

Staff Report of Investigation

Seneca Wind Farm
Seneca Wind, LLC

Case No. 18-0488-EL-BGN

July 3, 2019



Power Siting
Board

Mike DeWine, Governor | Sam Randazzo, Chairman

In the Matter of the Application of Seneca Wind, LLC)
for a Certificate to Site a Wind-Powered Electric) **Case No. 18-0488-EL-BGN**
Generation Facilities in Seneca County, Ohio)

Staff Report of Investigation

Submitted to the
OHIO POWER SITING BOARD

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

In the Matter of the Application of Seneca Wind, LLC)
for a Certificate to Site a Wind-Powered Electric) **Case No. 18-0488-EL-BGN**
Generation Facilities in Seneca County, Ohio)

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

To the Honorable Power Siting Board:

In accordance with the Ohio Revised Code (R.C.) 4906.07(C) and rules of the Ohio Power Siting Board (Board), the staff of the Public Utilities Commission of Ohio (Staff) has completed its investigation in the above matter and submits its findings and recommendations in this Staff Report for consideration by the Board.

The findings and recommendations contained in this report are the result of Staff coordination with the following agencies that are members of the Board: 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, 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 U.S. Coast Guard.

In accordance with R.C. 4906.07(C) and 4906.12, copies of this Staff Report have been filed with the Docketing Division of the Public Utilities Commission of Ohio and served upon the Applicant or its authorized representative, the parties of record, and pursuant to Ohio Administrative Code 4906-3-06, the main public libraries of the political subdivisions in the project area.

The Staff Report presents the results of Staff's investigation conducted in accordance with R.C. 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,



Tamara S. Turkenton
Director, Rates and Analysis
Public Utilities Commission of Ohio

TABLE OF CONTENTS

| | |
|---|----|
| I. POWERS AND DUTIES | 1 |
| Ohio Power Siting Board | 1 |
| Nature of Investigation..... | 1 |
| Criteria..... | 3 |
| II. APPLICATION..... | 5 |
| Applicant | 5 |
| History of the Application..... | 5 |
| Project Description..... | 8 |
| Project Maps..... | 10 |
| III. CONSIDERATIONS AND RECOMMENDED FINDINGS | 21 |
| Basis of Need | 21 |
| Nature of Probable Environmental Impact..... | 22 |
| Minimum Adverse Environmental Impact..... | 43 |
| Electric Grid | 46 |
| Air, Water, Solid Waste, and Aviation..... | 49 |
| Public Interest, Convenience, and Necessity | 54 |
| Agricultural Districts and Agricultural Land | 56 |
| Water Conservation Practice | 57 |
| IV. RECOMMENDED CONDITIONS OF CERTIFICATE..... | 59 |
| General Conditions..... | 59 |
| Socioeconomic Conditions..... | 60 |
| Ecological Conditions | 61 |
| Public Services, Facilities, and Safety Conditions..... | 63 |
| Air, Water, Solid Waste, and Aviation Conditions | 65 |

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I. POWERS AND DUTIES

OHIO POWER SITING BOARD

The authority of the Ohio Power Siting Board (Board or OPSB) is prescribed by Ohio Revised Code (R.C.) Chapter 4906. R.C. 4906.03 authorizes the Board to issue certificates of environmental compatibility and public need for the construction, operation, and maintenance of major utility facilities defined in R.C. 4906.01. Included within this definition of major utility facilities 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 of 100 kilovolts (kV) or more; and gas pipelines greater than 500 feet in length and more than nine inches in outside diameter, and associated facilities, designed for transporting gas at a maximum allowable operating pressure in excess of 125 pounds per square inch. In addition, pursuant to R.C. 4906.20, the Board authority applies to economically significant wind farms, defined in R.C. 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 5 MW or greater but less than 50 MW.

Membership of the Board is specified in R.C. 4906.02(A). The voting members include: the Chairman of the Public Utilities Commission of Ohio (PUCO or Commission) who serves as Chairman of the Board; the directors of the Ohio Environmental Protection Agency (Ohio EPA), the Ohio Department of Health, the Ohio Development Services Agency, the Ohio Department of Agriculture, 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 Board has promulgated rules and regulations, found in Ohio Administrative Code (Ohio Adm.Code) 4906:1-01 et seq., which establish application procedures for major utility facilities and economically significant 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 Board an application for a certificate of environmental compatibility and public need.¹ The application must include a description of the facility and its location, a 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 Applicant or Board may consider relevant.²

Within 60 days of receiving an application, the Chairman must determine whether the application is sufficiently complete to begin an investigation.³ If an application is considered complete, the Board or an administrative law judge will cause a public hearing to be held 60 to 90 days after the

1. R.C. 4906.04 and 4906.20.

2. R.C. 4906.06(A) and 4906.20(B)(1).

3. Ohio Adm.Code 4906-3-06(A).

official filing date of the completed application.⁴ At the public hearing, any person may provide written or oral testimony and may be examined by the parties.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.⁶ The report sets forth the nature of the investigation and contains the findings and conditions recommended by Staff.⁷ The Board's Staff, which consists of career professionals drawn from the staff of the PUCO and other member agencies of the Board, 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 Historic Preservation Office (OHPO), and the U.S. Fish and Wildlife Service (USFWS).

The technical investigations and evaluations are conducted pursuant to Ohio Adm.Code 4906-1-01 et seq. The recommended findings resulting from Staff's investigation are described in the Staff Report pursuant to R.C. 4906.07(C). The report does not represent the views or opinions of the Board 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, is served upon all parties to the proceeding and is made available to any person upon request.⁸ A record of the public hearings and all evidence, including the Staff Report, may be examined by the public at anytime.⁹

Board Decision

The Board may approve, modify and approve, or deny an application for a certificate of environmental compatibility and public need.¹⁰ If the Board 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 applicable standards and rules adopted under the Ohio Revised Code.¹¹

Upon rendering its decision, the Board 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.¹² A copy of the Board's decision and its opinion is memorialized upon the record and must be served upon all parties to the proceeding.¹³ Any party to the proceeding that believes its issues were not adequately addressed by the Board may submit within 30 days an application for rehearing.¹⁴ An entry on rehearing will be issued by the Board within 30 days and may be appealed within 60 days to the Supreme Court of Ohio.¹⁵

4. R.C. 4906.07(A) and Ohio Adm.Code 4906-3-08.

5. R.C. 4906.08(C).

6. R.C. 4906.07.

7. Ohio Adm.Code 4906-3-06(C).

8. R.C. 4906.07(C) and 4906.10.

9. R.C. 4906.09 and 4906.12.

10. R.C. 4906.10(A).

11. R.C. 4906.10.

12. R.C. 4906.11.

13. R.C. 4906.10(C).

14. R.C. 4903.10 and 4906.12.

15. R.C. 4903.11, 4903.12, and 4906.12.

CRITERIA

Staff developed the recommendations and conditions in this *Staff Report of Investigation* pursuant to the criteria set forth in R.C. 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 pipeline;
- (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 generating 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 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) to (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 alternative site; and
- (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.

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II. APPLICATION

APPLICANT

Seneca Wind, LLC is a subsidiary of sPower Development Company, LLC (sPower) which is a private owner and operator of solar and wind assets. In 2017, sPower was purchased as part of a joint acquisition by the AES Corporation (AES) and the Alberta Investment Management Corporation (AIMCo). AES is an electrical generating and distributing company, with operating subsidiaries in 15 countries around the world, including The Dayton Power & Light Company and AES Ohio Generation LLC, in Ohio. AIMCo is a Canadian investment-management corporation with an investment portfolio of \$100 billion.

HISTORY OF THE APPLICATION

Prior to formally submitting its application, the Applicant consulted with the Staff and representatives of the Board, regarding application procedures.

On April 12, 2018, the Applicant filed a pre-application notification letter regarding the project.

On April 17, 2018, the Applicant held a public informational meeting for the project at the Camden Falls Reception and Conference Center in Tiffin, Ohio

On July 16, 2018, the Applicant filed the application for the Seneca Wind Farm.

On July 20, 2018, the Applicant filed Appendix E, Traffic Management Plan, which was pending at the time the application was filed.

On September 7, 2018, the Applicant filed a response to the first set of interrogatories from Staff.

On September 14, 2018, the Applicant filed a motion for an extension of time of the completeness review period. On this date, the Applicant also filed supplemental information regarding changes or updates to its application.

On September 18, 2018, the Administrative Law Judge issued an entry granting motion for an extension of time of the completeness review period.

On October 15, 2018, the Director of Rates and Analysis, PUCO, issued a letter to the Applicant stating that the application had been found to comply with the requirements of Ohio Adm. Code 4906-01, et seq.

On October 25, 2018, the Applicant filed a response to the second set of interrogatories from Staff.

On November 13, 2018, Seneca County Residents and the Ohio Farm Bureau Federation filed motions to intervene.

On November 14, 2018, the boards of trustees of Eden, Reed, Scipio, and Venice townships filed notices of intervention.

On November 15, 2018, the Board of Education of Seneca East Local School District, Steve C. Shuff, and the Black Swamp Bird Observatory filed motions to intervene.

On November 27, 2018, the Board of County Commissioners, Seneca County filed a notice of intervention.

On December 3, 2018, the Applicant filed an updated aquatic resource report.

On December 7, 2018, the Administrative Law Judge issued an entry scheduling a local public hearing for this case to be held on February 19, 2019 at 3:00 p.m., at the Tiffin University, Marion Center, 235 Miami Street, Tiffin, Ohio 44883. The entry also scheduled an adjudicatory hearing to commence on March 6, 2019, at 10:00 a.m., 11th floor, Hearing Room 11-A, at the offices of the Public Utilities Commission of Ohio, 180 East Broad Street, Columbus, Ohio 43215.

On December 10, 2018, the Applicant filed an errata to the supplemental information filed on September 14, 2018.

On December 14, 2018, the Applicant filed a response to the third set of interrogatories from Staff.

On December 20, 2018, the Applicant filed a response to the fourth set of interrogatories from Staff.

On January 2, 2019, the Applicant filed a notice of project modifications and project information update.

On January 29, 2019, Seneca Wind and Staff filed a joint motion to suspend the procedural schedule.

On January 29, 2019, the Seneca County Park District filed a motion for leave to file a petition to intervene.

On February 1, 2019, the Administrative Law Judge issued an entry granting the motion to suspend the procedural schedule.

On February 7, 2019, the Administrative Law Judge issued an entry rescheduling the local public hearing in this case to begin at 3:00 p.m. on April 23, 2019 at Tiffin University, Marion Center, 235 Miami Street, Tiffin, Ohio 44883. The entry also rescheduled the adjudicatory hearing to commence on May 16, 2019, at 10:00 a.m., 11th Floor, Hearing Room A, at the offices of the Public Utilities Commission of Ohio, 180 East Broad Street, Columbus, Ohio 43215.

On February 12, 2019, the Applicant filed a notice of project modifications and project information update.

On March 27, 2019, the Administrative Law Judge granted the motions for intervention filed by Seneca County Residents, the Ohio Farm Bureau Federation, the Board of Education of Seneca East Local School District, Steve C. Shuff, and the Black Swamp Bird Observatory. The entry also accepted as timely the notices of intervention filed by the boards of trustees of Eden, Reed, Scipio, and Venice townships and accepted for good cause shown the untimely notice filed by the Board of County Commissioners, Seneca County.

On March 29, 2019, Board of Education of Seneca East Local School District filed answers, responses, and objections to interrogatories and requests for production of documents propounded by the Applicant.

On April 4, 2019, the Applicant and the Board's Staff filed an unopposed joint motion to suspend the procedural schedule and stay discovery and request for expedited treatment.

On April 5, 2019, the Administrative Law Judge granted in part, the Applicant's and Staff's motion to suspend the procedural schedule and stay discovery. Specifically, the Administrative Law Judge granted the motion and tolled the filing of the Staff report until July 3, 2019. The Administrative Law Judge will establish a new procedural schedule, including new dates for the local public hearing and the adjudicatory hearing, by subsequent entry.

On June 6, 2019, the Applicant filed a notice of project modifications and project information update.

This summary of the history of the application does not include every filing in Case No. 18-0488-EL-BGN. The docketing record for this case, which lists all documents filed to date, can be found online at <http://dis.puc.state.oh.us>.

PROJECT DESCRIPTION

The Applicant proposes to construct and operate the Seneca Wind farm with up to 77 wind turbines for a total generating capacity of up to 212 megawatts (MW) in Seneca County, east of Tiffin.

Project Area

The facility would be located in Scipio, Reed, Venice, Eden, and Bloom Townships in Seneca County. The project area is comprised of approximately 56,900 acres of land involving approximately 506 properties. The project area and proposed facilities are shown on the map in this report.

Wind Turbines

The Applicant proposes to use either Siemens Gamesa 2.7-129 (2.7 MW), General Electric GE 2.3-116 (2.3 MW), GE 2.8-127 (2.8 MW), or Vestas V110 (2.2MW) wind turbine models. At the time of the submittal of the application, the Applicant had proposed 94 turbine locations and evaluated all locations within the studies presented in their application. The number of turbines constructed would depend on the output of chosen model, but would not exceed 77 turbines. The proposed structures would consist of a three-bladed horizontal axis turbine and nacelle on top of a white or off-white tubular conical steel tower. The maximum height would be 584 feet with a maximum turbine hub height of 374 feet and a maximum blade length of 208 feet.

The Applicant expects that the annual energy production for Seneca Wind would be approximately 805,000 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 300 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, removal of forms, backfilling and compacting, and finally site restoration.

Suitable turbine foundation systems would be designed upon completion of the detailed geotechnical exploration, but the two most likely foundation types would be spread footing or rock-anchored pile foundations. These are commonly used foundation designs for wind turbines and would be reasonable to use at this proposed facility.

Based on the preliminary geological assessment of the project area, the Applicant does not anticipate that blasting would be necessary for foundation construction. Pursuant to Ohio Administrative Code (Ohio Adm.Code) 4906-4-09, should site-specific conditions warrant blasting, the Applicant would be required to submit a blasting plan to OPSB Staff for review and acceptance in advance of any blasting.

Electric Collection System

A 34.5 kV underground electric collection system would be installed to transfer the power from each wind turbine to a collection substation. The total length of the underground 34.5 kV collector lines carrying electricity to the collection substation would be up to 115 miles, and would be placed at a depth of between 3 to 4 feet. Collection line installation would be done with the use of a

trencher (direct burial), open trenching, or by horizontal directional drilling when needed to avoid impacts to wetlands.

The collector substation would step up voltage from 34.5 kV to 138 kV. An approximately 1.65 mile long 138 kV transmission line would connect the wind farm collector substation to the existing AEP Melmore substation. The 138 kV transmission line and associated collector substation are the subjects of a separate filing. The Board approved the collector substation and transmission line on February 11, 2019 (Ref: Case No. 18-1794-EL-BLN).

Operations and Maintenance Facility

The proposed wind farm would include an operations and maintenance (O&M) facility located along Township Road 86, east of State Route 67. The O&M facility would be used for office space, parking, and equipment/material storage.

Permanent Meteorological Towers

Up to four 440-foot tall permanent meteorological towers would be installed. These towers would be galvanized steel structures equipped with wind velocity directional measuring instruments at three different elevations, and with aviation warning lighting mounted at the top. Each tower would be a self-supporting, non-guyed, structure. The proposed sites for the meteorological towers are shown in the maps in this report.

Access Roads

Approximately 39 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

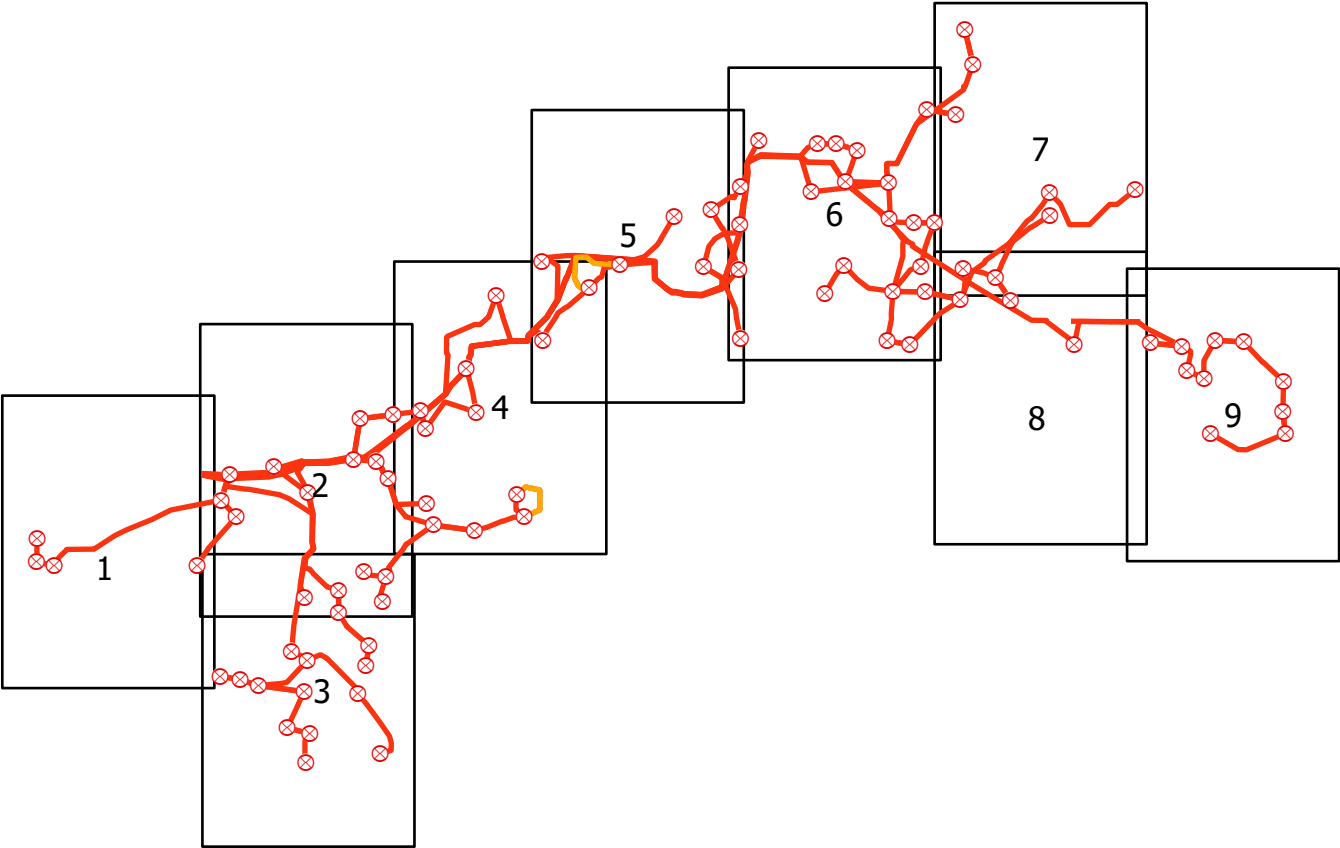
The Applicant generally intends to deliver materials directly to each turbine construction site, to the extent practicable. The Applicant also plans to use three temporary 10-acre laydown yards, for construction staging. These laydown yards would accommodate equipment/material storage, construction trailers, and construction worker parking. The proposed locations for the temporary laydown areas are shown in the maps in this report.

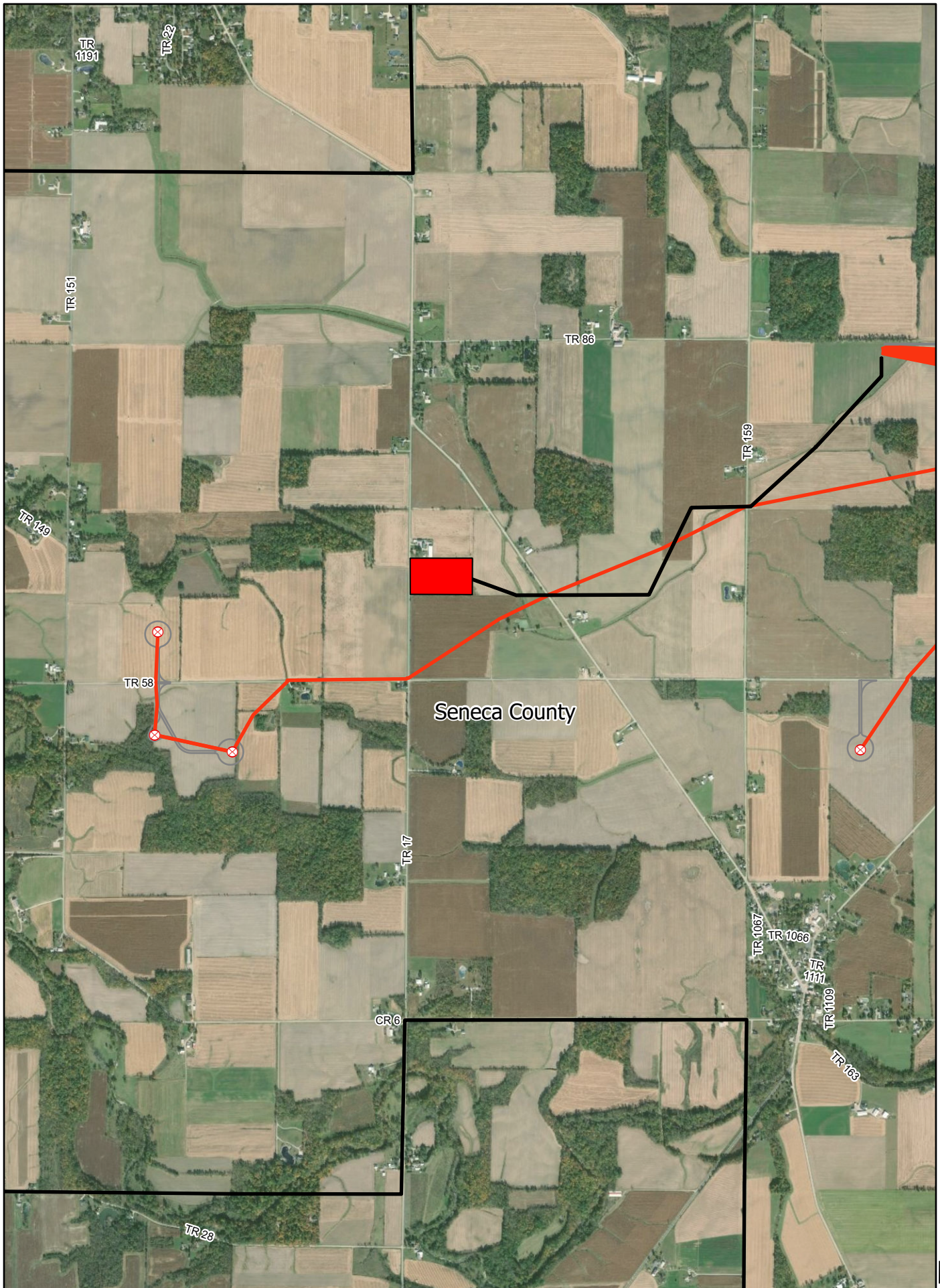
Construction Schedule

Construction was anticipated to begin in March 2019, and to be completed within 8 months.¹⁶ Staff requested an updated construction schedule, but has not received one as of the date of this report.

16. Application at Figure 03-4.

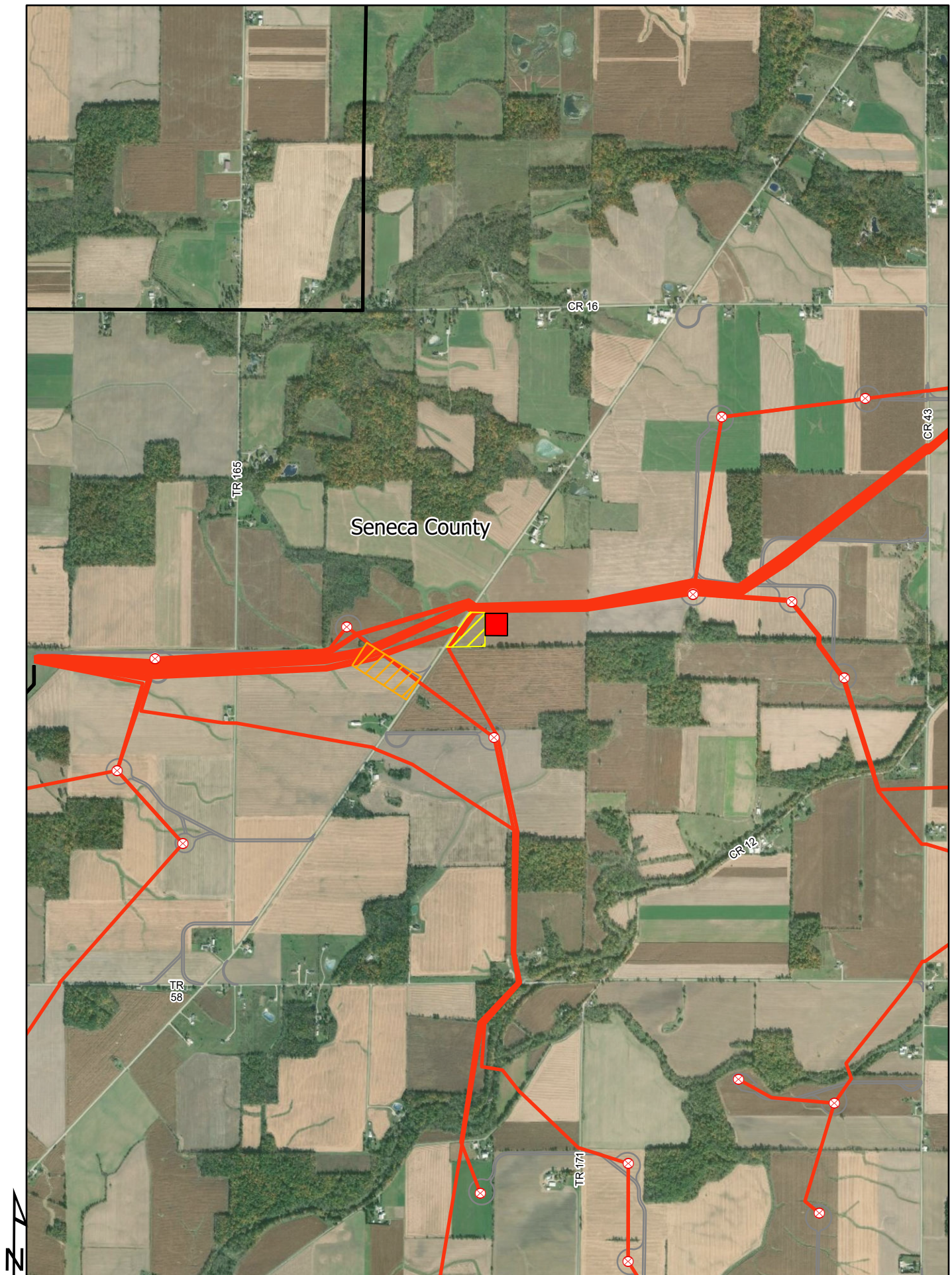
Map Index

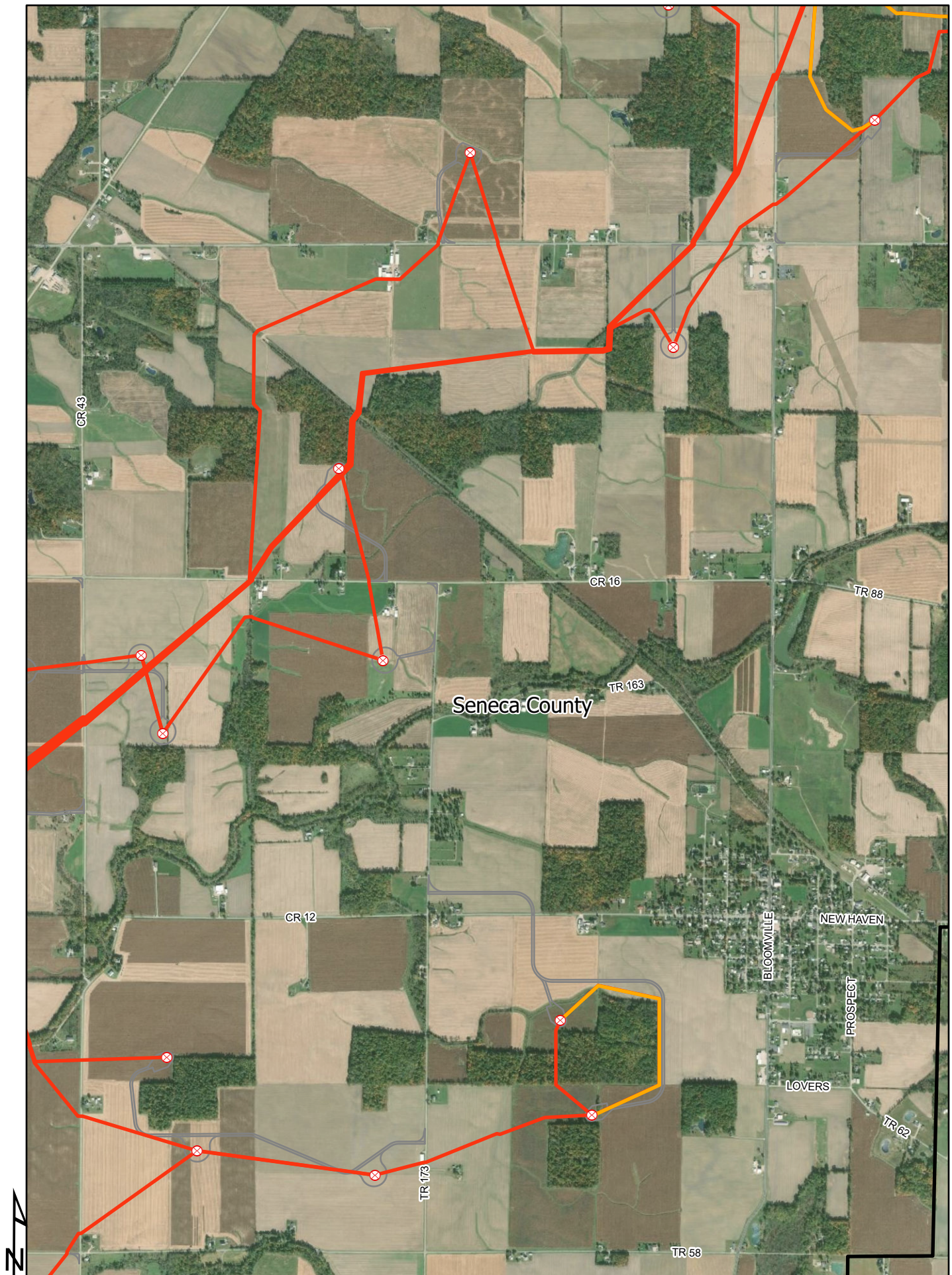


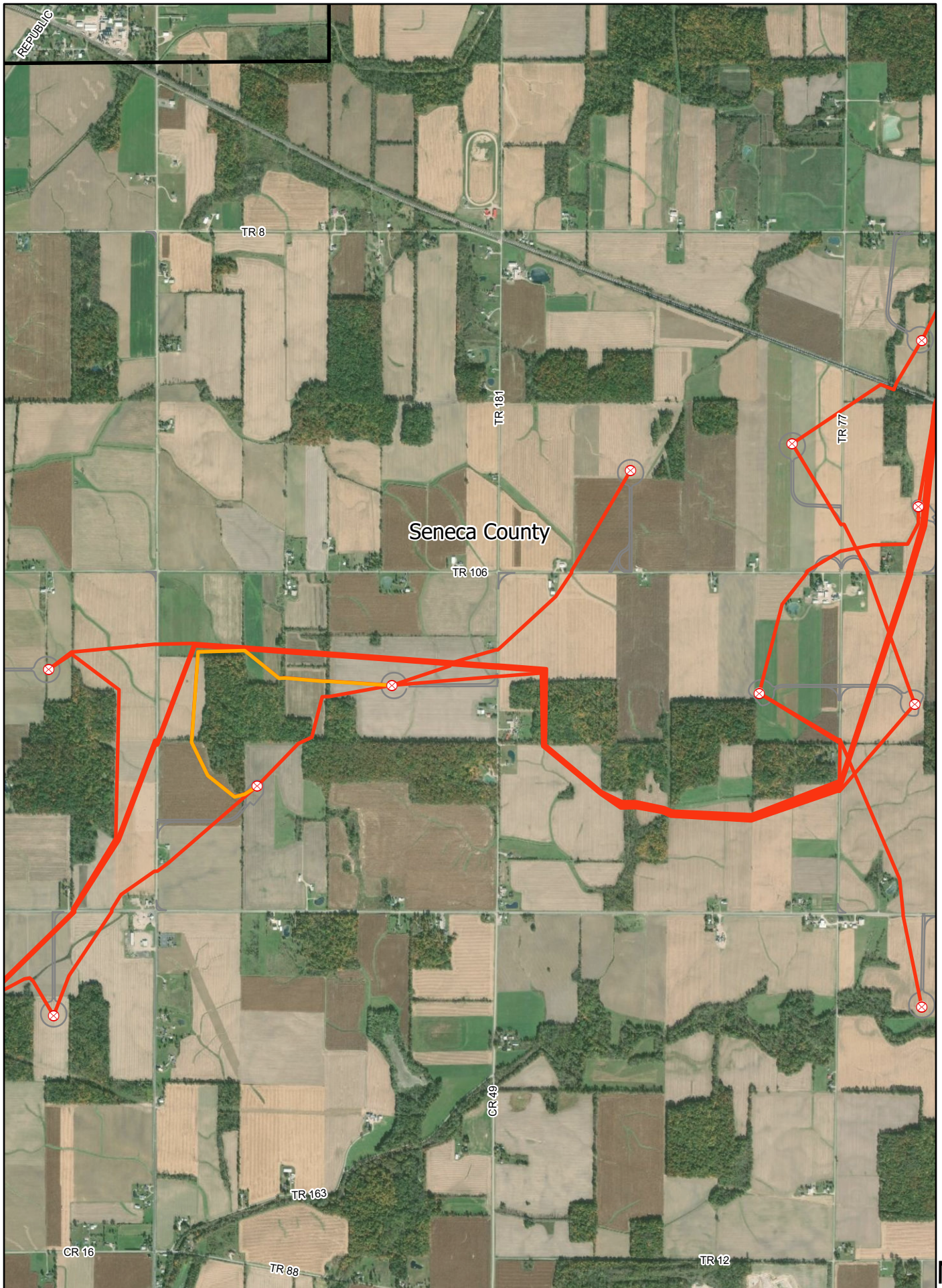


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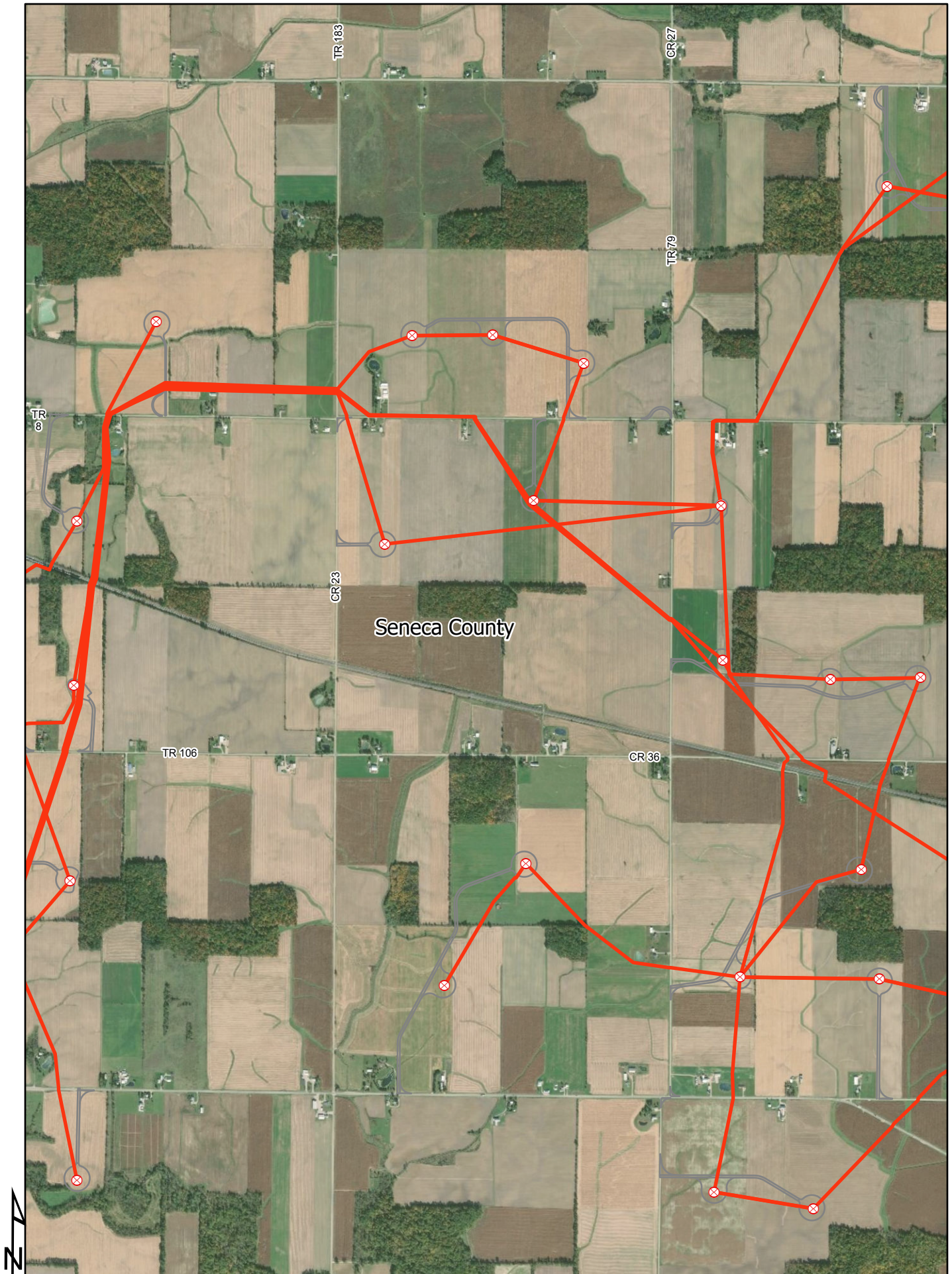
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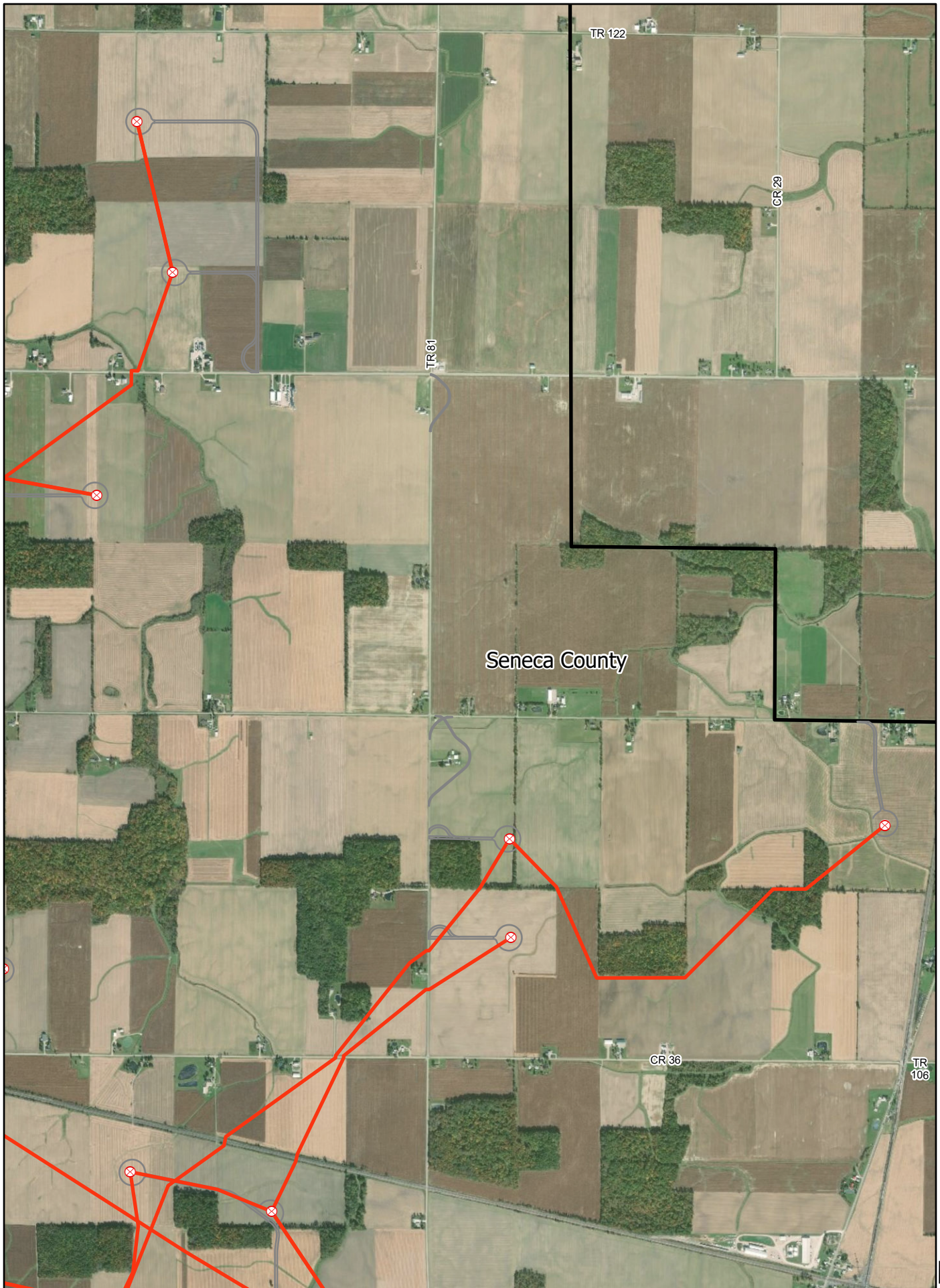






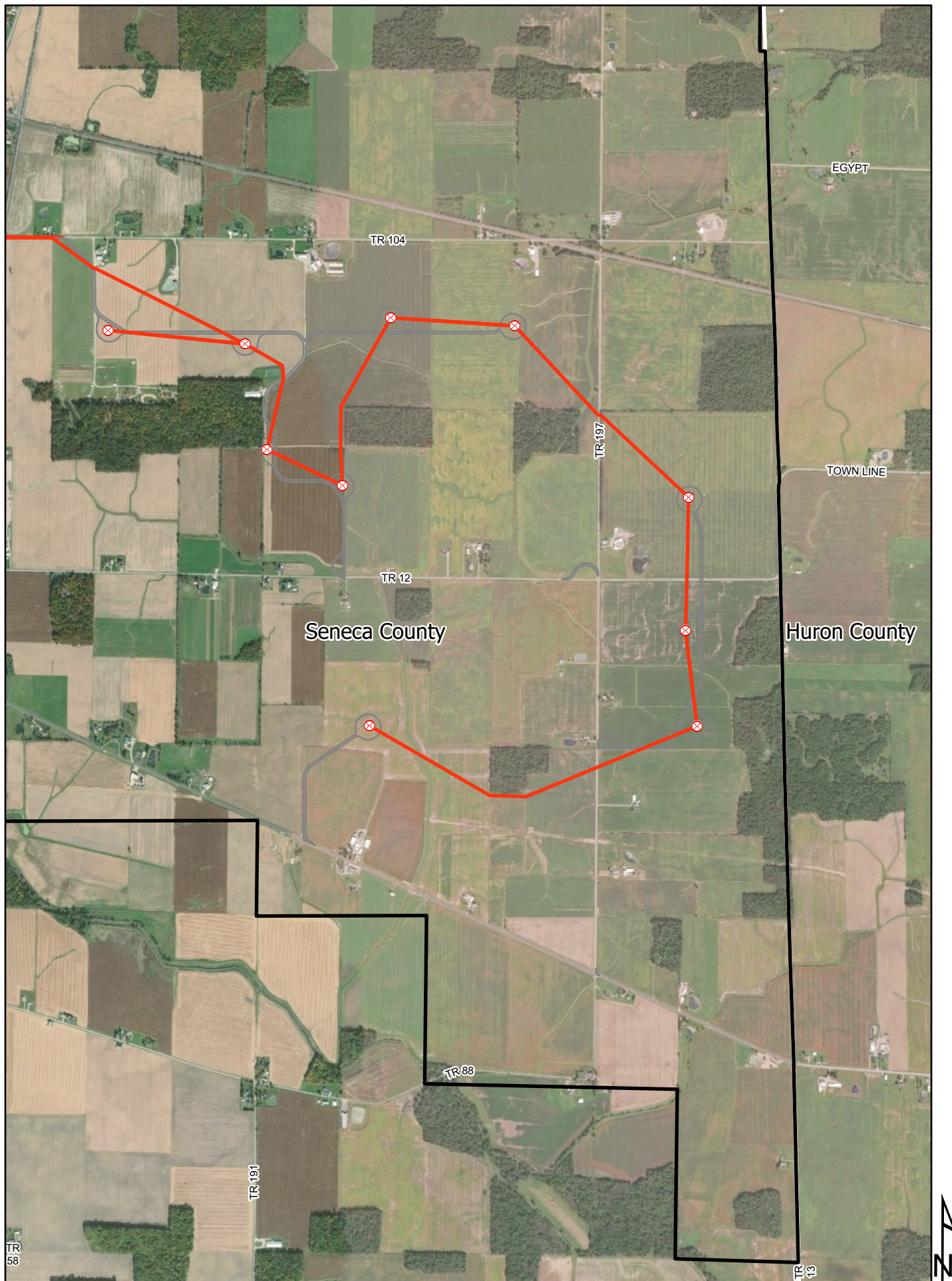
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1 inch = 2,000 feet





1 inch = 2,000 feet

III. CONSIDERATIONS AND RECOMMENDED FINDINGS

In the Matter of the Application of Seneca Wind, LLC for a Certificate to Site a Wind-Powered Electric Generation Facilities in Seneca County, Ohio, Staff submits the following considerations and recommended findings pursuant to R.C. 4906.07(C) and 4906.10(A).

Considerations for R.C. 4906.10(A)(1)

BASIS OF NEED

Pursuant to R.C. 4906.10(A)(1), the Board must determine the basis of the need for the facility only if the facility is an electric transmission line or gas pipeline. Staff's investigation in this case does not include the proposed 138 kV transmission line that is related to this project and is the subject of a separate filing before the Board in Case No. 18-1794-EL-BLN. Therefore, Staff has found an analysis of R.C. 4906.10(A)(1) to be inapplicable to the facility in question.

Recommended Findings

Staff recommends that the Board find that the basis of need as specified under R.C. 4906.10(A)(1) is not applicable to this facility, as the facility is neither an electric transmission line nor a gas pipeline.

Considerations for R.C. 4906.10(A)(2)

NATURE OF PROBABLE ENVIRONMENTAL IMPACT

Pursuant to R.C. 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

Regional Planning and Development

The Applicant has studied comprehensive land use plans for communities within a five-mile radius of the proposed project. Specifically, the Applicant focused on Seneca County's 2011 economic development strategy and Tiffin's 2016 strategic development plan. Staff concurs that key elements of compatibility with these developmental plans center on preservation of agricultural activities, job creation, alternative energy development and economic opportunities. Wind turbine projects are consistent with farming practices and they provide a means of continued farmland preservation. Farming operations are able to resume shortly after construction activities terminate. Agricultural activities are consistent with wind facility operations because wind facilities typically require relatively small footprints.

Demographics

The proposed facility is located entirely in Seneca County. In 2010, the population of Seneca County was 56,745 and the population density was about 90 persons per square mile. The population of Seneca County is projected to decrease by approximately 21 percent between 2010 and 2030. Seneca Wind's long-term employment levels are not of a significant number to alter existing population trends in proximity to the project.

Land Use

Land use in proximity to the proposed facility is approximately 94 percent agricultural use. Approximately 1,177 acres of agricultural land would experience temporary disturbances, resulting in losses in agricultural production. The Applicant estimates that about 82 acres of agricultural land would be permanently converted to wind farm use. The Applicant stated that no structures would be removed or relocated for this facility's construction or operation. The facility would comply with required property line setbacks unless waived by cooperating property owners. Significant impacts to commercial, industrial, recreational and institutional land uses are not likely because their operations and activities would be able to continue unimpeded during operation of the wind generation facilities.

Recreation

The proposed facility would be located entirely on leased private land. Construction and operation of the facility would not physically impact any recreational areas. However, the facility would have the potential to cause visual impacts to recreational resources within the 10-mile study area.

The Applicant identified 53 parks, golf courses, wildlife refuges and recreational areas within the ten-mile project study area. The vast majority of these resources are located outside of the project area. The Silver Creek Wildlife Area and the Garlo Heritage Nature Preserve are located within a mile of the closest turbine. Forest Nature Preserve is within a half-mile of the nearest proposed turbine location. A portion of the Mohawk Golf and Country Club is approximately 1.4 miles away

from the nearest proposed turbine location. The Sandusky River is a state-designated scenic river located about 2.4 miles from the nearest proposed turbine location. Due to the forested nature of these areas and its distance from the proposed project, minimal visual impacts to these facilities are expected.

Cultural, Archaeological, and Architectural Resources

The Applicant initially conducted a Phase I cultural resource survey to ascertain potential impacts to historical properties and archaeological sites. The survey included an analysis of National Register of Historic Places (NHRP) and sites that may be eligible for the NHRP. The Applicant's survey focused on a 10-mile radius around the project area. The Applicant's survey included archaeological resources and known sites, landmarks, historical structures, bridges, cemeteries and historic districts.

The Applicant consulted with the State Historic Preservation Office (SHPO) in preparation of their overall survey plan for the project area and the SHPO has approved the Applicant's design for ongoing archaeological and architectural field work. An evaluation of the Applicant's study results would be coordinated with the SHPO to determine specific measures to appropriately avoid or minimize any potentially adverse impacts to cultural resources. If potentially adverse impacts to cultural resources can not be avoided or minimized, then the Applicant has committed to achieving a memorandum of understanding with the SHPO to address and mitigate those impacts.

Aesthetics

Due to the height of turbines in a wind farm, it is impractical to completely screen them from view. Aesthetic impacts and considerations are always measured against the surrounding land use features and potential viewers' subjective opinions. The turbines would be painted a neutral light color, per guidance from the Federal Aviation Administration (FAA). The locations of the turbines among existing agricultural fields and farm features such as storage silos provides additional visual minimization. The rural nature of the project vicinity limits the number of potential viewers. Transportation corridors in a rural setting typically are smaller and much more lightly traveled, also limiting the potential for viewing impacts. Existing woodlots are also able to offer additional natural screening of portions of the facility.

Economics

The Applicant stated that it would construct all structures associated with the facility. The Applicant also plans to own and operate the completed facility. The Applicant provided its estimate of the costs for installing the facility, which totaled approximately \$280,000,000, or \$1,321/kW. For comparison, the Applicant provided a reference to installed costs of similar facilities that was compiled by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) in August 2017. The referenced NREL report stated that the capital and intangible costs of wind energy facilities completed in 2016 averaged \$1,509/kW. These average costs are somewhat higher than the costs estimated for installation of the proposed facility.

The Applicant provided O&M expenses for similar facilities installed since 2010 on average was \$27/kW per year. This information was compiled by the Berkeley National Laboratory. The Applicant estimated its O&M expenses to be approximately \$22/kW per year.

The Applicant estimated that the cost of delays in permitting and construction of the proposed facility would be approximately \$500,000 to \$1,000,000 per month, depending on the timing of

the delay. The Applicant characterized these costs as attributable to lost construction days and the costs associated with idle construction crew and idle equipment. The Applicant also noted that there would be penalties associated with failing to meet a delivery deadline under a potential power purchase agreement. Delays that would prevent the project from meeting federal Investment Tax Credit deadlines could result in the loss of those benefits to the Applicant. The Applicant's characterization of its estimated costs of delays appears reasonable to Staff.

The Applicant's consultant, Tetra Tech, evaluated the potential economic impacts of the facility on the local region using the NREL's Job and Economic Development Impact (JEDI) model. Economic impacts identified by the JEDI model include direct employment and payroll associated with construction and operation of the facility; turbine supply chain employment and payroll during construction; and, jobs induced from increased spending of household income. The model does not, however, take into consideration previously existing economic activity that would be displaced by the modeled project. The projected economic benefits of the project during construction includes a total of 795 jobs in Ohio, \$47 million in wages, and a total of \$133 million in economic output. The JEDI model estimates that operation and maintenance of the proposed facility would result in 39 jobs in Ohio, \$2 million in wage earnings, and \$7.8 million in economic output. These annual average impacts are expected to occur over the life of project operation.

The Applicant also estimated revenue derived from lease payments and local tax revenue or payments in lieu of taxes (PILOT). Lease payment estimates include approximately \$20 million over the 40-year life of the project. PILOT payments would be \$6,000 to \$9,000 per MW of nameplate capacity, or \$1.28 to \$1.91 million per year if the complete 212 MW facility would be constructed.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Socioeconomic Conditions** heading of the Recommended Conditions of Certificate section.

Ecological Impacts

Public and Private Water Supplies

The Applicant does not anticipate significant adverse impacts to public or private water supplies due to construction of the Seneca Wind Farm. While much of Seneca County derives its water source from private groundwater wells, project setback requirements from non-participating property owners would minimize the potential for any impacts to neighboring groundwater wells during construction.

In order to assure that potential for impacts to groundwater would be minimized, during both construction and operation of the facility, the Applicant should conduct spill response training for construction workers and for operations and maintenance staff. The Applicant should also use prudent design including, but not limited to, the use of containment structures for oil and chemicals used during construction, operation, and/or maintenance. Staff also recommends compliance with any drinking water source protection plans developed by villages within the project boundaries. Compliance with these control mechanisms would minimize the potential impact to public and private water supplies.

Geology

Seneca County is located within the Till Plains section of the Central Lowlands physiographic province. Rocks that outcrop in the two counties belong to relatively flat-lying sedimentary rocks of Silurian and Devonian age, consisting of shale, limestone, and dolomite.

The underlying geologic features in the project area include Wisconsin-age glacial till, lacustrine deposits, and sand and gravel outwash of variable thickness. Karst limestone occurs principally in the eastern portion of Seneca County. The Applicant did identify karst features within the proposed project area. The Applicant would avoid siting wind turbines where these features exist.

Oil and gas operations are scattered throughout the county. Several active well operations are located within the footprint of the project. One active limestone quarry mining operation is located within the proposed project area. There have been four recorded seismic events in Seneca County dating back as far as 1936 and as recent as 2010. None have occurred within the project area. Although the existence of karst features could preclude the construction of turbines in specific locations, no geological features exist that would prevent the construction of the wind farm.

Slopes and Soil Suitability

The Applicant has noted that the wind farm would be located in soil types described primarily as silt loam, silty clay loam, fine sandy loam, very stony loam, and loam. The Applicant noted that there are no slopes along any of the project area that are greater than 12 percent, and most of the project area has slopes that are 6 percent or less.

One major concern is the potential for dissolution in the carbonate rocks exposed to slightly acidic groundwater within the project area. Other potential limiting factors include soil type and its position on slopes, shallow water table, low strength soils, shrink-swell, erosion, and frost action.

The Applicant would conduct an additional site specific geotechnical investigation at each wind turbine location to obtain further detailed information and engineering properties for the soils for construction design purposes. The subsurface investigation would also ensure that the structures would be installed in locations that are suitable, based upon soil and rock properties.

The Applicant would also implement best management practices such as surface drainage controls at each turbine site, grading, and drainage swales, to ensure, both during and after construction, the long-term stability of the wind farm. Although there are potential land use limitations related to dissolution, erosion, frost action, low strength, and shrink-swell, with the proper design and appropriate construction methods, these limitations should not adversely affect or restrict the construction of wind farm project.

Surface Waters

Construction of the facility, considering all proposed turbine locations, would impact one ephemeral stream, 15 intermittent streams, and four perennial streams, totaling approximately 0.2 acre of temporary stream impacts and 0.1 acre of permanent stream impacts. Construction would also impact 12 wetlands, totaling approximately 0.4 acre of temporary wetland impacts and 0.1 acre of permanent wetland impacts. All delineated wetlands are category 1 and category 2 wetlands. All surface water impacts would be associated with access roads and collection lines.

To minimize surface water impacts, the Applicant would install many of the collection lines by horizontal directional drilling (HDD) where they would cross streams and wetlands. HDD is often

a preferred installation method to open trenching, as impacts would be avoided in most cases. However, the HDD process has a risk of an inadvertent return of drilling lubricant, or frac-out. A frac-out occurs when the drilling lubricant, typically a non-toxic, fine clay bentonite slurry, is forced through cracks in bedrock and surface soils. Staff recommends that, prior to construction, the Applicant provide a frac-out contingency plan detailing monitoring, environmental specialist presence, containment measures, cleanup, and restoration in the event of an inadvertent return.

The Applicant would obtain a Nationwide Permit from the United States Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act for impacts to streams and wetlands. Additional measures to reduce water quality impacts would be taken through the development of a Stormwater Pollution Prevention Plan (SWPPP), as part of the Ohio Environmental Protection Agency's (Ohio EPA) National Pollutant Discharge Elimination System (NPDES) permit, to help control potential sedimentation, siltation, and run-off.

No ponds or lakes would be impacted by the facility during construction or operation. Several turbines, as well as associated access roads and collection lines would overlap mapped 100-year floodplains. Floodplains are managed at the local level. Staff recommends that the Applicant obtain the appropriate floodplain permit prior to construction of any facility components which overlap these areas.

Threatened and Endangered Species

The Applicant requested information from the ODNR and the USFWS regarding state and federal listed threatened and endangered plant and animal species. Additional information was provided through field assessments and review of published ecological information. The following table identifies state and federal listed species on which the ODNR and USFWS provided comments due to their potential to be found in the project area considering the available information.

| BIRDS | | | | |
|--------------------|---------------------------------|----------------------------|---------------------|---|
| Common Name | Scientific Name | Federal Status | State Status | Presence in Project Area |
| bald eagle | <i>Haliaeetus leucocephalus</i> | BGEPA & MBTA ¹⁷ | N/A | Known range, observed during Avian Use Surveys |
| upland sandpiper | <i>Bartramia longicauda</i> | N/A | Endangered | Known range, nesting habitat includes dry grasslands |
| northern harrier | <i>Circus cyaneus</i> | N/A | Endangered | Known range, observed during Avian Use Surveys |
| loggerhead shrike | <i>Lanius ludovicianus</i> | N/A | Endangered | Known range, nesting habitat includes hedgerows, thickets and fencerows |

17. Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

| REPTILES & AMPHIBIANS | | | | |
|-------------------------|--------------------------------|----------------|--------------|--|
| Common Name | Scientific Name | Federal Status | State Status | Presence in Project Area |
| Blanding's turtle | <i>Emydoidea blandingii</i> | N/A | Threatened | Known range, habitat includes marshes, ponds, lakes, streams, wet meadows, and swampy forests and adjacent upland habitats |
| spotted turtle | <i>Clemmys guttata</i> | N/A | Threatened | Known range, habitat includes fens, bogs and marshes, but also is known to inhabit wet prairies, meadows, pond edges, wet woods, and the shallow sluggish waters of small streams and ditches and adjacent upland habitats |
| MAMMALS | | | | |
| Common Name | Scientific Name | Federal Status | State Status | Presence in Project Area |
| Indiana bat | <i>Myotis sodalis</i> | Endangered | Endangered | Known range, presence of the species has been established in portion of the project area |
| northern long-eared bat | <i>Myotis septentrionalis</i> | Threatened | Threatened | Known range, habitat includes woodlands |
| 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, potentially present in perennial streams |
| FISH | | | | |
| Common Name | Scientific Name | Federal Status | State Status | Presence in Project Area |
| Greater redhorse | <i>Moxostoma valenciennesi</i> | N/A | Threatened | Potentially present in perennial streams |

The Applicant did not identify any listed plant species during field surveys. Further, the ODNR and the USFWS did not identify any concerns regarding impacts to listed plant species. In the unexpected event that the Applicant encounters listed plant or animal species during construction, Staff recommends that the Applicant contact Staff, the ODNR, and the USFWS, as applicable. Staff also recommends that if the Applicant encounters any listed plant or animal species prior to construction, the Applicant notify Staff of the location and how impacts would be avoided during construction.

The ODNR has a record for a great blue heron rookery near the project area. Nesting great blue herons are protected under the Migratory Bird Treaty Act of 1918. Impacts to great blue heron rookeries can have a significant impact on a local population due to the large number of birds that return each year to the same rookery to nest. Rookeries often include a certain set of characteristics

that are not easily found elsewhere. The ODNR recommends a 100-yard construction buffer be maintained around the rookery during the breeding season as to not interfere with nesting birds. The project does not propose any work within 100 yards of this rookery, and therefore construction impacts are not expected. Impacts due to operation will be assessed during post-construction monitoring.

The project is within the range of the federal and state endangered Indiana bat and federal and state threatened northern long-eared bat. The primary threat to the Indiana bat and northern long-eared bat would be the risk of collision with an operational wind turbine. The Applicant has proposed a curtailment regime to minimize impacts to bats and other avian species in the project area during operation of the facility. However, Staff believes that the Applicant's proposal may be inadequate and inconsistent with the recommendations of past wind projects.

The Seneca project site and adjacent parcels encompass habitat with confirmed use by listed species. The Applicant expects collision risk to bats in the project area "to be consistent with other wind energy projects in agricultural landscapes in the Midwestern U.S." and estimates 1,039 to 2,332 bat deaths per year. However, the ODNR anticipates the mortality rate may be greater as this site has approximately four times the amount of forested area as other operating projects in agricultural landscapes in Ohio. Additionally, active roost trees for the Indiana bat and northern long-eared bat have been documented in and adjacent to the project area during surveys. Further, resident Indiana bats have been documented near the project and take during the summer months would be likely.

Staff recommends that the Applicant obtain an Incidental Take Permit (ITP) under Section 10(a)(1)(B) of the Endangered Species Act, which allows for incidental take of federally-listed species through implementation of a Habitat Conservation Plan. Because an ITP can take years to obtain, Staff recommends that the Applicant obtain a Technical Assistance Letter (TAL) from the USFWS, which would detail a curtailment regime for avoidance of Indiana bat take. Staff recommends that the Applicant obtain the TAL prior to operation and implement the operational measures specified in the TAL for the entire facility until an ITP is obtained. Past TALs have recommended operational measures to protect Indiana bats during migrations, such as increased cut-in speed for all turbines of 6.9 meters/second from ½ hour before sunset to ½ hour after sunrise between March 15 and May 15 and between August 1 and October 15.

Because this project is in the vicinity of documented resident Indiana bats, Staff expects that letter issued for this case would include curtailment recommendations for portions of the facility which are near documented roost trees during the summer months as well. Staff would be supportive of this curtailment regime for the proposed facility. Additionally, Staff recommends that turbines be feathered below manufacturer's cut-in speed during the summer season from May 16 through July 31. The operational measures implemented both through the implementation of the TAL and the ITP would protect Indiana bats, northern long-eared bats, and other non-listed bats.

The final 4(d) rule of the endangered species act identifies prohibitions that focus on protecting the northern long-eared bat's sensitive life stages in areas affected by white-nose syndrome. The final 4(d) rule also provides that there are no prohibitions on incidental and purposeful take of northern long eared bats in certain instances. Incidental take of the northern long eared bat would not be federally prohibited in the project area as defined by the 4(d) rule. Presence of the northern long-eared bat during the summer months has been established for the project area. As this is a

state threatened species, Staff recommends that the Applicant apply the measures recommended to protect the Indiana bat detailed in the TAL to the northern long-eared bat, including summertime feathering of turbines within specified distances of documented northern long-eared bat roost trees.

As tree roosting species in the summer months, the habitat of the Indiana bat and northern long-eared bat species would be impacted by tree clearing during construction of the project. In order to avoid impacts to the Indiana bat and northern long-eared bat, Staff recommends that the Applicant adhere to seasonal tree cutting dates of October 1 through March 31 for all trees three inches or greater in diameter, unless coordination efforts with the ODNR and the USFW allows a different course of action. The ODNR and USFWS may allow tree clearing outside of these dates if the Applicant can document the absence of these species in the project area, which is usually accomplished through mist-net surveys. Presence of the Indiana bat has been established in portions of the project area, so additional surveys in these areas could not establish the absence of this species.

The ODNR stated that this project must not have an impact on freshwater native mussels at the project site. The project would impact four perennial streams. However, these streams do not contain the necessary characteristics to be considered suitable mussel habitat.

The project is within the range of the greater redhorse, a state threatened fish which may inhabit perennial streams within the project area. The Applicant has proposed impacts to four perennial streams associated with access and open trench collection line installation. Staff recommends no in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat, unless coordination with the ODNR allows for a different course of action.

The project is within the range of the state threatened Blanding's turtle and state threatened spotted turtle. These species inhabit a variety of different types of streams, ponds, and wetlands. Although essentially aquatic, these species travel over land as they move from one wetland to the next. Because the project would impact wetlands and upland habitats adjacent to wetlands, the ODNR recommends that a habitat suitability survey be conducted by an approved herpetologist to determine if suitable habitat exists within the project area. If suitable habitat is determined to be present, the ODNR recommends one of the following:

- (1) The area determined to be suitable habitat be avoided along with an appropriate buffer.
- (2) A presence/absence survey be conducted by the approved herpetologist.
- (3) An avoidance/minimization plan be developed and implemented by the approved herpetologist.

If the Applicant decides to conduct a presence/absence survey and the either species is determined to be present, Staff recommends that the Applicant continue to coordinate with the ODNR to assure that impacts are avoided.

The project is within the range of the upland sandpiper, a state endangered bird. Nesting upland sandpipers utilize dry grasslands. The grassland habitat used by upland sandpipers varies widely and can include both exotic and native grasses as well as associated forbs and legumes. Areas that are grazed, hayed, or mowed may also be used by upland sandpipers. Staff recommends that

construction be avoided in these habitats during the species' nesting period of April 15 through July 31, unless coordination with the ODNR allows a different course of action.

The project is within the range of the state endangered northern harrier. This species is common in the vicinity of the proposed project area during migration and winter. Northern harriers breed and hunt in large wet meadows and dry grasslands. Staff recommends that construction be avoided in this habitat during the species' nesting period of May 15 through August 1, unless coordination with the ODNR allows a different course of action.

The project is within the range of the state endangered loggerhead shrike. The loggerhead shrike nests in hedgerows, thickets, fencerows, and other types of dense shrubbery habitat. Staff recommends that construction be avoided in these habitat types during the species' nesting period of April 1 through August 1, unless coordination with the ODNR allows a different course of action.

The Applicant documented observations of multiple bald eagles and active eagle nests within the project area and in the project vicinity. The Applicant has committed to create an Eagle Conservation Plan. Staff recommends that, prior to construction, the Applicant develop the plan in consultation with the USFWS and in accordance with the USFWS's Eagle Conservation Plan Guidance document.

The Applicant has committed to implement a post-construction avian and bat fatality monitoring program in accordance with ODNR and USFWS guidelines. Staff recommends that the post-construction avian and bat fatality monitoring plan be submitted prior to operation for ODNR and Staff review.

The Applicant has committed to contacting Staff, the ODNR, and the USFWS within 24 hours if state or federal threatened or endangered species are encountered during construction activities. Construction activities that could adversely impact the identified plants or animals would be halted until an appropriate course of action has been agreed upon by the Applicant, Staff, and the ODNR in coordination with the USFWS.

If construction is delayed beyond the initial 5-year term of the OPSB certificate Staff recommends that certain wildlife surveys be updated as determined by the ODNR at that time.

Vegetation

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

| VEGETATION | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| Vegetation Community Type | Total Disturbance (Acres) | Temporary Impacts (Acres) | Permanent Impacts (Acres) |
| Forestland | 13.1 | 13 | 0.1 |
| Agricultural Lands | 830 | 733 | 97 |
| Grassland | 2.2 | 2 | 0.2 |
| Scrub/Shrub | 2 | 2 | 0 |
| Total | 847.3 | 750 | 97.3 |

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, earth-moving, 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 likely to occur for any plant species as a result of this facility.

Staff recommends that the Applicant have an environmental specialist on site during construction activities that may affect sensitive areas. 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 would be familiar with water quality protection issues and potential threatened or endangered species of plants and animals that may be encountered during facility construction.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Ecological Conditions** heading of the Recommended Conditions of Certificate section.

Public Services, Facilities, and Safety

Setbacks

R.C. 4906.201(A) delineates how minimum setbacks for “an electric generating plant that consists of wind turbines and associated facilities with a single interconnection to the electrical grid that is designed for, or capable of, operation at an aggregate capacity of fifty megawatts or more” are to be determined. These minimum setback requirements are further detailed in Ohio Adm.Code 4906-4-08(C)(2).

Turbine Removed from Consideration

In its January 2, 2019 filing, the Applicant eliminated turbine 91 from the wind farm layout.

Property line and state or federal highway

The wind turbine must be at least 1,125 feet in horizontal distance from the tip of the turbine's nearest blade at 90 degrees to the property line of the nearest adjacent property, including a state or federal highway, at the time of certification application. The Siemens Gamesa 2.7-129 turbine model has the maximum blade length proposed for this project. Using this turbine model, the minimum setback calculates to 1,338 feet from the turbine base to nearest adjacent property. The minimum setback for the GE 2.8-127 calculates to 1,334 feet, 1,316 feet for the GE 2.3-116, and 1,306 feet for the Vestas V110-2.2 turbine models.

Several turbines would require setback waivers in order to be constructed. However, the exact number of required waivers would not be determined until the Applicant has selected which turbine locations would be constructed and which model would be implemented. The Applicant is in the process of working with property owners to obtain the necessary waivers and would only be able to construct turbines that either meet the statutory setback requirement or have the requisite setback waivers.

Staff reviewed Revised Table O-1 (filed 2/12/2019) and found that turbines 58, 61, 71, and 72 are at distances less than the minimum setback. Staff notes that turbines 58, 61, 71, and 72 would need setback waivers prior to construction.

Staff reviewed the “Seneca Response to Interrogatory 10” spreadsheet (submitted 1/9/2019) and found that Turbines 70, 71, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 92, 93, 94, 95, and 96 are at distances less than the minimum setback and would need setback waivers prior to construction.

Staff also found that turbine 16, would need a setback waiver, or the Applicant could construct only the GE 2.8-127 model at that location without a setback waiver.

Staff found that turbine 59, would need a setback waiver, or the Applicant could construct only the Vestas V110 (2.2MW) model at that location without a setback waiver. Staff further notes that the applicant has proposed a minor shift of approximately 50 feet to the northeast to turbine location 59 in its 2/12/2019 filing.

Staff analyzed the digital geographically referenced map data provided by the Applicant and found that the wind farm complies with the minimum setbacks along state and federal highways in the project area: US 224, State Route 100, and State Route 67.

Distance from easements

Pursuant to Ohio Adm.Code 4906-4-08, the distance from a wind turbine base to any electric transmission line, gas pipeline, gas distribution line, hazardous liquids pipeline, or public road shall be at least 1.1 times the total height of the turbine structure as measured from its tower’s base to the tip of the blade at its highest point. For the GE 2.8-127 turbine model, the maximum total height is 584 feet. Therefore, setback to these facilities and roads for the proposed turbines would be 642 feet.

Staff analyzed the digital geographically referenced map data submitted by the Applicant and found that turbine 77 is approximately 570 feet from the AEP Bloomville-Republic 69 kV electric line (characterized as a transmission line by AEP). Staff finds that the turbine models proposed would not be compatible at this location. Staff recommends that turbine 77 not be constructed at the proposed location.

Local members of the public expressed to Staff that turbines 44, 85 and 86 were near local gas pipelines. Staff asked the Applicant to investigate these claims. The Applicant performed a detailed ALTA survey, which shows property boundaries, location of improvements, structures, easements, and utilities. The Applicant found through this survey, and staff confirmed, that these turbine locations comply with the setback requirements.

The Applicant found that the turbine closest to a gas distribution line, at 583 feet, is turbine 6. Because the Applicant proposed to install the GE 2.3-116 at a maximum height of 499 feet at the turbine 6 location, this location would comply with the pipeline setback of 549 feet as well.

Turbine Foundations

The Applicant would prepare a wind turbine assembly area by grading and removing vegetation within a maximum radius of 300 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, removal of forms, backfilling and compacting, and site restoration.

Suitable turbine foundation systems would be designed upon completion of the detailed geotechnical exploration, but the two most likely foundation types would be spread footing or rock-anchored pile foundations. The Applicant is not aware of any problems with the design of spread footer foundations. The Applicant is aware of complexities of rock-anchored pile foundations and how to address them. Both are commonly used foundation designs for wind turbines and would likely be reasonable to use at this proposed facility.

Based on the preliminary geological assessment of the project area, the Applicant does not anticipate that blasting would be necessary for foundation construction. Pursuant to Ohio Administrative Code (Ohio Adm.Code) 4906-4-09, should site-specific conditions warrant blasting, the Applicant would be required to submit a blasting plan to OPSB Staff for review and acceptance in advance of any blasting.

Wind farms typically submit to the OPSB detailed engineering drawings of their proposed foundations. Staff notes that there is Karst topography in the project area. Additionally, the Siemens Gamesa 2.7-127 and GE 2.8-127 models have not previously been installed in North America. These are larger turbines than have previously been proposed for Ohio wind farms. For these reasons, Staff recommends that when the Applicant submit detailed engineering drawings of the foundation, that it include the identity of the registered professional engineer, structural engineer, or engineering firm, that approved the designs, and that the entity be licensed to practice engineering in the state of Ohio.

Roads and Bridges

During construction, local, township, county, and state roads would experience a temporary increase in truck traffic due to deliveries of equipment and materials. The Applicant's Preliminary Transportation Study indicated the selection of one primary route and one alternate route for the delivery of components to the project area. Each route is listed below:

- Primary route from I-76 to US Route 224, traveling west to enter the east portion of the project area; or
- Alternative Southern route from I-90 to US Route 4, delivery vehicles would travel southwest to enter the east portion of the project area, or continue west on US 224 to enter the west portion of the project area.

The Applicant conducted a field review of local roads within the project area to identify possible impacts to township and county roads from construction. The Applicant also reviewed issues including the pavement condition, load capacity, and restricted turning radii from trucks delivering turbine components.

The Applicant expects some modifications to local roads, including the expansion of intersection turns to accommodate specialized turbine component delivery vehicles, as well as conventional construction trucks. Other transportation infrastructure improvements include temporary road gravel fills, pipe to maintain drainage in the ditched areas, and relocation of poles, street signs and other appurtenances. The Applicant stated that, upon completion of the facility, it would return all roadways to their pre-construction conditions or better.

Prior to commencement of construction activities that require transportation permits, the Applicant would have to obtain all such permits. The Applicant would also need to 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 would include, but not be limited to, the county engineer, Ohio Department of Transportation, local law enforcement, and health and safety officials. This coordination would need to 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 commitment. The Applicant would need to restrict public access to the facility with appropriately placed warning signs or other necessary measures.

Staff recommends that the Applicant be required to 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 would complete a study on the final equipment delivery route to determine what improvements would be needed in order to transport equipment to the wind turbine construction sites. The Applicant would 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 would include, but not be limited to, the following: Performing a survey of the final delivery routes to determine the exact locations of vertical constraints where the roadway profile would exceed the allowable bump and dip specifications and outline steps to remedy vertical constraints; 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; Identifies 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; Identifies locations where wide turns would require modifications to the roadway and/or surrounding areas and make all necessary alterations. Any alterations for wide turns would be removed and the area restored to its preconstruction condition unless otherwise specified by the county engineer(s).

The Applicant has committed to repairing damage to government-maintained (public) roads and bridges caused by construction or maintenance activities. Any damaged public roads and bridges would be repaired promptly to their previous condition by the Applicant under the guidance of the appropriate regulatory agency. Any temporary improvements would be removed unless the county engineer(s) request that they remain. The Applicant stated that it would 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 would 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 commitment. The Road Use Agreement would contain provisions for the following: A preconstruction survey of the conditions of the roads; a post-construction survey of the condition of the roads, 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; 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.

Blade Shear

Blade shear occurs when a wind turbine blade, or segment, separates from the rotor and is thrown or dropped from the tower. The Applicant asserts that past incidences 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 blade

failures. The turbines have the following safety features to address blade shear: two fully independent braking systems, a pitch control system, a turbine shut down system at excessive wind speeds and during excessive blade vibration or stress. These safety features, and the use of setbacks, minimize the potential for blade shear impacts. Staff recommends that the certificate be conditioned to require that the Applicant notify the OPSB Staff within 24 hours of an occurrence of any blade shear event, to be followed up by a written report within 30 days of the event detailing the incident and corrective actions to be taken to avoid, prevent, mitigate, or minimize a recurrence.

Ice Throw

Ice throw occurs when accumulated ice on a wind turbine blade separates from the blade and falls or is thrown from the blade. The proposed turbine models have ice detection equipment and safety features that would shut down a turbine if the buildup of ice were to cause excess vibrations or the speed to power ratio were to become too high. The Applicant conducted an ice throw study to determine the probability of a one kilogram piece of ice landing at the nearest public road and nearest non-participating property boundary. The Applicant's ice throw study reports the probability of a one kilogram piece of ice landing at the nearest public road to be less than 1 percent per year and probability of a one kilogram piece of ice landing at the nearest non-participating property boundary to be less than 1 percent per year. Staff recommends that the certificate be conditioned to require that the Applicant notify the OPSB Staff within 24 hours of an occurrence of any ice throw event resulting in injury, to be followed up by a written report within 30 days of the event detailing the incident and corrective actions to be taken to avoid, prevent, mitigate, or minimize a recurrence.

Construction Noise

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

Operational Noise

The noise impact of the proposed wind farm is related to the existing ambient noise level 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. The Applicant modeled the facility noise output using DataKustic GmbH's Cadna/A® noise modeling software. In order to estimate the potential noise impact associated with the proposed facility, the model used the maximum sound power for the GE 2.5-127 and the SG 2.7-129.

In order to characterize the existing ambient noise level, an acoustic survey of the project area was conducted by the Applicant between May 15 and May 25, 2018. Five survey locations were sampled. Based on this study, the Applicant found that average ambient noise levels (LEQ) across the project area ranged from 48 to 57 dBA during the day and from 39 to 56 dBA at night.

The Applicant had six turbine arrays that it evaluated for operational noise impacts. The arrays incorporated a combination of the following turbines: GE 2.3 MW-116 hub height 80 m, GE 2.3 MW-116 hub height 90 m, and GE 2.3 MW-116 hub height 94 m, GE 2.8 MW-127 hub height 134 m, 84 Siemens Gamesa 2.7 MW-129 hub height 109 m and Vestas V-110 2.2 MW hub height 110 m. The applicant has the used turbines with the largest sound power levels for each array to model operational noise impacts. To determine operational noise impacts, the Applicant determined a critical wind speed for each of the arrays. The critical wind speed is the wind speed at which has the greatest differential between turbine sound levels and the ambient sound levels. The Applicant indicated that for the GE 2.8 MW-127 the critical wind speed is 9 m/s, for the SG 2.7 MW-129 the critical wind speed is 8 m/s and for the Vestas V-110 2.2 MW the critical wind speed is 8 m/s. The nighttime ambient LEQ at the critical wind speed at 9 m/s was shown to be 46 dBA and at 8 m/s was shown to be 44 dBA. The Applicant modeled 94 potential turbine locations although only 77 turbines would be built, therefore overall operational noise impacts will be less than what has been modeled.

The Applicant used an operational sound output design goal of 51 dBA for arrays using the GE 2.8 MW-127 and 49 dBA for arrays using the SG 2.7 MW-129 and the Vestas V-110 2.2 MW at all non-participating receptors. These design goals equate to the addition of five dBA to the average nighttime LEQ at the critical design wind speed for the project area. In order to achieve the design goal limits, several turbines would need to operate in a noise reduction operation (NRO) mode. The Applicant's analysis of noise impacts, incorporating NRO modes for certain turbines, showed that for the each of proposed arrays, no non-participating receptors had modeled sound impacts in excess of 51 dBA at the critical design wind speed of 9 m/s and no non-participating receptors had modeled sound impacts in excess of 49 dBA at the critical design wind speed of 8 m/s.

Based on Staff's review, the Applicant's proposed turbine layout and the Applicant's commitment to adherence of the design limit, the project 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.

Low Frequency Noise and Infrasound

Low frequency noise is noise that occurs in the 20 to 200 Hz range. Infrasound is noise that occurs below the human threshold of hearing, which is generally below 20 Hz. The turbines proposed for this project would produce low frequency noise and infrasound, but at levels too low to cause adverse effects to human health. In response to Staff's question on low frequency noise and infrasound from wind turbines the Ohio Department of Health has stated, "...it is unlikely that infrasound generated by wind turbines would pose a significant health threat to residents living adjacent to the wind turbine projects..."

Several international studies have come to similar conclusions:

In 2014, the Australian Medical Association¹⁸ evaluated the health impact relative to wind turbines and released a position statement: "The available Australian and international evidence does not support the view that the infrasound or low frequency sound generated by wind farms, as they are

18. Australian Medical Association, (2014) Position Statement, Wind Farms and Health, accessed March 13, 2019, <https://ama.com.au/system/tdf/documents/Wind%20Farms%20and%20Health%202014.pdf?file=1&type=node&id=40584>.

currently regulated in Australia, causes adverse health effects on populations residing in their vicinity. The infrasound and low frequency sound generated by modern wind farms in Australia is well below the level where known health effects occur, and there is no accepted physiological mechanism where sub-audible infrasound could cause health effects.”

In March 2017, the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) carried out measurement campaigns near three wind farms.¹⁹ Their report concluded, “The results of these campaigns confirm that wind turbines are sources of infrasound and low sound frequencies, but did not show any cases of the hearing thresholds in the areas of infrasound and low frequencies up to 50 Hz being exceeded.” The study further noted that “The review of these experimental and epidemiological data did not find any adequate scientific arguments for the occurrence of health effects related to exposure to noise from wind turbines, other than disturbance related to audible noise and a placebo effect²⁰, which can help explain the occurrence of stress-related symptoms experienced by residents living near wind farms.”

Annoyance can lead to stress and stress can lead to adverse health effects. A 2001 New York State Department of Environmental Conservation (NYSDEC) document notes that, in non-industrial settings, the ambient noise level at any given receptor should probably not be exceeded by more than 5 dBA, and an increase of 5 dBA may cause complaints.²¹

In order to mitigate annoyance due to operational noise, Staff recommends the applicant comply with Ohio Adm. Code 4906-4-09(F)(2).²²

Shadow Flicker

The Applicant used WindPRO, a software program used to design and model wind facilities, to calculate the yearly shadow flicker impact of receptors within approximately one mile of the project area. The model included 2,902 receptors and 93 turbine locations, although a maximum of 77 would potentially be built. WindPRO uses the following inputs to calculate shadow flicker impact: coordinates of proposed turbines, turbine specifications, shadow receptor coordinates, monthly sunshine probabilities, joint wind speed and direction frequency distribution, USGS digital elevation model (DEM - height contour data), and locations of existing turbines. The calculation of the potential shadow impact at a given receptor, defined as a one-meter square area located one meter above ground level, was evaluated with this model.

The position of the sun relative to the turbine rotor disk and the resulting shadow is calculated in time steps 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

19. French Agency for Food, Environmental and Occupational Health & Safety, (2017) Opinion of the French Agency for Food, Environmental and Occupational Health & Safety regarding the expert appraisal on the “Assessment of the health effects of low-frequency sounds and infrasounds from wind farms,” accessed March 1, 2019, <https://www.anses.fr/en/system/files/AP2013SA0115EN.pdf>.

20. The placebo effect occurs when adverse effects are generated by negative expectations.

21. NYSDEC, (2001) Assessing and Mitigating Noise Impacts, Albany, New York. Accessed March 13, 2019, http://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf.

22. The facility shall be operated so that the facility noise contribution does not result in noise levels at any non-participating sensitive receptor within one mile of the project boundary that exceed the project area ambient nighttime average sound level (Leq) by five A-weighted decibels (dBA). During daytime operation only (seven a.m. to ten p.m.), the facility may operate at the greater of: the project area ambient nighttime Leq plus five dBA; or the validly measured ambient Leq plus five dBA at the location of the sensitive receptor.

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 22 non-participating receptors would be exposed to more than 30 hours of shadow flicker per year by the facility. Once a turbine model is chosen and final turbine site locations are determined a pre-construction shadow-flicker analysis would be done to determine how many receptors would still be modeled to receive more than 30 hours of shadow flicker per year.

This representation is based on model results, and actual shadow flicker levels may be different when the wind farm is in operation. Therefore, Staff recommends that the certificate be conditioned upon the requirement that the Applicant show through mitigation or modeling that it would not impact any non-participating sensitive receptor with more than 30 hours of shadow flicker per year. This requirement would apply also to any cumulative shadow flicker associated with adjacent wind farms should they be built before the proposed project.

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 5 to 30 flashes per second, or hertz (Hz).²³ This project's maximum wind turbine rotor speed translates to a blade pass frequency of approximately 0.88 Hz²⁴ and therefore would not be likely to trigger seizures.

High Winds

Wind turbines are designed to withstand high wind speeds. The wind turbines proposed for this project, are 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 wind turbines would be designed to automatically shut down and stop producing energy at their cut-out speeds, which are less than or equal to 25 meters per second (m/s), or 55.9 miles per hour (mph). The GE and Siemens Gamesa models are certified by the IEC as Class III wind turbines 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 wind turbine designs also specify two levels of wind turbulence intensity, category A for higher intensity or category B for lower intensity. These IEC standards represent minimum design values.

The Applicant currently monitors meteorological conditions in the area and intends to take appropriate precautions for the events 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.²⁵ Installing and utilizing these safety control mechanisms minimizes potential impacts from high winds.

23. Epilepsy Foundation of America, accessed Dec. 21, 2009, <http://www.epilepsyfoundation.org/about/photosensitivity>.

24. $17.6 \text{ RPM} = 0.29 \text{ Hz} \times 3 \text{ blades} = 0.88 \text{ Hz}$.

25. Application, p. 63.

Safety

The Applicant is required to provide the generation equipment manufacturer's safety standards, such as a safety manual or similar document. Staff reviewed these documents for the GE, Siemens Gamesa, and Vestas turbine models. The purpose of Staff's review of this safety information is to ensure safety requirements or setback recommendations would be upheld by the wind farm owner/operator and for inclusion in the wind farm operator's overall safety culture. In accordance with Ohio Administrative Code 4906-4-09(A)(2)(a), the Applicant would comply with the turbine manufacturer's most current safety manual and maintain a copy of that safety manual in the O&M building of the facility. The Applicant claimed that the Vestas safety manual is confidential. Staff recommends that if the Applicant uses the Vestas turbine model, the Applicant shall file a copy in this docket.

Public safety during construction of the facility would be maintained through several means. The Applicant stated that it intends to restrict inappropriate public access to the facility. The Applicant intends to install signs, and gates at the intersections of public roads and access roads that identify the turbine and prohibit unauthorized entry.

According to the Applicant, the turbines and equipment will be installed in accordance with National Fire Protection Association 70E code standards. The Applicant states that in the event of a turbine fire, the Applicant would disconnect power to the turbine, set and maintain an appropriate temporary safety perimeter, and allow the fire to burn itself out.²⁶ The Applicant stated it would develop an emergency response plan during both construction and operation.²⁷

The Applicant stated that turbines would have safety lighting to comply with FAA requirements.

Additionally, the Applicant explained it has restart procedures and protocols after an automatic shutdown occurs due to excess vibration, ice, lightning storms, high wind and temperature events are specified in its turbine manuals and that Seneca Wind will comply with the Applicable safety procedures when restarting a turbine. Staff recommends that the Applicant provide the relevant sections of these restart procedures and protocols, so Staff may confirm that these are designed to ensure the safe return to operation/restart without the turbines being a danger to on-site personnel or the public. Staff further recommends reporting requirements for any of these extraordinary events.

By letter dated October 4, 2018 and follow-up phone conversations, Staff received two general concerns about the Seneca Wind farm from LifeFlight, a medical air ambulance company that operates in the project area. The first concern is that the wind farm will require it to climb higher to avoid the wind turbines. This concern will be evaluated by the FAA and the ODOT Office of Aviation during their review, and conditioned on receipt of a determination of no hazard letter from the FAA. As of the date of this report, Staff has not received an FAA determination or the final ODOT Office of Aviation analysis.

The second concern is that there will be limited/reduced landing zones within the wind farm project area. Patients requiring this air ambulance service will need to be re-routed to predesignated landing zones outside the wind farm project area. The Applicant stated that it has installed predesignated landing zones at other wind farms for use during the construction phase. Staff's

26. Application, p. 61.

27. Application, p. 64.

research on the subject has found that a predesignated landing zone can be a cleared field marked by safety cones or a concrete pad. The Applicant also stated that it is working with LifeFlight to put it in touch with the Applicant's 24-hour emergency operation center to coordinate shutdown of the turbines during these medical emergencies.

The Applicant intends to require its contractors to implement its emergency action plan(s) and consult with all necessary local emergency services, including medical facilities. The Applicant also intends to provide proper equipment (R.C. 5727.75 (F)) to fire and emergency responders to enable them to respond to emergencies. Staff encourages continued coordination between LifeFlight, Applicant, and local emergency services. Staff recommends that the Applicant explore constructing one predesignated landing zone within the project area to mitigate impacts to LifeFlight and other air ambulatory services.

Communications

The Applicant evaluated potential impacts from its wind farm proposal on communication systems in the project area. The Applicant expects the project to cause a slight impact to off-air television signals. Specific impacts to television reception could include interference, reduced picture quality, and signal loss.²⁸ If facility operation results in impacts to existing off-air television coverage, Staff concurs with the Applicant's recommendation to investigate methods of improving the television reception system, specifically a high-gain directional antenna oriented towards the signal origin. If improvements cannot be made, then the Applicant would resolve the issue through its complaint resolution process. The Applicant notes that cable service and direct satellite service would be unaffected by the presence of wind turbines. 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 1.9 miles of turbines or when stations with non-directive antennas are located within 0.19 miles. All AM stations are located well outside the project area, with the closest station located approximately 12 miles from the nearest proposed turbine site. No impact on AM coverage is expected.

The closest operational FM radio station, WYOR, is located approximately 1 mile from the nearest proposed turbine location, a distance that the Applicant expects not to degrade/interfere with WYOR's coverage. No impact to FM broadcast stations are 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 59 licensed 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.

Turbines 9, 64, and 83 are close to the existing beam paths. Staff concurs with the Applicant's commitment to denote avoidance procedures of the beam paths on the construction plans, so that construction cranes are not placed in the beam paths during construction.

28. Off-air TV stations broadcast signals from land-based facilities directly to TV receivers.

Turbines 80 and 89 would obstruct the WCFZ of the licensed microwave paths in the project area. Therefore, Staff recommends that turbines not be built at these locations.

The microwave 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. Staff recommends that the Applicant study potential impacts to all known and/or discovered microwave communication systems, using survey-quality data, and avoid or mitigate known impacts as outlined in the Recommended Conditions of Certificate.

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. To evaluate this potential, the Applicant sent a notification letter to the National Telecommunications and Information Administration (NTIA) on June 25, 2018. 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, in a letter dated August 20, 2018, did not identify any concerns regarding radio frequency blockage and had no issues with turbine placement in the project area.

No impacts to AM or FM radio, cable television, radar, or satellite systems are expected. Staff recommends that the Applicant be required to mitigate any impacts to these communication 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 years. A potential option 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.

In accordance with Ohio Administrative Code 4906-4-09(I), the Applicant has committed to providing a decommissioning plan to Staff and the Seneca County engineer that includes the removal of the facility components and provides financial assurance to ensure that funds would be available to decommission the project.

At the end of the wind farm or turbine's useful life, 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. This plan would include the Applicant's intent to excavate the turbine foundations to a depth of 36 inches below grade and remove any other facility components buried at a depth of less than 36 inches. The Applicant would not remove below ground features such as underground collection/utility lines or foundations, if buried deeper than three feet below the surface; those would be abandoned in place. 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.²⁹

Also, in accordance with Ohio Administrative Code 4906-4-09(I) and 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 associated facilities constructed and would not include the salvage value of the equipment. Further, the Applicant proposes that the decommissioning costs would be recalculated every five years. Also, the financial assurance would be a performance bond that is routinely updated and adjusted.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Public Services, Facilities, and Safety Conditions** heading of the Recommended Conditions of Certificate section.

Recommended Findings

Staff recommends that the Board find that the Applicant has determined the nature of the probable environmental impact for the proposed facility, and therefore complies with the requirements specified in R.C. 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 *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

29. Application at p. 48.

Considerations for R.C. 4906.10(A)(3)

MINIMUM ADVERSE ENVIRONMENTAL IMPACT

Pursuant to R.C. 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 Applicant determined location for the Seneca Wind facility based on its consideration of various factors, including: adequate wind resource; nearby access to adequate transmission infrastructure; willing land lease participants; site accessibility; low-density population; appropriate geological conditions; compatible land use; and limited sensitive ecological and cultural resources. The project layout was determined through geographic information system tools, assistance from consultants, state wind power siting laws, and willing landowner participation.

Minimizing Impacts

The proposed facility aligns with regional development plans in and around the project area. These comprehensive plans generally center on preservation of agricultural activities, job creation and economic opportunities. The installation of a wind facility would allow for continued agricultural production and provide additional revenues to the local communities. Agricultural land accounts for over 94 percent of all land that would be impacted by the proposed facility.

In order to avoid potential impacts to cultural resources within the project area, the Applicant consulted with the SHPO in preparation of their overall survey plan for the project area and the SHPO has approved the Applicant's design for ongoing archaeological and architectural field work. Staff has recommended a condition to assure appropriate protection of cultural resources in the project area.

Construction of the proposed facility would result in an increase in construction spending, wages, and purchasing of goods and services. During operation, the facility would provide annual lease payments to the local landowners, and PILOT payments that could be up to \$9,000 per MW of nameplate capacity per year.

To minimize impacts to wetlands and streams, the Applicant has committed to using HDD to install the underground electric collection cable under streams and wetlands, where possible. To minimize impacts related to frac-out, Staff recommends the Applicant be required to provide a frac-out contingency plan. Construction of the facility would not require work within mapped 100-year floodplains.

The Applicant has acknowledged that operation of the facility may result in incidental take of listed bat species. The Applicant has coordinated with the USFWS and the ODNR on wildlife protocols and study expectations. The Applicant would continue to coordinate with the USFWS and the ODNR on minimizing wildlife impacts. Staff recommends that the Applicant work with USFWS to apply for an ITP and obtain a TAL from the USFWS that would stay in effect until an ITP is obtained. If tree clearing would be necessary, the Applicant would adhere to seasonal cutting dates of October 1 through March 31.

Many of the proposed turbine locations are within the minimum property line setbacks. The Applicant is currently pursuing waivers of the minimum setback with landowners and states that it understands that a turbine may not be constructed at a location which does not meet the minimum setback unless a waiver has been obtained.

The Applicant has indicated that various safety control technologies would be utilized to minimize the potential for blade shear and ice throw impacts. Staff has recommended conditions that the Applicant not render inoperative any wind farm safety control system, and set parameters for notification of blade shear and certain ice throw occurrences.

Based on Staff's review, the Applicant's proposed turbine layout and the Applicant's commitment to adherence of the dBA limit, and Staff's recommend conditions, the project is not likely to generate unacceptable levels of noise for non-participating residents. The Applicant also modeled shadow flicker impacts with respect to the proposed facility. The model results showed that, without mitigation, forty-five non-participating receptors would be exposed to more than 30 hours of shadow flicker per year by the facility. Staff has recommended a condition that the Applicant be required to provide mitigating measures to 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 minimize 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 would be developed through discussions with the Paulding County Engineer and implemented in conjunction with the ODOT special hauling permit process.

No impacts to AM or FM radio, cable television, radar, or satellite systems are expected. Possible impacts to off-air television signals would be remediated through a high-gain directional antenna oriented towards the signal origin or through the complaint resolution process. Further study is recommended for potential impacts to microwave communication systems and mobile phones.

Because the project impacts such a large area, it is imperative that the Applicant secure a financial instrument that best assures the ability to completely decommission the facility. Additionally, because the project would not generate revenue until it is operational, it is necessary that the decommissioning funds be available at the start of construction. The decommissioning requirements outlined in Ohio Admin.Code 4906-4-09(1) would ensure that the potential for adverse environmental impact would be minimized.

As of the time of preparation of this Staff report, the FAA and the ODOT Office of Aviation have not yet issued their final determinations on the potential impacts to air navigation. Given this, it is not currently possible for Staff to determine that potential impacts to air navigation have been identified nor minimized.

Conclusion

Staff concludes that the proposed facility would result in both temporary and permanent impacts to the project area and surrounding areas. Initially, Staff recommends denial of the proposed facility because the FAA and the ODOT Office of Aviation have not determined the impacts of the facility. However, the measures taken by the Applicant to minimize impacts to land use, cultural resources, streams, wetlands, wildlife, communications, and non-participating residents,

and with Staff's recommended conditions to further mitigate such impacts, Staff concludes that these factors of the proposed facility may represent the minimum adverse environmental impact.

As noted above, the FAA and the ODOT Office of Aviation have not yet completed their analysis of potential impacts to air navigation. Until the FAA and the ODOT Office of Aviation are able to complete their analyses, and Staff subsequently is able to analyze the studies' results, Staff recommends denial of the proposed facility.

Recommended Findings

Staff recommends that the Board find that the proposed facility does not represent the minimum adverse environmental impact. Therefore, it does not comply with the requirements specified in R.C. 4906.10(A)(3). Staff recommends that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

CONSIDERATIONS FOR R.C. 4906.10(A)(4)

ELECTRIC GRID

Pursuant to R.C. 4906.10(A)(4), the Board must determine that the proposed electric facilities are 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 facilities will serve the interests of electric system economy and reliability.

The purpose of this section is to evaluate the impact of integrating the proposed facility into the bulk power system (BPS). The Applicant proposes to construct a wind-powered electric generation facility located in Seneca County, capable of producing 212 MW. The proposed facility would interconnect to the BPS via American Electric Power Ohio Transmission Company's (AEP-OH Transco) existing Melmore Station, which is part of the Fostoria Central-Greenlawn-Howard 138 kV circuit.

NERC Planning Criteria

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 BPS. As an owner, operator, and/or user of the bulk power system, the Applicant is subject to compliance with various NERC reliability standards, including but not limited to those related to transmission planning for contingency events. NERC reliability standards are included as part of the system impact evaluations conducted by PJM Interconnection, LLC (PJM).³⁰

PJM Interconnection

The Applicant submitted a new service request to PJM requesting to interconnect the facility to the BPS on December 26, 2008. PJM assigned the request to queue position numbers U4-028 and U4-029. Each queue position number was for 100 MW. The initial System Impact Studies (SIS) were released by PJM in January 2011. An updated SIS for both queue numbers was released in May 2015.³¹

PJM studied the interconnection as an injection into the BPS via AEP-OH Transco's existing Melmore Station. The Applicant requested an injection of 200 MW, of which 26 MW could be available in the PJM capacity market. The capacity market ensures the adequate availability of necessary generation resources can be called upon to meet current and future demand.³²

30. PJM Interconnection, LLC is the regional transmission organization charged with planning for upgrades and administering the generation queue for the regional transmission system in Ohio. 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. The interconnection process provides for the construction of expansions and upgrades of the PJM transmission system, as needed to maintain compliance with reliability criteria with the addition of generation in its footprint.

31. PJM Interconnection, LLC, "System Impact Study, Queue Number U4-028/U4-029," accessed December, 20 2018, <https://pjm.com/planning/services-requests/interconnection-queues.aspx>.

32. For wind resources, PJM Interconnection, LLC recognizes 13% of a wind facility's capacity in the PJM capacity market. 200 MW * 13 percent = 26 MW.

The Applicant along with AEP-OH Transco and PJM filed an executed Interconnection Service Agreement and Interconnection Construction Service Agreement with the Federal Energy Regulatory Commission in December 2016.³³

PJM Network Impacts

PJM analyzed the bulk electric system with the proposed facility interconnected to the BPS. A 2013 summer peak power flow model was used to evaluate the regional reliability impacts. The studies revealed that, at an output of 200 MW, there would be reliability problems under a multiple contingency. The below chart displays the results of the PJM System Impact Study for the PJM regional footprint.³⁴

| PJM REGIONAL SYSTEM IMPACTS | |
|--|------------------------|
| Generator Deliverability - System Normal & Single Contingency Outage | |
| <i>Plant Output: Capacity Level – 26 MW</i> | No problems identified |
| Category C and D - Multiple Contingency Outages | |
| <i>Plant Output: 200 MW</i> | |
| <ol style="list-style-type: none"> <i>Kelsey Hayes-Ottawa 138 kV line overloads from 97.88 percent to 102.08 percent of its emergency rating for the line fault with failed breaker contingency outage ('C2-BRK-WR136').</i> <i>West Fremont-Kelsey Hayes 138 kV line overloads from 98.54 percent to 102.73 percent of its emergency rating for the line fault with failed breaker contingency outage ('C2-BRK-WR136').</i> | |

To correct the overloads found in the SIS, PJM suggested a reconfiguration at the West Fremont Substation in the SIS released in January 2011. The updated SIS, which was released in May 2015, stated the overloads were resolved by baseline upgrades B1281 and B1282. The baseline upgrades were completed and placed in-service in May 2014. The Applicant will be responsible for approximately \$550,000 of the cost of the upgrades, which corrects their contribution towards the overloads.

Contribution to Previously Identified Overloads - Network Impacts

PJM studied overloading where the proposed facility may affect earlier projects in the PJM Queue.

| CONTRIBUTION TO PREVIOUSLY IDENTIFIED OVERLOADS | |
|--|------------------------|
| <i>Plant Output: 200 MW</i> | No problems identified |

Potential Congestion due to Local Energy Deliverability- Energy Delivery Impacts

PJM studied the delivery of the energy portion. Network upgrades under this section would allow for the delivery of energy with operational restrictions. The upgrades are at the discretion of the Applicant and not required.

33. Federal Energy Regulatory Commission, Docket No. ER17-817-000, “Queue Position U4-028/U4-029, Original Service Agreement No. 4604,” accessed December, 20 2018, <https://ferc.gov/docs-filing/elibrary.asp>.

34. PJM Interconnection, LLC, “System Impact Study, Queue Number U4-028/U4-029,” accessed December, 20 2018, <https://pjm.com/planning/services-requests/interconnection-queues.aspx>.

| POTENTIAL CONGESTION DUE TO LOCAL ENERGY DELIVERABILITY | |
|---|---|
| Plant Output: Capacity Level – 26 MW Energy Level – 200 MW | West Fremont-Ottawa 138 kV line loads from 99.15 percent to 103.43 percent of its emergency rating (289 MVA) for the single line contingency outage ('B_LINE2_WR_034'). |

Short Circuit Analysis

The short circuit analysis study, which is part of the SIS, evaluates the interrupting capabilities of circuit breakers that would be impacted by the proposed generation addition. The results identified no circuit breaker problems.

Conclusion

PJM analyzed the bulk electric system, with the facility interconnected to the transmission grid, for compliance with NERC reliability standards and PJM reliability criteria. The PJM system studies indicated that, at an output of 200 MW, reliability violations would occur during multiple contingencies. The violation conditions have been corrected by baseline projects that are in-service. In addition, no potential violations were found during the short circuit analysis.

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

Recommended Findings

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, Staff recommends that the Board find that the facility complies with the requirements specified in R.C. 4906.10(A)(4), provided that any certificate issued by the Board for the proposed facilities include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(5)

AIR, WATER, SOLID WASTE, AND AVIATION

Pursuant to R.C. 4906.10(A)(5), the facility must comply with Ohio law 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.

During construction, the Applicant would comply with fugitive dust rules by the use of water spray or other appropriate dust suppressant measures whenever necessary. These methods of dust control are sufficient to comply with fugitive dust rules.

Water

Neither construction nor operation of the proposed facility would require the use of significant amounts of water, thus requirements under R.C. 1501.33 and 1501.34 are not applicable to this project. The Applicant has indicated that applicable permits would be limited to:

- Ohio National Pollutant Discharge Elimination System (NPDES) construction storm water general permit, Ohio EPA Permit No. OHC000004
- Nationwide Permit 51 under Section 404 of the Clean Water Act

In order to obtain the NPDES general permit, an Ohio EPA Notice of Intent (NOI) application would be submitted at least 21 days before construction. Along with the NOI a Storm Water Pollution Prevention Plan (SWPPP) would be developed.

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.

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

Solid Waste

The Applicant stated that it is unaware of any debris or solid waste removal necessary prior to construction. Waste generated during construction would consist of metals, packing/packaging materials, construction debris, office waste, scrap lumber, cables, glass, 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.

During operation of the facility, the solid waste would likely consist of office waste, lube oil containers, used oil, used antifreeze, and general waste. The operation and maintenance facilities would utilize licensed solid waste recycling and disposal services. With these measures, the Applicant's solid waste disposal plans comply with solid waste disposal requirements in R.C. Chapter 3734, and the rules and laws adopted under this chapter.

Aviation

The Federal Aviation Administration (FAA) and ODOT Office of Aviation administer regulatory programs to evaluate and authorize certain obstructions near airports and provide navigable airspace analysis.

FAA

The FAA conducts an aeronautical study process to determine whether the proposed wind farm would create a hazard to navigable airspace. The FAA authorization would pertain to individual wind turbines, meteorological towers, use of construction cranes, and use of an aircraft detection lighting system. The FAA requires a wind farm developer to file a *Notice of Proposed Construction* (Form 7460-1) for any structure greater than 199 feet above ground level. The Applicant submitted these forms to the FAA on June 20, 2018 for most of the individual wind turbines and its meteorological towers. The tip height for the wind turbines ranges from 453 to 584 feet tall depending on the model selected. The height for the proposed meteorological towers is 440 feet.

The FAA also has policy explanation document related to wind turbines on its website, entitled *Wind Turbine FAQs (latest revision 04/02/2018)*.³⁵ This document describes the FAA obstruction evaluation/airport airspace analysis group's policies on wind turbine aeronautical study analysis and aircraft detection lighting systems.

Particularly relevant to the Seneca Wind farm, in the *Wind Turbine FAQs* document at question 27, the FAA explains that objects over 500 feet require special attention. According to the FAA, "at 500 feet or higher, your proposed structure will be in altitudes available to general aviation aircraft. A public notice may be issued to gather aeronautical information, and this includes a 30-day comment period." During this time, the FAA considers and receives public comment from the flying public and the structures' impact on aviation.

At the end of the review, the FAA would issue either a Determination of No Hazard (DNH) or a Notice of Presumed Hazard (NPH). The Applicant stated that it expected an FAA final determination by June 2019. The FAA analysis is still pending at the time of preparation of this Staff report.

Turbines without proper aeronautical study

The Applicant submitted incorrect coordinates to the FAA for turbines 59, 71, and 85.

Staff inquired with the Applicant about this. According to the Applicant "Turbine 71 was relocated following the submittal to the FAA but prior to the filing of the OPSB application. This relocation was done to ensure compliance with potentially occupied structures south of the turbine. The location submitted to the OPSB is the correct location. The FAA will be provided the updated location prior to construction." Staff believes that the aeronautical studies performed are for locations from 140 to 350 feet away from those proposed to OPSB. Staff notes that, according to the FAA policy explanation document *Wind Turbine FAQs* and as outlined in question 17, these turbines will require a new aeronautical study (Form 7460-1). ODOT Office of Aviation personnel concurred that simply submitting updated turbine locations through an FAA Supplemental Notice

35. "Wind Turbine FAQs" (latest revision April 2, 2018), accessed July 1, 2019, <https://oeaaa.faa.gov/oeaaa/external/searchAction.jsp?action=showWindTurbineFAQs>.

(Form 7460-2) would be rejected by the FAA. Staff further notes that simply informing FAA of a different wind turbine location just prior to construction does not properly inform the flying public of the actual wind turbine's proposed locations.

Staff recommends that the Applicant not construct Turbines 59, 71, or 85, as the locations provided to the OPSB do not have proper FAA authorization or an aeronautical study at the time of this report.

Meteorological Towers

A proposed permanent meteorological tower, identified in Aeronautical Study 2018-WTE-5693-OE, located southwest of turbine 53, would exceed the 14 CFR Part 77.17 (a)(2) of the Seneca County Airport.

Staff recommends that the Applicant not construct the proposed permanent meteorological tower because it does not satisfy FAA requirements at the time of this report.

The other proposed permanent meteorological towers are currently awaiting FAA review and do not have FAA authorization at the time of this report. Staff recommends that the Applicant not construct the permanent meteorological towers as proposed.

Construction Cranes

Cranes would be used during the construction of the proposed facility. The specific height and type of the construction cranes has yet to be finalized, but would necessarily be higher than the nacelle height of the wind turbines. A separate temporary construction permit would need to be obtained from the FAA, which would detail the height, operating conditions, and duration of the crane work.

Staff recommends that the Applicant file in this docket copies of the FAA temporary construction permits for any work activity involving construction cranes once they are received, but no later than seven days prior to crane deployment.

Aircraft Detection Lighting System

The Applicant proposed to use an Aircraft Detection Lighting System at this wind farm. This proposed system would use radar to identify a plane in the area, and then the system would activate and flash the wind farm's marking and lighting warning systems and send a radio warning to the approaching plane. The FAA has approved this kind of system on a case-by-case basis. The Applicant indicates that, if the system malfunctions, the default system setting will be lighting as normal. The benefit of this Aircraft Detection Lighting System is that it allows the wind farm to remain unlit except when an aircraft is in the area. The FAA policy explanation document *Wind Turbine FAQs* outlines, in questions 29 and 30 of that document, the requirements for FAA authorization of an Aircraft Detection Lighting System.

Staff recommends that the Applicant provide the letter or other FAA authorization for its Aircraft Detection Lighting System prior to installation and use of this system at this wind farm.

ODOT Office of Aviation

The ODOT Office of Aviation has access to the same aeronautical studies submitted to the FAA and often performs a simultaneous review. The ODOT Office of Aviation implements R.C. 4561.31, which is a construction permit program for structures affecting airport operations.

According to the ODOT Office of Aviation, its duty is to protect Federal Aviation Regulations Part 77 surfaces (49 CFR 77) which is slightly different than the FAA analysis.³⁶ For proposed major utility facilities and economically significant wind farms, participation in the Ohio Power Siting Board process, pursuant to R.C. 4561.31(E) and R.C. 4906.10(A)(5) replaces the permitting process.

Staff coordinated with the Ohio Department of Transportation Office of Aviation during the review of this application in its review of potential impacts of the facility on airspace navigation.

The ODOT Office of Aviation provided its “preliminary, cursory, and incomplete” recommendations to address airspace navigation issues in a letter to Staff dated December 26, 2018. The ODOT Office of Aviation found that the location and height of all 86 wind turbine structures would exceed 499 feet above ground level and would constitute an obstruction to air navigation by exceeding the 14 C.F.R. Part 77.17(a)(1) surface by approximately 157 feet. Staff notes that the Applicant has reduced the maximum height of the proposed wind turbines in its 2/12/2019 filing to 584 feet.

The ODOT Office of Aviation also noted that 10 of the proposed wind turbines structure locations are within 3 nautical miles of the Seneca County Airport and would impact the 14 CFR Part 77.17 (a)(2) surfaces of that airport. Also, According to the ODOT Office of Aviation, “the impacts to the minimum obstacle clearance altitude or minimum vectoring altitude of various en route airways or arrival procedures, in addition to any impacts to approach or departure procedures to any public use airport, all of which are 14 C.F.R. Part 77.17(a)(3) impacts, are currently unknown.”

The ODOT Office of Aviation stated that the final FAA determination is an essential piece for their review. The FAA determination has not been received as of the date of this report, and therefore the ODOT Office of Aviation is unable to update its letter from December 26, 2018.

Department of Defense

By letter dated December 4, 2018, the Department of Defense (DoD) Military Aviation and Installation Assurance Siting Clearing House indicated that the proposed Seneca Wind farm project would have an adverse impact on military operations and readiness. Specifically, the DoD indicated that there are three military aviation training routes that cross the project area. These are SR-709, SR-711, and SR-715. These SR routes, or slow speed routes, are flown at or below 1500 feet above ground level at speeds of 250 knots or less. These military aviation training routes are used by the 179th Airlift Wing of the Ohio Air National Guard.

The DoD concluded its review of the Seneca Wind farm and issued a letter dated June 11, 2019 that indicated “No Unacceptable Risk to National Security.” Also, on 6/11/2019, the DoD representative contacted OPSB staff via e-mail. The e-mail stated that any additional structures beyond the current project footprint will have significant adverse impacts to low level training missions conducted by the Ohio Air National Guard. That means that the DoD would want notice

36. Part 77 surfaces such as approach, transitional, and horizontal surfaces are FAA defined airspaces or clearance areas around airports.

if the wind farm project area expands. Also, the e-mail requested that the Applicant install Night Vision Goggle compatible lighting on all structures.

Consultant Reports

Staff reviewed the aviation consultant's reports prepared on behalf of the Applicant. Specifically, Staff reviewed Aviation Systems, Inc. ASI #19-S-0841.001 dated January 17, 2019 and Capitol Airspace Group's January 9, 2019 report. Aviation Systems, Inc. noted that turbines 9, 10, 11, 12, 13, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 31, 32, 33, 34, 36, 38, 39, 43, 45, 58, 63, 64, 72, 73, 75, 77, 78, 79, 80, 81, 82, 83, 84, 87, 88, 89, 93, 94, 95, 96 penetrate the military training routes. Aviation Systems, Inc. also noted that turbines 77 and 84 would impact an approach to the Seneca County Airport and the Applicant is unable to mitigate the impact.

Conclusion

The FAA determination and ODOT Office of Aviation have not been received as of the date of this report. Therefore, Staff recommends that the Board find that the proposed facility does not comply with the requirements specified in R.C. 4906.10(A)(5), and that this application for a certificate be denied.

If the Board does issue a certificate for the proposed facility, then Staff recommends several conditions designed to avoid, mitigate, and minimize airspace navigation concerns.

All 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

Staff recommends that the Board find that the proposed facility does not comply with the requirements specified in R.C. 4906.10(A)(5). Staff recommends that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(6)

PUBLIC INTEREST, CONVENIENCE, AND NECESSITY

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

Public Interaction and Participation

The Applicant hosted a public informational open house for this project on April 17, 2018. Attendees were provided the opportunity to speak with representatives of the Applicant about the proposed project and to provide feedback. The Applicant provides information about the project online at <https://senecawind.spower.com>.

The Applicant indicated that it served copies of the complete application on the Seneca County Board of Commissioners; the Bloom, Eden, Reed, Scipio, and Venice township trustees; the Seneca Soil and Water Conservation District; the Seneca Regional Planning Commission; and the Seneca County Engineer. The Applicant indicated that it also sent copies of the complete application to the Tiffin-Seneca Public Library, the Seneca East Public Library, and the Bliss Memorial Public Library. Additionally, copies of the complete application are available for public inspection at the offices of the PUCO and online at <http://opsb.ohio.gov>.

The Applicant has committed to provide notice to affected parties at least seven days prior to the start of construction. Staff recommends that a similar notice be mailed to these same individuals at least seven days prior to the start of facility operation.

During construction of the project, the Applicant has committed to implementing the complaint resolution program described in Appendix D of the application. According to the program, residents with complaints may call a toll-free telephone number or visit the local construction office to register a complaint. The Applicant stated that it will file quarterly complaint reports with the OPSB. The Applicant will update the complaint resolution program for use during facility operation.

As of July 1, 2019, 182 documents have been filed in the public comments of the case record for this proceeding.³⁷ Comments are often filed in groups by the PUCO Docketing Division, therefore many of these documents include comments from multiple individuals or organizations. The OPSB received comments in opposition to and in support of the proposed facility. Public comments are made available for Board members, Staff, and the public to view online in the case record at <http://dis.puc.state.oh.us>.

The Administrative Law Judge has granted or accepted intervention in this case as filed by Seneca County Residents; the Ohio Farm Bureau Federation; the boards of trustees of Eden, Reed, Scipio, and Venice townships; the Board of Education of Seneca East Local School District; Steve C. Shuff; the Black Swamp Bird Observatory; and the Seneca County Board of Commissioners.

37. In the Matter of the Application of Seneca Wind, LLC for a Certificate to Site a Wind Powered Electric Generation Facilities in Seneca County, Ohio, Case No. 18-0488-EL-BGN, Public Comments, accessed July 1, 2019, <http://dis.puc.state.oh.us>.

On April 5, 2019, the Administrative Law Judge issued an entry suspending the hearings scheduled in this case. The Administrative Law Judge will establish new dates for the local public hearing and the adjudicatory hearing in a subsequent entry.

Land Leases

The collector lines associated with the facility would be located primarily on privately-owned land leased by the Applicant, but also in public road right-of-ways. All other facility components, including turbines, would be located entirely on privately-owned leased land. The Applicant states that participating landowner acreage totals approximately 25,691 acres comprised of 506 properties within the 56,900-acre project area.

Liability Insurance

The Applicant stated that it will carry general commercial liability insurance and automobile liability insurance to cover liability during the construction and operation of the proposed facility.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the Recommended Conditions of Certificate section.

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 R.C. 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 *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(7)

AGRICULTURAL DISTRICTS AND AGRICULTURAL LAND

Pursuant to R.C. 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 facility. The agricultural district program was established under R.C. Chapter 929. Agricultural district land is exempt from sewer, water, or 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 ten acres or produce a minimum average gross annual income of \$2,500.

The construction, operation, and maintenance for the Seneca Wind facility would occur mainly on land currently used for agricultural purposes. According to the Applicant, approximately 82 acres of farmland would be permanently converted to wind farm use. About 1,177 acres of agricultural land would experience temporary disturbances.

Wind turbines, access roads, meteorological towers, and the collection substation would account for almost all of the permanent agricultural land lost to the project. Laydown yards and cable burying activities would account for a temporary loss of agricultural land use. Of the total agricultural land lost due to the project, approximately 19 acres of agricultural district land would be permanently impacted. The viability of the agricultural district lands would not be compromised by the proposed project.

The Applicant would take measures to minimize impacts to agricultural land that would occur as a result of construction, operation, and maintenance of the proposed project. Any soils compacted by construction activity would be de-compacted during restoration. The Applicant has committed to coordinate with landowners to avoid long-term impacts to field irrigation systems. The Applicant designed the project to avoid, where possible, known field drainage systems, and has committed to conduct reviews of public records and coordinate with land owners to locate and avoid additional subsurface drainage infrastructure. Further, the Applicant has committed to document and coordinate repair of any damaged system in a timely manner. The Applicant stated that it does not plan to impact any agricultural structures during construction or operation of the facility.

Recommended Findings

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 R.C. 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 *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(8)

WATER CONSERVATION PRACTICE

Pursuant to R.C. 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 operations and maintenance 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 proposed facility would incorporate maximum feasible water conservation practices, and therefore complies with the requirements specified in R.C. 4906(A)(8). Further, the Staff recommends that any certificate issued by the Board for the certification of the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

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IV. RECOMMENDED CONDITIONS OF CERTIFICATE

Following a review of the application filed by the Applicant, and the record compiled to date in this proceeding, Staff recommends that a certificate not be issued for the proposed facility. However, should the Board choose to issue a certificate for the proposed facility, Staff recommends that a number of conditions become part of such certificate. These recommended conditions may be modified as a result of public or other input received subsequent to the issuance of this report. At this time, Staff recommends the following conditions:

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) The Applicant shall comply with the requirements established by the Ohio Administrative Code chapter 4906-4-09, Regulations associated with wind farms.
- (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 conferences for each stage of construction.
- (4) 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.
- (5) 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.
- (6) As the information becomes known, the Applicant shall file in this proceeding the date on which construction will begin, the date on which construction was completed, and the date on which the facility begins commercial operation.

- (7) Prior to the commencement of construction activities in areas 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.
- (8) The Applicant shall coordinate with local building code enforcement officials with regard to the construction of any structures not directly related to the operation of the generation facility.
- (9) At least 30 days prior to the preconstruction conference, the Applicant shall submit to Staff, for review and acceptance, one set of detailed engineering drawings that includes a proposed construction schedule of the final project design, including the facility, 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 incorporate 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. The detailed engineering drawings of the final project design and foundation design shall include the identity of the registered professional engineer(s), structural engineer(s), or engineering firm(s), licensed to practice engineering in the state of Ohio who reviewed and approved the designs.
- (10) The facility shall be operated in such a way as to assure that no more than 200 megawatts would at any time be injected into the Bulk Power System.

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) Prior to the commencement of construction, the Applicant shall finalize coordination of the assessment of potential effects of the proposed facility on cultural resources, if any, with Staff and the Ohio Historic Preservation Office (OHPO). If the resulting coordination discloses a find of cultural or archaeological significance, or a site that could be eligible for inclusion in the National Register of Historic Places, then the Applicant shall submit a modification or mitigation plan to Staff. Any such mitigation effort, if needed, shall be developed in coordination with the OHPO and submitted to Staff for review and assurance that it complies with this condition.
- (12) At least seven days prior to construction, the Applicant shall provide Staff, affected property owners and tenants, residences located within 1 mile of the project area, interveners to this case, county commissioners, township trustees, emergency responders, airports, schools, and libraries, as well as anyone who has requested updates regarding the project, with written notice regarding the start of construction and a copy

of the complaint resolution program outlined in Appendix D of the application. The notice shall include a description of the nature of the project, the toll-free telephone number and local construction office for the project, and the proposed timeframe for project construction and restoration activities. A copy of the notice shall be filed on the docket in this case.

- (13) At least seven days prior to the start of facility operation, the Applicant shall file on the docket in this case and provide Staff, affected property owners and tenants, residences located within 1 mile of the project area, interveners to this case, county commissioners, township trustees, emergency responders, airports, schools, and libraries, as well as anyone who has requested updates regarding the project, with written notice regarding the start of operation and a copy of the complaint resolution program used during facility operation. The notice shall include a description of the nature of the project, the toll-free telephone number and local office for the facility, and the proposed timeframe for the start of facility operations. A copy of the notice shall be filed on the docket in this case.
- (14) During the construction and operation of the facility, the Applicant shall notify the Staff, within 48 hours, of any complaints that are a direct result of the wind farm and provide staff with a quarterly complaint report on January 31, April 30, July 31, and October 31 of each year.
- (15) The Applicant shall restore all disturbed field drainage systems, irrigation systems, and temporarily impacted farmland to its previous or better condition unless otherwise specified by the affected land owner.

ECOLOGICAL CONDITIONS

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

- (16) 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 subsurface evaluation at each turbine location to provide subsurface soil properties, static water level, rock quality description, 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.
- (17) Should construction be delayed beyond five years of the date of the certificate, certain wildlife surveys shall be updated as determined by the ODNR.
- (18) The Applicant shall have an environmental specialist on site during construction activities that may affect sensitive areas, as accepted by 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.

- (19) Prior to the use of horizontal directional drilling, the Applicant shall file on the docket of this case and provide to Staff a frac-out contingency plan detailing monitoring, environmental specialist presence, containment measures, cleanup, and restoration.
- (20) Sixty days prior to the first turbine becoming operational, the Applicant shall submit a post-construction avian and bat monitoring plan for Ohio Department of Natural Resources (ODNR) Division of Wildlife (DOW) and Staff review and confirmation that it complies with this condition. The Applicant's plan shall be consistent with Ohio 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. This includes having a sample of turbines that are searched daily. Collectors of bird and bat carcasses for the purpose of post-construction monitoring shall obtain the appropriate carcass collection permits. The post construction monitoring shall begin within two weeks of operation of the first turbine and be conducted for a minimum of two seasons (April 1 through 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 shall extend into the second calendar year (e.g., start monitoring on July 1, 2019 and continue to November 15, 2019; resume monitoring April 1, 2020 and continue to June 30, 2020). The second monitoring season may be waived at the discretion of ODNR and Staff. The monitoring start date and reporting deadlines will be provided in the DOW approval letter.
- (21) The Applicant shall contact Staff, ODNR, and the USFWS within 24 hours if state or federal listed species are encountered during construction, operation, or monitoring activities. Activities that could adversely impact the identified plants or animals shall be immediately halted until an appropriate course of action has been agreed upon by the Applicant, Staff and the appropriate agencies.
- (22) During construction of the facility, if OPSB Staff and the ODNR, in consultation with the USFWS, determine the project results in significant adverse impact to wild animals, ODNR and OPSB Staff will notify the Applicant. Thereafter as soon as possible and no longer than 30 days after receiving notification of the significant adverse impact, the Applicant shall implement practices to rectify the significant adverse impact, which will include development and submission of a mitigation plan or adaptive management strategy to OPSB Staff and the ODNR for review to confirm compliance with this condition. Activities that could adversely impact the identified animals shall be modified to minimize risk until the mitigation plan or adaptive management strategy is agreed upon.
- (23) The Applicant shall adhere to seasonal cutting dates of October 1 through March 31 for removal of any trees greater than or equal to three inches in diameter, unless coordination efforts with the ODNR and the U.S. Fish and Wildlife Service (USFWS) allows a different course of action.

- (24) Prior to the first turbine becoming operational, the Applicant shall obtain a technical assistance letter for avoidance of Indiana and Northern Long-eared Bat Take from the USFWS. The Applicant shall comply with the operational measures detailed within the technical assistance letter until an incidental take permit has been obtained for the project.
- (25) Prior to construction, if impacts to wetlands or upland habitats adjacent to wetlands are proposed, the Applicant shall obtain an ODNR-approved herpetologist to conduct Blanding's turtle and spotted turtle habitat suitability surveys to determine if suitable habitat exists within the project area. If suitable habitat is determined to be present, the Applicant shall avoid impacts to this habitat by doing one of the following:
 - (a) Avoid the area determined to be suitable habitat along with an appropriate buffer determined by the ODNR.
 - (b) Obtain an ODNR-approved herpetologist to conduct a presence/absence survey. If either species is determined to be present, the Applicant shall continue to coordinate with ODNR to assure that impacts are avoided
 - (c) Obtain an ODNR-approved herpetologist to develop and implement an avoidance/minimization plan.
 - (d) The Applicant shall conduct no in-water work in perennial streams from April 15 through June 30 to reduce impacts to indigenous aquatic species and their habitat.
- (26) Construction in upland sandpiper preferred nesting habitat types shall be avoided during the species' nesting period of April 15 through July 31, unless coordination with the ODNR allow a different course of action.
- (27) Construction in northern harrier preferred nesting habitat types shall be avoided during the species' nesting period of May 15 through August 1, unless coordination with the ODNR allow a different course of action.
- (28) Construction in loggerhead shrike preferred nesting habitat types shall be avoided during the species' nesting period of April 1 through August 1, unless coordination with the ODNR allow a different course of action.
- (29) The Applicant shall develop and implement an Eagle Conservation Plan. The Eagle Conservation Plan shall be developed prior to construction in consultation with the USFWS and in accordance with the USFWS's Eagle Conservation Plan Guidance document.

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 notify the OPSB Staff at (866) 270-6772 or contactOPSB@puco.ohio.gov as soon as practicable, but in no event, later than 24 hours of an occurrence of any extraordinary event. Extraordinary events include, but are not

limited to: tower collapse, turbine failure, thrown blade or hub, ice throw beyond the setback, collector or feeder line failure, injury to any person, or nacelle fire. A written report shall be submitted to staff within 30 days detailing the incident and corrective actions to be taken to avoid, prevent, mitigate, or minimize a recurrence. Where additional related information is obtained after the 30-day written report is submitted, the Applicant shall make a supplemental report as soon as practicable.

- (31) That the Applicant shall not construct Turbines 80 and 89 as proposed, because these would interfere with known existing microwave paths.
- (32) That the Applicant shall denote on the set of detailed engineering drawings of the final project design the microwave paths and procedures to avoid interference with those microwave paths by construction equipment for turbines 9, 64, and 83.
- (33) That the Applicant shall not construct Turbine 77 as proposed, because it does not meet the setback to an electric transmission line.
- (34) At least 30 days prior to construction, the Applicant shall submit to Staff relevant portions of the turbine manufacturer's turbine restart procedures due to vibration, ice accumulation, lightning storm, collector or feeder line failure.
- (35) At least 30 days prior to construction, the Applicant shall prepare through interested and pertinent persons, a plan for at least one predesignated emergency-response landing zone within the project area. The Applicant shall include the location of this landing zone in its emergency response plan.
- (36) At least 30 days prior to construction, the Applicant shall submit a noise study showing that cumulative nighttime sound levels will not exceed 44 dBA at any non-participating sensitive receptor.
- (37) At least 30 days prior to construction, the Applicant shall submit a shadow flicker study showing that cumulative shadow flicker impacts will not exceed 30 hours per year at any non-participating sensitive receptor.
- (38) 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 complete a microwave path study that identifies all existing microwave paths that intersect the wind farm project, 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 communication 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.
- (39) All existing licensed microwave paths, 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, 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, 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.

AIR, WATER, SOLID WASTE, AND AVIATION CONDITIONS

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

- (40) The Applicant shall meet all recommended and prescribed Federal Aviation Administration (FAA) and Ohio Department of Transportation (ODOT) Office of Aviation requirements to construct an object that may affect navigable airspace. This includes submitting coordinates and heights for all towers exceeding 199 feet AGL for ODOT Office of Aviation and FAA review prior to construction, and the non-penetration of any FAA Part 77 surfaces.
- (41) At least 30 days prior to the preconstruction conference, the Applicant shall file in this docket a copy of the FAA Determination of No Hazard letter for the wind turbines and permanent meteorological towers, at the locations as shown in the application, and the FAA temporary construction permit for any work activity involving construction cranes.
- (42) The Applicant shall not construct Turbines 1, 2, 3, 4, 5, 6, 7, 8, 70, and 71 as these are within three nautical miles of, and in the Part 77.17(a)(2) surface, of the Seneca County Airport and these do not satisfy FAA and ODOT Office of Aviation requirements .
- (43) The Applicant shall not construct Turbines 59, 71, and 85, as the locations provided to the OPSB do not have an aeronautical study or FAA authorization.
- (44) The Applicant shall not construct Turbines 77 and 84 as the locations impact an approach to the Seneca County airport.

- (45) Staff recommends that the Applicant not construct the permanent meteorological towers as proposed, because the Applicant does not currently have FAA authorization.
- (46) The Applicant shall not construct the permanent meteorological tower (Aeronautical Study Number 2018-WTE-5693-OE) proposed to be located at latitude 41°1'55.33"N and longitude 83°8'40.24"W and southwest of turbine 53, because it is within three nautical miles of and in the Part 77.17(a)(2) surface of the Seneca County Airport and does not satisfy FAA requirements.
- (47) At least 30 days prior to installation of the Aircraft Detection Lighting System, the Applicant shall submit copies of any applicable FAA Lighting System authorization(s) to Staff.
- (48) The Applicant shall also submit on the docket of this case copies of the FAA temporary construction permits for any work activity involving construction cranes once such permits are received, but no later than seven days prior to crane deployment.
- (49) The Applicant shall use NVG (night vision goggle) compatible lighting for Turbines 1 through 96.
- (50) If the Applicant uses the Vestas V110 (2.2MW) turbine model, then the Applicant shall file a copy of the manufacturer's most current safety manual in the docket of this case.



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Summary: Staff Report of Investigation electronically filed by Mr. Matt Butler on behalf of Staff of OPSB