicant is complying with this condition. The assessment shall conform to the following requirements:

- A. An independent and registered surveyor, licensed to survey within the state of Ohio, shall determine the exact locations and worst-case Fresnel zone dimensions of all known microwave paths or systems operating within the project area, including all paths and systems identified by the electric service providers that operate within the project area. In addition, the surveyor shall determine the center point of all turbines within 1,000 feet of the worst-case Fresnel zone of each system, using the same survey equipment.
 - B. Provide the distance in feet between the nearest rotor blade tip of each surveyed turbine identified within section (a) above and the surveyed worst-case Fresnel zone of each microwave system path.
 - C. Provide a map of the surveyed microwave paths, center points, and boundaries at a legible scale.
 - D. Describe the specific, expected impacts of the project on all paths and systems considered in the assessment.
42. All existing licensed microwave paths, Doppler weather radar systems, and licensed communication systems shall be subject to avoidance or mitigation. The Applicant shall complete avoidance or mitigation measures prior to commencement of construction for impacts that can be predicted in sufficient detail to implement appropriate and reasonable avoidance and mitigation measures. After construction, the Applicant shall mitigate all observed impacts of the project to microwave paths, Doppler weather radar systems, and licensed communication systems within seven days or within a longer time period acceptable to Staff. Avoidance and mitigation for any known point-to-point microwave paths, Doppler weather radar systems, and licensed communication systems shall consist of measures acceptable to Staff, the Applicant, and the affected path owner, operator, or licensee. If interference with an omni-directional or multi-point system is observed after construction, mitigation would be required only for affected receptors.
43. Prior to commencement of construction activities that require transportation permits, the Applicant shall obtain all such permits. The Applicant shall coordinate with the appropriate authority regarding any temporary or permanent road closures, lane closures, road access restrictions, and traffic control necessary for construction and operation of the proposed facility. Coordination shall include, but not be limited to, the county engineer, Ohio Department of Transportation, local law enforcement, and health and safety officials. This coordination shall be detailed as part of a final traffic plan submitted to Staff prior to the preconstruction conference for review and confirmation that it complies with this condition.
44. The Applicant shall provide the final delivery route plan and the results of any traffic studies to Staff and the County Engineer(s) 30 days prior to the preconstruction conference. The Applicant shall complete a study on the final equipment delivery route to

determine what improvements will be needed in order to transport equipment to the wind turbine construction sites. The Applicant shall make all improvements outlined in the final delivery route plan prior to equipment and wind turbine delivery. The Applicant's delivery route plan and subsequent road modifications shall include, but not be limited to, the following:

- A. Perform a survey of the final delivery routes to determine the exact locations of vertical constraints where the roadway profile will exceed the allowable bump and dip specifications and outline steps to remedy vertical constraints.
 - B. Identify locations along the final delivery routes where overhead utility lines may not be high enough for over-height permit loads and coordinate with the appropriate utility company if lines must be raised.
 - C. Identify roads and bridges that are not able to support the projected loads from delivery of the wind turbines and other facility components and make all necessary upgrades.
 - D. Identify locations where wide turns would require modifications to the roadway and/or surrounding areas and make all necessary alterations. Any alterations for wide turns shall be removed and the area restored to its preconstruction condition unless otherwise specified by the County Engineer(s).
45. The Applicant shall repair damage to government-maintained (public) roads and bridges caused by construction or maintenance activity. Any damaged public roads and bridges shall be repaired promptly to their previous condition by the Applicant under the guidance of the appropriate regulatory agency. Any temporary improvements shall be removed unless the County Engineer(s) request that they remain. The Applicant shall provide financial assurance to the counties that it will restore the public roads it uses to their condition prior to construction or maintenance. The Applicant shall also enter into a Road Use Agreement with the County Engineer(s) prior to construction and subject to Staff review and confirmation that it complies with this condition. The Road Use Agreement shall contain provisions for the following:
- A. A preconstruction survey of the conditions of the roads.
 - B. A post-construction survey of the condition of the roads.
 - C. An objective standard of repair that obligates the Applicant to restore the roads to the same or better condition as they were prior to construction.
 - D. A timetable for posting of the construction road and bridge bond prior to the use or transport of heavy equipment on public roads or bridges.
46. The facility owner and/or operator shall repair damage to government-maintained (public) roads and bridges caused by decommissioning activity. Any damaged public roads and bridges shall be repaired promptly to their pre-decommissioning state by the facility owner and/or operator under the guidance of the appropriate regulatory agency. The Applicant shall provide financial assurance to the counties that it will restore the public roads and bridges it uses to their pre-decommissioning condition. These terms

shall be defined in a road use agreement between the Applicant and the County Engineer(s) prior to construction. The road use agreement shall be subject to Staff review and confirmation that it complies with this condition, and shall contain provisions for the following:

- A. A pre-decommissioning survey of the condition of public roads and bridges conducted within a reasonable time prior to decommissioning activities.
 - B. A post-decommissioning survey of the condition of public roads and bridges conducted within a reasonable time after decommissioning activities.
 - C. An objective standard of repair that obligates the facility owner and/or operator to restore the public roads and bridges to the same or better condition as they were prior to decommissioning.
 - D. A timetable for posting of the decommissioning road and bridge bond prior to the use or transport of heavy equipment on public roads or bridges.
47. The Applicant, facility owner, and/or facility operator shall comply with the following conditions regarding decommissioning:
- A. The Applicant, facility owner, and/or facility operator shall provide the final decommissioning plan to Staff and the county engineer(s) for review and confirmation of compliance with this condition, at least 30 days prior to the preconstruction conference. The plan shall:
 - (i) Indicate the intended future use of the land following reclamation.
 - (ii) Describe the following: engineering techniques and major equipment to be used in decommissioning and reclamation; a surface water drainage plan and any proposed impacts that would occur to surface and ground water resources and wetlands; and a plan for backfilling, soil stabilization, compacting, and grading.
 - (iii) Provide a detailed timetable for the accomplishment of each major step in the decommissioning plan, including the steps to be taken to comply with applicable air, water, and solid waste laws and regulations and any applicable health and safety standards in effect as of the date of submittal.
 - B. The Applicant, facility owner and/or facility operator shall file a revised decommissioning plan to the Staff and the county engineer(s) every 5 years from the commencement of construction. The revised plan shall reflect advancements in engineering techniques and reclamation equipment and standards. The revised plan shall be applied to each five-year decommissioning cost estimate. Prior to implementation, the decommissioning plan and any revisions shall be reviewed by Staff to confirm compliance with this condition.
 - C. The Applicant, facility owner and/or facility operator shall, at its expense, complete decommissioning of the facility, or individual wind turbines, within 12 months after the end of the useful life of the facility or individual wind turbines. If

no electricity is generated for a continuous period of 12 months, or if the Board deems the facility or turbine to be in a state of disrepair warranting decommissioning, the wind energy facility or individual wind turbines will be presumed to have reached the end of its useful life. The Board may extend the useful life period for the wind energy facility or individual turbines for good cause as shown by the Applicant, facility owner and/or facility operator. The Board may also require decommissioning of individual wind turbines due to health, safety, wildlife impact, or other concerns that prevent the turbine from operating within the terms of the Certificate.

- D. Decommissioning shall include the removal and transportation of the wind turbines off site. Decommissioning shall also include the removal of buildings, cabling, electrical components, access roads, and any other associated facilities, unless otherwise mutually agreed upon by the Applicant, facility owner and/or facility operator and the landowner. All physical material pertaining to the facility and associated equipment shall be removed to a depth of at least 36 inches beneath the soil surface and transported off site. The disturbed area shall be restored to the same physical condition that existed before erection of the facility. Damaged field tile systems shall be repaired to the satisfaction of the property owner.
- E. During decommissioning, all recyclable materials, salvaged and non-salvaged, shall be recycled to the furthest extent practicable. All other non-recyclable waste materials shall be disposed of in accordance with state and federal law.
- F. The facility owner and/or facility operator shall not remove any improvements made to the electrical infrastructure if doing so would disrupt the electric grid, unless otherwise approved by the applicable regional transmission organization and interconnection utility.
- G. Subject to confirmation of compliance with this condition by Staff, and seven days prior to the preconstruction conference, an independent, registered Professional Engineer, licensed to practice engineering in the state of Ohio, shall be retained by the Applicant, facility owner, and/or facility operator to estimate the total cost of decommissioning in current dollars, without regard to salvage value of the equipment. Said estimate shall include: (1) an identification and analysis of the activities necessary to implement the most recent approved decommissioning plan including, but not limited to, physical construction and demolition costs assuming good industry practice and based on ODOT's Procedure for Budget Estimating and RS Means material and labor cost indices or any other publication or guidelines approved by Staff; (2) the cost to perform each of the activities; (3) an amount to cover contingency costs, not to exceed 10 percent of the above calculated reclamation cost. Said estimate will be converted to a per-turbine basis (the "Decommissioning Costs"), calculated as the total cost of decommissioning of all facilities as estimated by the Professional Engineer divided by the number of turbines in the most recent facility engineering drawings. This estimate shall be conducted every five years by the facility owner and/or facility operator.

- H. The Applicant, facility owner and/or facility operator shall post and maintain for decommissioning, at its election, funds, a surety bond, or similar financial assurance in an amount equal to the per-turbine Decommissioning Costs multiplied by the sum of the number of turbines constructed and under construction. The funds, surety bond, or financial assurance need not be posted separately for each turbine so long as the total amount reflects the aggregate of the Decommissioning Costs for all turbines constructed or under construction. For purposes of this condition, a turbine is considered to be under construction at the commencement of excavation for the turbine foundation. The form of financial assurance or surety bond shall be a financial instrument mutually agreed upon by the Board and the Applicant, the facility owner, and/or the facility operator. The financial assurance shall ensure the faithful performance of all requirements and reclamation conditions of the most recently filed and approved decommissioning and reclamation plan. At least 30 days prior to the preconstruction conference, the Applicant, the facility owner, and/or the facility operator shall provide an estimated timeline for the posting of decommissioning funds based on the construction schedule for each turbine. Prior to commencement of construction, the Applicant, the facility owner, and/or the facility operator shall provide a statement from the holder of the financial assurance demonstrating that adequate funds have been posted for the scheduled construction. Once the financial assurance is provided, the Applicant, facility owner and/or facility operator shall maintain such funds or assurance throughout the remainder of the applicable term and shall adjust the amount of the assurance, if necessary, to offset any increase or decrease in the Decommissioning Costs.
- I. The decommissioning funds, surety bond, or financial assurance shall be released by the holder of the funds, bond, or financial assurance when the Applicant, facility owner and/or facility operator has demonstrated, and the Board concurs, that decommissioning has been satisfactorily completed, or upon written approval of the Board, in order to implement the decommissioning plan.

AIR, WATER, SOLID WASTE, AND AVIATION CONDITIONS

Staff recommends the following conditions to address the requirements discussed in Air, Water, Solid Waste, and Aviation:

48. At least seven days before the preconstruction conference, the Applicant shall submit to Staff, for review and acceptance, a copy of all NPDES permits including its approved SWPPP, approved SPCC procedures, and its erosion and sediment control plan. Any soil issues must be addressed through proper design and adherence to the Ohio EPA BMPs related to erosion and sedimentation control.
49. The Applicant shall meet all recommended and prescribed FAA and ODOT Office of Aviation requirements to construct an object that may affect navigable airspace. This includes submitting coordinates and heights for all towers exceeding 200 feet AGL for ODOT Office of Aviation and FAA review prior to construction, and the non-penetration of any FAA Part 77 surfaces.

50. All applicable structures, including construction equipment, shall be lit in accordance with FAA circular 70/7460-1 K Change 2, Obstruction Marking and Lighting; or as otherwise prescribed by the FAA. This includes all cranes and construction equipment.
51. The Applicant shall remove all temporary gravel and other construction staging area and access road materials after completion of construction activities, as weather permits, unless otherwise directed by the landowner. Impacted areas shall be restored to preconstruction conditions in compliance with the NPDES permit(s) obtained for the project and the approved SWPPP created for this project.
52. The Applicant shall not dispose of gravel or any other construction material during or following construction of the facility by spreading such material on agricultural land. All construction debris and all contaminated soil shall be promptly removed and properly disposed of in accordance with Ohio EPA regulations.
53. The Applicant shall comply with fugitive dust rules by the use of water spray or other appropriate dust suppressant measures whenever necessary.

APPENDIX

1. DOCKETING RECORD

CASE NUMBER: 13-0990-EL-BGN

DESCRIPTION: Greenwich Windpark

FILINGS AS OF: April 18, 2014

Date Filed	Summary
03/28/2014	Response of 6011 Greenwich Windpark to Staff Data Requests electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
03/25/2014	Proof of Pub of 6011 Greenwich Windpark, LLC electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
03/13/2014	Correspondence 6011 Greenwich Windpark, LLC electronically filed by Teresa Orahod on behalf of Sally Bloomfield
03/10/2014	Administrative Law Judge Entry granting Ohio Farm Bureau Federation's motion to intervene, scheduling this matter for a local public hearing on May 6, 2014, at 6:00 p.m., at South Central High School, 3305 Greenwich Angling Road, Greenwich, Ohio and an adjudicatory hearing on May 19, 2014, at 10:00 a.m., at the offices of the Public Utilities Commission of Ohio, 180 East Broad Street, Columbus, Ohio and establishing a procedural schedule; electronically filed by Vesta R. Miller on behalf of Greta See, Administrative Law Judge, Ohio Power Siting Board.
03/10/2014	Service Notice
02/27/2014	Notice of Payment of 6011 Greenwich Windpark, LLC of OPSB Application Fee electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
02/21/2014	Correspondence Proof of Service of Application on Local Public Officials and Libraries electronically filed by Teresa Orahod on behalf of Sally Bloomfield
02/19/2014	Letter to Monica Jensen, Windlab Development USA Ltd that the application filed with the OPSB is in compliance filed by T. Snitchler, OPSB Chairman.
01/09/2014	Motion to Intervene and Memorandum in Support electronically filed by Mr. Chad A Endsley on behalf of Ohio Farm Bureau Federation, Inc.
12/27/2013	Application of 6022 Greenwich Windpark, LLC - Exhibit V electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/27/2013	Application of 6022 Greenwich Windpark, LLC - Exhibit U electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/27/2013	Application of 6022 Greenwich Windpark, LLC - Exhibit T electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/27/2013	Application of 6022 Greenwich Windpark, LLC - Exhibit Exhibits Q, R and S electronically filed by Teresa Orahod on behalf of Sally Bloomfield.

12/27/2013	Application of 6022 Greenwich Windpark, LLC - Exhibit J electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit P electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibits M, N, and O electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit K electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit X electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit W, Part V electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit W, Part IV electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit W, Part III electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit W, Part II electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit W, Part I electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit L, Part II electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/24/2013	Application Of 6011 Greenwich Windpark, LLC - Exhibit L, Part I electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/23/2013	Application of 6011 Greenwich Windpark, LLC - Exhibits F, G and H electronically filed by Teresa Orahod on behalf of Sally Bloomfield
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Exhibit E (Part 5 of 5) electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Exhibit E (Part 4 of 5) electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Exhibit E (Part 3 of 5) electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Exhibit E (Part 2 of 5) electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Exhibit E (Part 1 of 5) electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Exhibits A, B, C and D electronically filed by Teresa Orahod on behalf of Sally Bloomfield.

12/23/2013	Application of 6011 Greenwich Windpark, LLC – Figures 05-3; 05-4; 08-1; 08-2 and 08-3 electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Figures 03-1; 04-1; 05-2 and 05-3 electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/23/2013	Application of 6011 Greenwich Windpark, LLC – Application Body Text electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
12/09/2013	Correspondence of 6011 Greenwich Wind Park, LLC Submitting for Filing updated Agricultural District Maps electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
11/15/2013	Correspondence of 6011 Greenwich Wind Park, LLC Submitting for Filing Agricultural District Maps Pursuant to OAC Rule 4906-17-08(F)(1) electronically filed by Teresa Orahod on behalf of Sally Bloomfield
06/17/2013	Service Notice
06/17/2013	Administrative Law Judge Entry granting waiver requests; electronically filed by Vesta R. Miller on behalf of Greta See, Administrative Law Judge, Ohio Power Siting Board.
06/13/2013	Response to request for waiver electronically filed by Mrs. Tonnetta Y. Scott on behalf of PUCO.
05/28/2013	Proof of Pub of 6011 Greenwich Windpark, LLC in Norwalk Reflector and Greenwich Enterprise Review electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
04/19/2013	Motion for Waivers and Memorandum in Support electronically filed by Teresa Orahod on behalf of Sally Bloomfield.
04/19/2013	In the matter of the Application for 6011 Greenwich Windpark, LLC for its Proposed Wind Farm electronically filed by Teresa Orahod on behalf of Sally Bloomfield.

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

4/18/2014 4:12:15 PM

in

Case No(s). 13-0990-EL-BGN

Summary: Report of investigation electronically filed by Mr. Adam S Bargar on behalf of Staff of OPSB