Montgomery County Wind Energy Conversion Systems (WECS) Application – Virden Wind Energy Project

March 20, 2024

Submitted to:
Montgomery County Development & Personnel Committee
c/o Christine Daniels
#1 Courthouse Square – Room 202
Hillsboro, IL 62049

Prepared by:
Virden Wind Energy, LLC
103 Elevator Street
Farmersville, Illinois 62553

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I. Introduction

Virden Wind Energy LLC (Virden Wind or Applicant), a limited liability company registered to do business in Illinois, is a wholly owned subsidiary of UKA North America LLC (UKA). Virden Wind submits this Wind Energy Conversion System (WECS) Permit Application (Application) to construct the Virden Wind Project (Project). This Application demonstrates that the Project complies with the Montgomery County Ordinance Regulating the Siting of Wind Energy Conversion Systems, Rev. February 13, 2024 (Ordinance or WECS Ordinance), and applicable federal, state and local laws and regulations.

Many stakeholders in the Montgomery County community support this Project. Landowners owning nearly 5,365 acres have signed up to participate in the Project. For these landowners, the Project will provide annual payments for the next thirty years, representing critical revenue for these Montgomery County landowners. Virden Wind has met with school districts, including Panhandle Community School District (CSD) and Pawnee CSD, in the Project footprint and they support this Project because it will be a long-term source of local, guaranteed tax revenue that schools can depend on. The Project will also bring road improvements to Montgomery County motorists and millions of dollars to the county and impacted township road districts. This Project is a unique opportunity for Montgomery County to enjoy all of these benefits without having to raise taxes. We ask the Montgomery County Board to approve the Project and enable the county and its many stakeholders to enjoy the benefits this Project will bring.

Brief Overview of Applicable Law

Montgomery County amended its WECS Ordinance twice over the past year, once on June 13, 2023 and again on February 13, 2024, and this Application complies with the WECS Ordinance to the extent it complies with the state Wind Siting Statute, 55 ILCS 5/5-12020. In various places throughout the WECS Ordinance, the language is inconsistent, conflicting, or vague. In those cases, such inconsistency, conflict, or vagueness and its resolution will be noted in the text of the Application.

Based on a complete reading of the WECS Ordinance and discussions with Montgomery County representatives, Virden Wind understands that a WECS Construction Permit and Operating Permit are the only permits from Montgomery County that are required to construct and operate the Virden Wind Project. Montgomery County does not issue building permits. The application forms for a WECS Construction Permit and WECS Operating Permit attached to the WECS Ordinance (Appendix A and C of the Ordinance, respectively) confirm this point, with the only other requirement being a Notification of WECS Construction (found in Appendix B of the Ordinance), which must be posted onsite prior to starting construction. Because Montgomery County does not issue building permits, Virden Wind has included a draft pre-construction checklist of proposed items that will be submitted to the County Engineer for review and approval prior to commencing construction (Pre-Construction Submittal). The Pre-Construction Submittal is included in Section IX below.

In places where the WECS Ordinance is more restrictive, the Wind Siting Statute prevails. 55 ILCS 5/5-12020(b) (“Notwithstanding any other provision of law or whether the county has formed a zoning commission and adopted formal zoning under Section 5-12007, a county may establish standards for commercial wind energy facilities . . . . The standards may include all of the requirements specified in this Section but may not include requirements for commercial wind energy facilities . . . that are more restrictive than specified in this Section.”).

The Wind Siting Statute requires that a request for siting approval “shall be approved if the request is in compliance with the standards and conditions imposed in this Act…” 55 ILCS 5/5-12020(g). Virden Wind demonstrates in this Application that it satisfies, and sometimes exceeds, both the current WECS Ordinance and the Wind Siting Statute.

Because the Wind Siting Statute requires a public hearing, allows the County Board to attach conditions that do not conflict with the Wind Siting Statute, and requires a hearing allowing public comment, the Wind Siting Statute protects the due process interests and the use and enjoyment of property interests held by Virden Wind and the residents of Montgomery County. The Applicant respectfully requests that upon review of the Application and conclusion of the public hearing, the Development and Personnel Committee vote to recommend granting and the County Board vote to approve the Application and issue Virden Wind a WECS Construction Permit to construct and operate the Project.

Organization of this Application

The following sections of the Application demonstrate compliance with the Montgomery County WECS Ordinance. Each section heading corresponds to sections of the Ordinance (specifically Sections §VI through §IX and §XIV) and documents Virden Wind's compliance with that portion of the Ordinance.

II. The Application Accomplishes the Purposes of the Montgomery County WECS Ordinance (§I.B)

The Montgomery County WECS Ordinance sets forth the following statement of purpose:

> *The purpose of this ordinance is to facilitate the construction, installation, operation, and decommission of Wind Energy Conversion Systems (WECS) in Montgomery County, Illinois in a manner that promotes economic development and ensures the protection of health, safety, and welfare while also avoiding adverse impacts to important areas such as agricultural lands, endangered species habitats, conservation lands, and other sensitive lands. This ordinance will promote the supply of wind energy in support of Illinois' statutory goal of increasing energy production from renewable energy sources. This ordinance shall not apply to personal or business wind energy development for the primary use of self-sustaining energy. This ordinance is not intended to replace safety, health, or environmental requirements contained in other applicable codes, standards, or ordinances. The provisions of this ordinance shall not nullify any provisions of local, state, or federal law.*

This Application demonstrates the Project meets the purposes of the Montgomery County WECS Ordinance.

- *As demonstrated in this Application, the Project will facilitate the construction, installation, operation, and decommissioning of WECS in a manner that promotes economic development.*

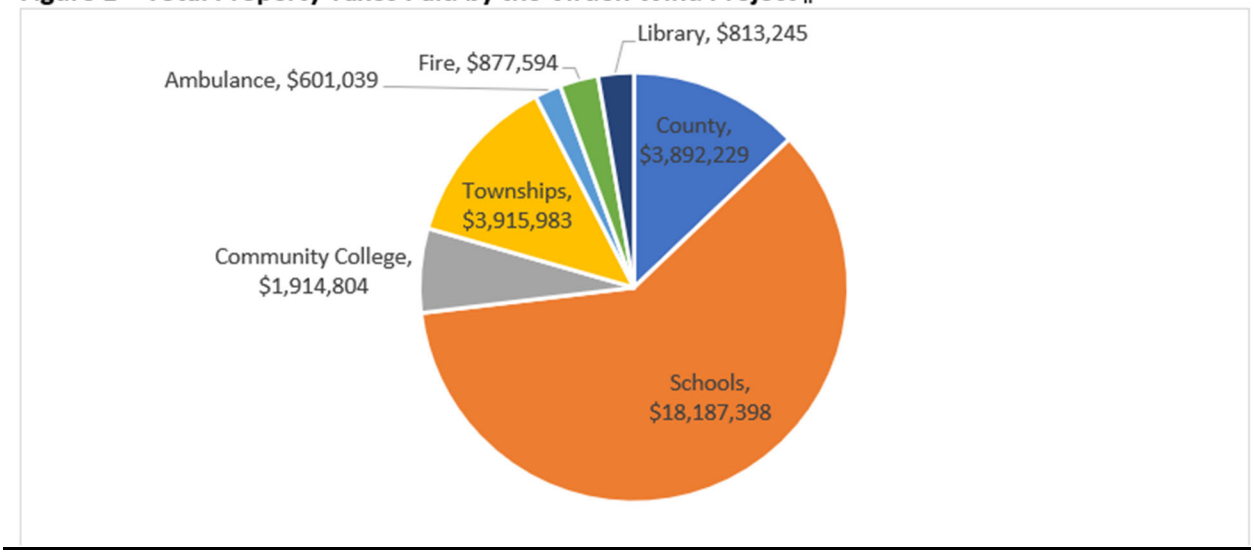
The Virden Wind Project facilitates short-term and long-term economic benefits for local residences and for Montgomery County and its taxing districts. As discussed in more detail below, these economic impacts include; (1) lease payments to Montgomery County landowners, (2) $18.1M in school district revenue for Montgomery County schools; and (3) over $30.2M in local property taxes for Montgomery County taxing districts (which include Montgomery County schools) over the life of the Project. These economic opportunities represent significant revenue input to the County without the need to raise taxes, and increased revenue to local businesses, such as restaurants, grocery stores, hotels, and gas stations during construction from construction-related workers.

Virden Wind hired Dr. David Loomis, *Professor Emeritus* at the University of Illinois, now retired, to conduct an economic impact study for this Project. Professor Loomis's study is provided in **Appendix A**.

The following pie chart from Dr. Loomis' report shows the estimated property taxes paid to each taxing district over the life of the Virden Wind project:

Figure 1 – Total Property Taxes Paid by the Virden Wind Project[1]

Figure·1—·Total·Property·Taxes·Paid·by·the·Virden·Wind·Project¶



Each "piece of the pie" shown in Figure 1 are further broken down by taxing jurisdiction in Tables 1 through 4 below (as provided in **Appendix A**).

Table 1. Tax Revenue from the Virden Wind Project for Montgomery County

Year	Montgomery County Tax	Community Mental Health	CES Extension Service	Senior Social Services	Veterans Assistance
Total	$3,170,205	$493,895	$110,038	$79,749	$38,342
Avg Annual	$105,673	$16,463	$3,668	$2,658	$1,278

[1] See Appendix A, page 5.

Table 2. Tax Revenue from the Virden Wind Project for the Townships

Year	Harvel Township	Harvel Road District	Bois D'Arc Township	Bois D'Arc Road District	Bois D'Arc-Harvel-Pitman-Zanesville Multi-Township Assessor
Total	$512,031	$1,110,608	$453,090	$1,756,419	$83,835
Avg Annual	$17,068	$37,020	$15,103	$58,547	$2,794

Table 3. Tax Revenue from the Virden Wind Project for Other Taxing Bodies

Year	Lincoln Land Community College	Raymond-Harvel Ambulance	Farmersville-Waggoner Ambulance	Farmersville-Waggoner Fire	Farmersville-Waggoner Library
Total	$1,914,804	$177,648	$423,391	$877,594	$813,245
Avg Annual	$63,827	$5,922	$14,113	$29,253	$27,108

Table 4. Tax Revenue from the Virden Wind Project for the School Districts

Year	Panhandle Community School District 2	Pawnee Community School District 11
Total	$16,467,972	$1,719,425
Avg Annual	$548,932	$57,314

Overall, the report documents the investment that the Virden Wind Project will make in Montgomery County which will ignite economic development and provide long-lasting economic benefits (**Appendix A**).

Construction and operation of the Project will not significantly affect current land use and production. Current land use, such as farming, can continue up to and surrounding the wind turbines and access roads, making the Project consistent with the current rural character of the community.

Virden Wind has also developed a robust decommissioning agreement **(Appendix B)** that has conservatively estimated the costs of decommissioning and provides decommissioning financial security

that will be held by the County in the event something should happen in the future that would prevent the facility owner from decommissioning the Project. The financial assurance will also list the landowners as secondary beneficiaries to ensure that decommissioning is covered even if the County fails to act. By factoring in the costs to restore the land within the Project area back to its original use, the decommissioning plan facilitates the continued economic development of the community and restoration of the land to agricultural uses.

Virden Wind will also enter into a Road Use Agreement (see Section III.E below) with the County and local road authorities under which the Applicant will agree to pay for road improvements and repairs required to safely construct the Project and make the roads safe for the motoring public after construction is complete as well as during and after decommissioning. Improvements made pursuant to the Road Use Agreement and costs to administer the agreement will be paid for by the developer with no additional financial burden to the County.

The Application has, accordingly, met this stated purpose of the Montgomery County WECS Ordinance.

- *The Project will ensure the protection of health, safety and welfare and avoid adverse impact to important areas such as agricultural lands, endangered species habitats, conservation lands, and other sensitive lands*.

Every regulatory or regulating entity that has reviewed the safety and protectiveness of the Project has approved it. Virden Wind created a robust Emergency Management Plan (see Section V.D below) and reviewed it with local officials to ensure the preparedness of local emergency responders. Virden Wind has consulted with the U.S. Fish & Wildlife Service (USFWS) and the Illinois Department of Natural Resources (IDNR) and committed to meeting all of the IDNR's recommendations for the protection of wildlife in the vicinity of the wind farm. The Project has also initiated consultation with the Illinois State Historic Preservation Office and will avoid any adverse impact to historic, architectural, or cultural resources that may exist in the Project area.

Electricity production from wind turbines does not pollute the water or air, so wind energy means less smog, less acid rain, and fewer greenhouse gas emissions. Because it is a clean energy source, wind energy reduces health care and environmental costs associated with air pollution. Also, wind energy requires no mining, drilling, or transportation of fuel and it poses no risk of large-scale environmental contamination. With these elements of safety and protection, the Virden Wind Project has met this stated purpose of the Montgomery County WECS Ordinance.

- *The Application will promote the supply of wind energy in support of Illinois' statutory goal of increasing energy production from renewable energy sources.*

The Project will be a new 100 MW (injection capacity)/ up to 122.4MW (nameplate capacity) source of renewable energy from wind to be located in Montgomery County that will support Illinois' statutory goal of increasing energy production to a 100% from clean energy sources by 2050. The Virden Wind Project will increase energy production from renewable energy sources in Illinois.

- *This Ordinance shall not apply to personal or business wind energy development for the primary use of self-sustaining energy.*

The WECS Ordinance applies to the Virden Wind Project because it will put renewable energy onto the electric distribution grid and sell power and renewable energy credits to third parties. Virden Will not be used for self-sustaining energy.

- *This ordinance is not intended to replace safety, health, or environmental requirements contained in other applicable codes, standards, or ordinances. The provisions of this ordinance shall not nullify any provisions of local, state, or federal law.*

The balance of this Application demonstrates how the Application meets the safety, health, and environmental requirements in other applicable local, state, and federal codes, standards and ordinances and, thereby, meets this stated intention of the Montgomery County WECS Ordinance.

III. WECS Permit Application Requirements (§VI)

A. Project Location and WECS Project Summary (§VI.B.a.)

The proposed Project is located in Montgomery County, approximately 3.0 miles east of Farmersville, Illinois (see Figure 2 attached). Land cover within the Project area is dominated by agricultural fields in row crop production with scattered pasturelands, rural residences and farmsteads.

The Project, approximately 5,363.6 acres in size, is proposed to have a nameplate capacity of up to 122.4 megawatts (MW), each turbine generating 6.8 MW, and will include up to 18 turbines with associated access roads to each turbine and underground collection cables (34.5 kilovolt (kV), as well as a proposed substation and a laydown yard to be located in Montgomery County (**see Site Plan in Appendix C**). The collective footprint of the Project, which includes turbines, access roads, a proposed Operations and Maintenance (O&M) building, MET tower, and proposed substation, is approximately 30 acres, which represents less than 0.6% of the total leased land for the Project. In addition, the Project will include construction of a 138-kV gen tie line that will extend approximately 4.9 miles from the Project substation into Macoupin County where it will interconnect at the existing Virden Substation (**see Site Plan in Appendix C**).

The Project will utilize the Nordex N163 turbine model which has a 163-meter (approximately 534.8-foot) rotor diameter, a hub height of 118 meters (387.1 feet), and a tip height of 199.5 meters (654.5 feet).

Construction of the Project is anticipated to begin March 2025 with a tentative Commercial Operation Date (COD) of October 2026.

B. Applicant and Landowner Information (§VI.B.b.)

Virden Wind Energy LLC (Virden Wind or Applicant) is a limited liability company registered to do business in Illinois and is a wholly owned subsidiary of UKA North America LLC (UKA). Virden Wind Energy LLC is not in partnership with any other entities for the Project.

UKA North America's contacts information for the Project is as follows:

Mr. Charles Wright
Head of Development
UKA North America LLC
103 Elevator Street
Farmersville, Illinois 62553
(561) 264 – 8673

The Applicant, Owner and Operator of the WECS is:

Virden Wind LLC
103 Elevator Street
Farmersville, Illinois 62553

The names and addresses of all landowners who have signed a lease agreement for the Project are provided in **Appendix D** per the Ordinance. For privacy reasons the Applicant has not included telephone numbers on the lists, even though those are requested by the WECS Ordinance. Phone numbers can be provided upon request.

All project participants will receive payments during the life of the Project.

C. Site Plan (§VI.B.c.)

Site Plans prepared for the Project are provided in **Appendix C.** Appendix C also includes an alternative site plan showing an alternate Project infrastructure route for the collection lines. All available information required by the Ordinance is provided on these plans; however, details of certain Project components are not yet known. Virden Wind will provide the County with a final site plan as part of the Pre-Construction Submittal showing the following: guy lines and anchor bases. In addition, proposed turnout locations are provided as part of the Traffic Impact Analysis to be provided as part of the Road Use Agreement (see discussion below).

D. Inventory Designations (§VI.B.d.)

Each of the proposed turbines has been assigned a unique number (see Site Plans in **Appendix C**; Turbines 1 through 18).

E. All Required Studies, Reports, Certifications, Waivers and Approvals Demonstrating Compliance (§VI.B.e.)

Road Use Agreement (§IV)
The Project will negotiate a Road Use Agreement with the applicable road authorities (Montgomery County Highway Department, Bois D'Arc Township, Harvel Township and/or Pitman Township) and provide an executed agreement in the Pre-Construction Submittal. Virden Wind prepared a Traffic Impact Analysis (TIA) to be included as part of the Road Upgrade and Maintenance Agreement, referred to herein as the "Road Use Agreement" or "RUA," with each applicable road authority currently being prepared for the Project.

Farmland Drainage Plan
Prior to construction, Virden Wind will provide a Farmland Drainage Plan in compliance with Section 5-12020(j-5) of the Counties Code. 55 ILCS 5/5-12020(j-5). Pinion, Virden Wind's drainage consultant, prepared a Farmland Drainage Plan for the Project and it is attached as **Appendix E**. Because the requirement for a Farmland Drainage Plan only became effective as of December 8, 2023,[2] Pinion is

[2] See Public Act 103-0580, effective December 8, 2023.A farmland drainage plan must be filed with the County and impacted drainage districts, but no approval is required per 55 ILCS 5/5-12020(j-5).

working diligently to research the locations of any potentially impacted drainage district facilities and this information will be provided in updated Farmland Drainage Plan in the Pre-Construction Submittal.

Federal, State, and Local Permits

Virden Wind will obtain all applicable federal, state, and local permits prior to construction. Table 5 provides a summary of anticipated permits and reviews that may apply to the Project.

Table 5
List of Potential Federal, State, and Local Approvals – Virden Wind Energy Project

Administering Agency	Permit, Approval, or Consultation	Applicability to the Project	Status
FEDERAL			
U.S. Army Corps of Engineers	Federal Clean Water Act Section 404 or Nationwide Permit 14, 33, or 51	Dredging, filing or other impacts to jurisdictional waters of the United States. A Nationwide Permit may be obtained if impacts are less than 0.5 acres.	To be obtained prior to construction, if necessary.
	Rivers and Harbors Act § 10 General or Regional Permit	Required if the Project impacts the course, location, or condition of navigable water.	To be obtained prior to construction, if necessary.
U.S. Fish and Wildlife Service (USFWS)	Review for Threatened and Endangered Species	Consultation on potential impacts to species protected under the Endangered Species Act.	Virden Wind requested an Official Species List through the USFWS Information for Planning and Consultation (IPaC) website and will coordinate with the USFWS as the project moves forward. Virden Wind intends to curtail turbine speeds (see below) while it seeks an Incidental Take Permit (ITP) for the federally listed northern long-eared bat and Indiana bat, as well as the tricolored bat, proposed for federal listing at the time of this permit application.
	Endangered Species Act Section 10(a), Incidental Take Permit and Habitat Conservation Plan	Required if the Project poses potential impacts or takings of federally listed species.	Virden Wind will curtail wind turbine operations below wind speeds of 6.9 meters per second, from sunset to sunrise, between July 15 and October 15 while it works with USFWS to develop a Habitat Conservation Plan in support of a federal ITP application.

Federal Aviation Administration (FAA)	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)	• Construction or alteration of structures standing higher than 200 feet above ground level. • Construction or alteration of structures near airports; 14 Code of Federal Regulations 77.13 provides details. • Siting within radar line of-sight of an air defense facility.	On March 19, 2024, a 7460-1 Notice of Proposed Construction form was filed with the Federal Aviation Administration (FAA) for each of the proposed WECS in pursuit of an FAA Determination of No Hazard.
	Notice of Actual Construction or Alteration (Form 7460-2)	Supplemental notice provided to FAA in advance of beginning construction.	To be provided in advance of commencing construction, as appropriate.
	Marking & Lighting Recommendations	Required for approval of Aircraft Detection Lighting System (ADLS).	Marking and lighting recommendations will be provided by the FAA in their Determination letter provided in response to the 7460-1 application.
Federal Communications Commission	Radio Station Authorization/License	Typically required for operation of communications tower associated with ADLS.	To be obtained prior to the operation of ADLS communications tower, if necessary.
U.S. Department of Commerce – National Telecommunications and Information Administration	Notification to National Telecommunications and Information Administration and review by Interdepartmental Radio Advisory Committee	Typically required to confirm no impact to federal telecommunications.	Virden Wind to coordinate with NTIA to determine if the facility will impact Federal Government systems.
STATE OF ILLINOIS			
Illinois Environmental Protection Agency	Clean Water Act Section 401 Water Quality Certification	Require if the construction activities require a Section 404 individual or Nationwide Permit.	To be obtained prior to construction, if necessary.
	Clean Water Act Section 402 National Pollutant Discharge Elimination System – General Permit to Discharge Stormwaters from Construction Activities	Construction activities that result in the disturbance of 1 acre or more of total land area.	To be obtained prior to construction.

Illinois Historic Preservation Division, State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review and Review of State and National Register of Historic Places (NRHP) and Archeological Survey	Projects that have state permitting requirements are obligated to conduct this consultation.	Virden Wind has initiated consultation with SHPO and will provide the results once complete.
Illinois Pollution Control Board (IPCB)	Noise Standards - 35 Ill. Admin. Code Parts 900, 901, and 910	Activities that emit noise and have the potential to be audible beyond the edge of the property on which the activity is occurring must comply with the IPCB noise standards.	The Project complies with sound regulations for wind farms – see Section VI.C and Appendix O.
Illinois Department of Natural Resources (IDNR)	Statewide Permit #2, Authorizing Construction of Bridge and Culvert Crossings in Rural Areas (Illinois Rivers, Lakes, and Streams Act)	Required for construction of bridge and culvert crossing of streams in rural areas of the state.	To be obtained prior to construction, if necessary.
	Statewide Permit #8 – Underground Pipeline and Utility Crossings (Illinois Rivers, Lakes, and Streams Act)	Required for construction of underground pipeline and utility crossings across waterways, floodplains, and wetlands.	To be obtained prior to construction, if necessary.
	Statewide Permit #12 – Bridge and Culvert Replacement Structures and Bridge Widenings (Illinois Rivers, Lakes, and Streams Act)	Required for replacement of existing bridges and culverts and the widening of existing bridges over waterways, floodplains, and streams regulated by IDNR.	To be obtained prior to construction, if necessary.
	Statewide Permit #13 – Temporary Construction Activities (Illinois Rivers, Lakes, and Streams Act)	Required for construction activities in waterways, floodplains, and streams.	To be obtained prior to construction, if necessary.
	Water withdrawal reporting	Required for withdrawals from surface water or ground water sources at a rate of 70 gallons per minute or greater (100,000 gallons per day).	To be obtained prior to construction, if necessary.
	Floodplain Development Permit (Illinois Rivers, Lakes, and Streams Act)	Required if construction will take place within floodways of rivers, lakes, or streams.	To be obtained prior to construction, if necessary.

	EcoCAT Consultation with IDNR	State and local governments are required to consider impacts of proposed actions on Illinois endangered and threatened species as well as sites listed on the Illinois Natural Areas Inventory.	The EcoCAT results and subsequent DNR response is summarized in Section VI.D and are included in Appendix F. Virden Wind intends to apply IDNR's recommendations and curtail wind turbine operations below wind speeds of 6.9 meters per second, from sunset to sunrise, between July 15 and October 15 until it obtains an ITA from IDNR for the black-billed cuckoo, upland sandpiper, northern long-eared bat, and Indiana bat and an ITP for the federally listed bat species from USFWS, and then will comply with the terms of the ITA and ITP.
	Illinois DNR Incidental Take Authorization (ITA) (Illinois Endangered Species Protection Act)	Required when impacts to state listed species and/or their habitats occur.	
Illinois Department of Agriculture	Executed Agricultural Impact Mitigation Agreement	Required by 55 ILCS 5/5-12020 for all commercial wind energy systems.	Complete – see Section VIII and Appendix Q.
Illinois Department of Transportation (IDOT)	Oversize/Overweight Permits for State Highways	Vehicles and loads that surpass legal dimension and weight limits.	To be obtained prior to construction, if necessary.
	Access Driveway Permits for IDOT roads	Construction of driveway or other access onto state road rights of way.	To be obtained prior to construction, if necessary.
	Permit to perform work within State Highway Right-of-Way	Installation of underground or overhead structures crossing or occupying state road rights of way.	To be obtained prior to construction, if necessary.
LOCAL APPROVALS			
Montgomery County	WECS (Wind Energy Conversion System) Construction Permit	Required for construction of a wind energy conversion system in Montgomery County.	Filed March 2024.
Montgomery County	WECS (Wind Energy Conversion System) Operating Permit	Required for operation of a wind energy conversion system in Montgomery County.	To be filed prior to operation.

Montgomery County	Road Upgrade and Maintenance Agreement	Required for construction of a wind conversion energy system in Montgomery County.	To be provided prior to construction
Montgomery County	Sewage Disposal Permit	Required for construction of O&M building if it will require septic	To be obtained prior to construction.
Townships Bois D'Arc, Harvel, and/or Pitman	Road Upgrade and Maintenance Agreement	Required for construction of a wind conversion energy system in Montgomery County.	To be provided prior to construction
Virden, Illinois	Community Benefit Agreement	Confirms the municipality is aware of and does not object to the transmission line siting.	In process
Farmersville, Illinois	Community Benefit Agreement	Confirms the municipality is aware of and does not object to the transmission line siting.	In process

F. Ecological Compliance Assessment Tool (EcoCAT) Compliance (§VI.B.f.)

Consultation with the IDNR was initiated through the IDNR's EcoCAT per Section IX.D.a of the Ordinance. The EcoCAT results and subsequent IDNR response with respect to wildlife is summarized in Section VI.D below and are included in **Appendix F.**

G. Decommissioning Plan (§VI.B.g.)

A decommissioning plan has been prepared for the Project and included in **Appendix B**. See additional discussion in Section VIII below.

H. Other Information Normally Required by the County (§VI.B.h.)

Because Montgomery County has not adopted a zoning ordinance, Montgomery County has not yet issued a WECS Permit, and the WECS Ordinance is not a special use ordinance, Virden Wind is not aware of other information "normally required" by the County when issuing permits.

I. Documentation That the Applicant Has the Financial Capability to Complete the Project as Proposed (§VI.B.i.)

Per discussions with Montgomery County officials, Virden Wind has provided an affidavit demonstrating that the Applicant has the financial capability to complete the project as proposed, included in **Appendix G**. This documentation will operate in lieu of the requirement to provide financial assurance to cover Project construction set forth in the WECS Ordinance Section VI.B.j. Additional financial assurance for decommissioning will be provided starting one year from the date of COD in accordance with the AIMA.

J. Fees (§VI.C)

Pursuant to the requirements of Sections VI.C and XI. of the WECS Ordinance, Virden Wind has provided Montgomery County with two certified checks totaling $55,000 to satisfy the WECS Ordinance fee for a WECS Construction Permit Application ($50,000) and Operating Permit Application ($5,000). Should the actual costs to the County exceed $50,000 the Applicant will be responsible for those costs and remit additional funds within 15 days of notice from the County.

K. Interconnection Agreement (§VI.N)

Virden Wind has a fully executed generation interconnection agreement with Ameren Services Company and Midcontinent Independent System Operator, Inc. See **Appendix H** for redacted interconnection agreement.

IV. Design and Installation (§VII)

A. Design Safety Certification (§VII.A)

All wind turbines are built to conform to industry standards including the American National Standards Institute (ANSI). Pursuant to Section VII.A. of the WECS Ordinance, Virden Wind has provided a

certificate of design compliance that equipment manufacturers have obtained from Underwriters Laboratories, Det Norske Veritas, Germanischer Loyd Wind Energic TUV Nord, for the Nordex N163 turbine model, included in **Appendix I.**

As part of the Pre-Construction Submittal, design plans for foundations and turbines will be provided to the County. The plans will be stamped by a certified Illinois licensed Project engineer and will provide details of soils and subsurface conditions on the plans as required by the WECS Ordinance (Sections VII.A.a.and VII.A.b). Soils and geotechnical reports will be provided to the independent engineer selected by the County for review as part of the Pre-Construction Submittal per Section VII.A.c of the WECS Ordinance.

B. Controls and Brakes (§VII.B)

All WECS proposed for the Project will be equipped with a redundant braking system in compliance with Montgomery County requirements. Turbine specifications for the Nordex N163 turbine model are provided in **Appendix J.**

C. Electrical Components (§VII.C)

Per the Ordinance, all electrical components of the WECS proposed for the Project *"will conform to applicable local, state, and national codes and to relevant national and international standards (e.g., ANSI and International Electrical Commission). Utility lines connecting the towers, substations, etc., shall be placed underground where practical. All electrical wire and lines connecting WECS to another WECS or substation must be installed no less than 6 (six) feet deep. The owner/operator of the WECS Installation shall be a member of Joint Utility Locating Information for Excavators (JULIE) and follow their rules and regulations. During the installation and before wires and lines are covered, there will be an inspection for compliance by an independent inspector chosen by the County and paid for by the Owner/Operator."*

All electrical components for the Project will conform to applicable national, state and local codes and relevant national and international standards such as ANSI. Although the WECS Ordinance specifies that all intra-project electrical wires and cables connecting each wind turbine to other turbines will be installed underground to a depth of no less than six feet deep (Section VII.C.a.), such electrical wires and cables will be installed with a minimum depth of no less than five feet in accordance with the Agricultural Impact Mitigation Agreement (Section 4.a.) (see Section VIII below), as required by the Wind Siting Statute.

D. Color (§VII.D)

Per the Ordinance, all towers and blades will be painted white or gray or another non-reflective, unobtrusive, color. No advertising or signage, other than safety warnings or standard manufacturer markings, will appear on any of the turbines, and each turbine will comply with any other Virden County ordinances relating to signage.

E. Compliance with the Federal Aviation Administration (§VII.E)

On March 19, 2024, a 7460-1 Notice of Proposed Construction form was filed with the Federal Aviation Administration (FAA) for each of the proposed WECS in pursuit of an FAA Determination of No Hazard for the proposed WECS locations (Turbines 1 through 18) as identified in Table 6.

Table 6. FAA Aeronautical Study Numbers – Proposed WECS Locations – Virden Wind Energy Project

WECS	FAA Aeronautical Study Number (ASN)
T-01	2024-WTE-2361-OE
T-02	2024-WTE-2362-OE
T-03	2024-WTE-2363-OE
T-04	2024-WTE-2364-OE
T-05	2024-WTE-2365-OE
T-06	2024-WTE-2366-OE
T-07	2024-WTE-2367-OE
T-08	2024-WTE-2368-OE
T-09	2024-WTE-2369-OE
T-10	2024-WTE-2370-OE
T-11	2024-WTE-2371-OE
T-12	2024-WTE-2372-OE
T-13	2024-WTE-2373-OE
T-14	2024-WTE-2374-OE
T-15	2024-WTE-2375-OE
T-16	2024-WTE-2376-OE
T-17	2024-WTE-2377-OE
T-18	2024-WTE-2378-OE

Virden Wind will coordinate and comply with the FAA on the proposed WECS locations and will comply with all applicable FAA criteria for the Project. The FAA Determinations of No Hazard for each turbine will be submitted as part of the Pre-Construction Submittal.

F. Warnings (§VII.F)

Virden Wind will meet the WECS Ordinance requirements regarding Project warnings, including:

- Warning signs regarding voltage will be placed at the base of all pad mounted transformers and substation.
- Emergency signs listing the 911 address for each WECS location (conforming with County requirements for size, color, and reflectivity) will be placed at each entrance to each WECS access road. In addition to the 911 address sign, signs will be provided at the same location that provide the WECS tower number and emergency and non-emergency phone numbers, including a phone number to reach a live operator (24 hours per day, 7 days per week).
- Once construction is complete, a sign will be placed at each WECS entrance warning the public to not approach a turbine while it is operating.
- Warning signs identifying underground wire locations will be placed at all road crossings, creek/waterway/ditch crossings, and at the base of all WECS towers. Virden Wind will map all underground wires with a GPS system and provide those data to the County.
- The signs identified in this section will be made with letters and numbers at least three inches in height per the Ordinance.

G. Climb Prevention (§VII.G)

Virden Wind will comply with WECS Ordinance requirements specific to climb prevention. The WECS proposed for the Project will be "unclimbable by design" per the Ordinance or will be equipped with anti-climbing devices as identified in the WECS Ordinance.

Fencing surrounding the WECS will be maintained in serviceable condition to ensure no unauthorized access. All gates to fencing surroundings the WECS or WECS components will be equipped with locks. Gates will remain locked unless Virden Wind or its contractors require access for Project maintenance or monitoring.

H. Lighting (§VII.I)

Any tall structure over 200 feet above ground level, including wind turbines, requires lighting and approval by the FAA for aircraft safety (14 C.F.R. §77.9). Virden Wind has prepared a lighting plan in compliance with the requirements of the WECS Ordinance, attached as **Appendix K** (Lighting Plan). Included in the Lighting Plan is Virden Wind's plan to provide location information for each turbine. FAA approvals of lighting and marking will be provided in the Pre-Construction Submittal (see Section IX below). The Project will also be equipped with an Aircraft Detection Lighting System (ADLS) to minimize the nighttime visual impact of the WECS towers. Virden Wind will request approval from the FAA for the ADLS system as well.

The FAA Code of Federal Regulations (CFR) Part 77 requires synchronized red obstruction lighting to be installed on each of the Virden Wind Project's WECS turbines. Once the turbines reach 200' tall and until the ADLS is installed, calibrated, and fully functional, red flashing lights are required (see **Appendix K**). Because the turbines proposed for the Project will exceed 499 feet in height (see Site Plan in **Appendix C** for locations), on March 19, 2024, a 7460-1 Notice of Proposed Construction form was filed with the FAA for each of the proposed WECS in pursuit of an FAA Determination of No Hazard (see Section IV.E above).

The FAA will conduct an aeronautical study to determine whether Virden Wind's WECS turbines constitute an aviation hazard. Virden Wind will comply with all Federal Regulations governing obstruction lighting & marking and will e-file FAA Form 7460-2 "Notice of Actual Construction of Alteration" for each WECS turbine within 5 days of reaching its maximum height.

In addition, the FAA's advisory circular, Advisory Circular 70/7460-1 M, Obstruction Marking and Lighting, Chapter 13, addresses the lighting and marking of wind turbines. Virden Wind agrees to follow all of the applicable specifications from the FAA Advisory Circular. FAA approvals of lighting and marking will be provided in the Pre-Construction Submittal.

White security lighting to be installed on other support buildings and structures (including the WECS substation) will be downward facing and down shielded to mitigate glare.

Virden Wind is voluntarily submitting this Lighting Plan (**Appendix K)** to provide additional information to Montgomery County and demonstrate its efforts to maximize transparency and minimize the visual impacts of the WECS Towers. Nothing in the Wind Siting Statute requires a lighting plan, and accordingly, Montgomery County would be in violation of state law if it required any such plan as a requirement of county approval. See P.A. 102-1123 (eff. Jan. 27, 2023, prohibiting counties from setting standards for wind projects more restrictive than the standards set forth in the wind provisions of the Counties Code).

Virden Wind will submit the proposed location of the ADLS tower to the FAA for approval once known. The ADLS allows the red lights to remain off as a default. With this system, turbine lighting remains off

until the radar detects an aircraft within a certain distance and elevation to the Project, at which time, the red lights are triggered to turn on and flash. After the aircraft is safely out of the Project range, the lights automatically turn off again. Aircraft flying at commercial cruising altitudes, Class A airspace above 18,000 feet, do not trigger the ADLS. The radar tower is connected to the turbines with underground fiber optic cabling that allows the ADLS system to communicate with the turbines to turn the lights on and off as needed.

I. Blade Clearance (§VII.J)

Per the Ordinance, *"the lowest point of the arc created by rotating wind vanes or blades on a wind turbine generator shall be no less than 20 feet measured from the highest point of the terrain within one blade radius from the base of the tower."* Blade clearance for the Nordex N163 turbine model is approximately 120 feet and, thus, complies with this section of the WECS Ordinance.

V. Operation(§VIII)

The Project will be staffed locally from an O&M building co-located with the Project's substation. The Project will be operated and maintained by a team of roughly three personnel, including facility managers, a site manager, and a certified crew of technicians. All contact information for the Project's facilities including the names of key Project staff will be provided to relevant Virden County and Road Authority officials.

A. Operating Permit (§VIII.A)

In compliance with the WECS Ordinance, Virden Wind will obtain an Operating Permit for the Project. The required application materials for the Operating Permit are included in this Application or will be provided as part of the Pre-Construction Submittal as specified herein.

B. Annual Operation and Maintenance Reports (§VIII.B)

Once the Project is operational, Virden Wind will submit, on an annual basis, a summary of operations and maintenance reports to the County. In addition, Project operations and maintenance reports will be provided to the County, if requested.

C. Interference – Communications Analysis (§VIII.C)

Per the WECS Ordinance, Virden Wind shall take all measures prescribed by the Federal Communication Commission (FCC) to mitigate or eliminate anticipated interference in compliance with FCC-promulgated regulations. ComSearch, on behalf of Virden Wind, conducted studies to identify the potential for interference to communications services as a result of the Project and determined in each study that the Project would cause little to no interference. A summary of each of the ComSearch (2024) reports is provide below; **Appendix L** provides the reports for each of the following services:

- AM/FM Radio Broadcast Stations (Appendix L-1) – No impacts to licensed and operational AM and FM radio stations were identified as a result of the study (see Appendix L-1).

- Emergency Services (Appendix L-2) - First responder, industrial/business land mobile sites, area-wide public safety, and commercial E-911 communications presented in the ComSearch (2024) report (Appendix L-2) are typically unaffected by the presence of wind turbines, and no significant

harmful effects to these services are anticipated as a result of the Project (Appendix L-2). However, if needed, there are options available to improve signal coverage.

- Microwave Bands (Appendix L-3) – The microwave beam path study shows that all 18 turbines are sited to avoid interference with microwave beam paths in the Project area. Ten microwave paths are mapped within the Project area, and all turbines avoid the microwave Fresnel Zones based on a cross sectional analysis and no FCC-licensed land mobile land mobile or public safety transmitting stations are expected to be adversely affected.

- Mobile Phone Services (Appendix L-4) - For the cellular towers located within Project area, no setback distance is required to avoid interference other than physical clearance of the blades. However, a setback distance of 77.3 meters (approximately 253.6 feet) is recommended to meet FCC emission requirements. Virden Wind is in compliance with all setback requirements set forth by the FCC.

- Doppler and NEXRAD Weather Radar (Appendix L-5) - No impacts are anticipated to those Doppler radar systems or NEXRAD radar systems located in the vicinity of the Project (Appendix L-5).

- Off-Air Television Services (Appendix L-6) - Comsearch's analysis showed it is possible that some stations may have their reception disrupted in and around the Project. In the unlikely event that interference from the Project does occur, Virden Wind will offer a directional antenna to mitigate the interference. If an antenna is insufficient, Virden Wind will find another solution such as cable service or direct broadcast satellite service to affected residents.

- Wireless Internet Services (Appendix L-7) - Wind turbines within a coverage area of a wireless Internet provider are unlikely to interfere with existing services; however, in the event that a wireless carrier believes that their coverage has been compromised by the presence of the wind energy facility, there are options available to improve signal coverage (Appendix L-7).

D. Coordination with Local Emergency Responders (§VIII.D)

Section VIII.D of the WECS Ordinance requires that the Applicant submit to the local emergency responders a copy of the site plan and emergency management plan (EMP). A draft of the EMP for the Project is included **Appendix M.** The draft EMP is intended to demonstrate the attention, diligence, and resources the Applicant dedicates to safety and responding to emergency situations. Upon request by the local fire department or Emergency Management Agency (EMA), Virden Wind will coordinate to revise and/or update the plan.

Virden Wind coordinated with the Montgomery County Emergency Management Agency, Kevin Schott (Director) and Joseph Gasparich (Deputy Director) on February 14, 2024 to introduce the Project and discuss the EMP for the Project. On March 06, 2024, Virden Wind held a follow up meeting with Kevin Schott, and Farmersville-Waggoner Fire Chief Mike Webb to present the draft EMP and gather feedback. Meetings with the fire departments of Raymond, and Litchfield are also planned.

The final EMP, will include, at a minimum, contact information (names, titles, email addresses, cell phone numbers) for Virden Wind's local Project representatives as well as its Remote Operations Control Center (ROCC), which is staffed 24 hours a day, 7 days a week, 365 days per year. The EMP will be updated as needed to reflect changes in the designated WECS representatives and annually. The EMP will also address fire protection such that local fire departments and other local emergency response authorities are knowledgeable about actions required in the event of a fire or other emergency at the wind facility.

The EMP will be submitted to the Virden County Emergency Management Agency Director for review and approval as part of the Pre-Construction Submittal.

Virden Wind will provide a final Site Plan to local fire departments as part of the Pre-Construction Submittal.

In addition, Virden Wind offers to provide, at its expense, annual training and necessary equipment to local emergency responders so they can properly respond to a potential emergency at the Project. Virden Wind notes that responding to an emergency situation at the Project will not require specialized equipment.

E. Materials Handling, Storage and Disposal (§VIII.E)

Per the WECS Ordinance, all solid and liquid waste generated as a result of the Project will be removed from the site promptly and in compliance with all applicable federal, state, and local laws.

Construction, operation and maintenance of the Project are not likely to result in the generation of any hazardous wastes. If hazardous waste is produced it will be handled according to local, state or federal laws and regulations. Safety Data Sheets will be retained at the O&M building and copies of these sheets will be provided to the local fire departments in accordance with federal laws and regulations. The Project will comply with all existing applicable septic and well regulations of Montgomery County and the State of Illinois.

VI. Setbacks, Prohibitions and Requirements (§IX)

A. Setback Description (§IX.A)

Table 7. Setback Descriptions – Virden Wind Energy Project		
Setback Description	**Setback Distance**	**Setback Compliance**
Occupied Community Buildings	2.1 times the maximum blade tip Buildings height of the wind tower to the nearest point on the outside wall of the structure	1375 feet
Participating Residences	1.1 times the maximum blade tip Height of the wind Tower to the nearest point on the outside wall of the structure	720 feet
Non-Participating Residences	2.1 times the maximum blade tip Height of the wind tower to the nearest point on the outside wall of the structure	1375 feet
Boundary Lines of Participating Properties	None	N/A
Boundary Lines of Non-Participating Properties	1.1 times the maximum blade tip Height of the wind tower to the nearest point on the property line of the nonparticipating property	720 feet
Public Road Rights-of-Way	1.1 times the maximum blade tip Height of the wind tower to the center point of the public road right-of-way	720 feet
Overhead Communication and Electric Transmission and Distribution Facilities (Not Including Individual Houses or Outbuildings)	1.1 times the maximum blade tip Height of the wind tower to the nearest edge of the property line, easement, or right of way containing the overhead line.	720 feet
Overhead Utility Service Lines to Individual Houses or Outbuildings	None	N/A

Table 7. Setback Descriptions – Virden Wind Energy Project		
Setback Description	**Setback Distance**	**Setback Compliance**
Fish and Wildlife Areas and Illinois Nature Preserve Commission Protected Lands	2.1 times the maximum blade tip height of the wind tower to the nearest point on the Illinois Nature Preserve Commission Protected Lands property line of the fish and wildlife area or protected land.[3]	N/A

B. Shadow Flicker (§IX.B)

Stantec Consulting Services (Stantec) performed shadow flicker modeling for the Project to document compliance with Section IX.B of the Ordinance which states that "…any occupied community building or nonparticipating residence will not experience more than 30 hours per year of shadow flicker under planned operating conditions." A summary of the shadow flicker modeling results is provided in this section, and the shadow flicker modeling report is provided in **Appendix N**. The Shadow Module of EMD's WindPro software application was used to perform the modeling. The Nordex N163 turbines with a 118-meter hub height were modeled at 18 potential locations to predict shadow flicker in the area surrounding the Project. Fifty (50) residences and occupied community buildings (sensitive receptors) within approximately 1.25 miles of the turbines were included in the assessment.

Results of the model (Table 8) indicate that 25 of the sensitive receptors will receive less than 10 annual hours of shadow flicker.

Table 8. Shadow Flicker Analysis Summary of Results (expected hours per year with 18 potential turbine sites) – Virden Wind Energy Project

Annual Shadow Flicker Hours	Non-Participating Receptors	Participating Receptors
Less than 10	25	0
10 – 20	8	1
20 – 30	7	2
Greater than 30	5	2

Although up to five non-participating residences may experience more than 30 hours of annual shadow flicker, as currently modeled, Virden Wind has committed to implementing turbine curtailment measures (i.e., pausing select turbines), as needed, to comply with the 30-hour annual limit at non-participating residences. The shadow flicker report (**Appendix N**) demonstrates that no non-participating residence or

[3] The WECS Ordinance actually reads: "2.1 times the maximum blade and Illinois Nature tip height of the wind tower Preserve Commission to the nearest point on the Protected Lands property line of the fish and wildlife area or protected land," but Virden Wind assumes the language was intended to incorporate the setback requirement for Fish and Wildlife Areas and Illinois Nature Preserve Commission Protected Lands in 55 ILCS 5/5/12020(e)(1) and set forth here in Table 7. This understanding was confirmed with the County on a February 21, 2024 call to discuss the Application.

occupied community building will exceed the 30 hours per year shadow flicker limit, with the curtailment of select turbines, as committed to by Virden Wind.

C. Sound Limitation (§IX.C)

Stantec completed a pre-construction sound assessment to evaluate operational compliance of the Virden Wind Energy Project with the Illinois Pollution Control Board (IPCB) and Montgomery County noise regulations. The Montgomery County WECS Ordinance requires compliance with the sound limitations established by the IPCB. Under 35 Ill. Admin. Code §901, a WECS Project operating in an agricultural field (Class C Land) cannot cause an exceedance of sound levels to residential land (Class A Land). The IPCB standard is based on the land use of the sound source and receiver. Both alternative energy sources and agricultural are considered Class C. Residences are considered Class A, as is the land subject to residential use directly surrounding them. Therefore, impacts to individual residences, and the land subject to residential use immediately surrounding them are evaluated according to the Class C to Class A standard.

Table 9. Illinois Pollution Control Board Sound Limits for Residences (Class A from Class C Land)

Period	Sound Limit (dB)								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Daytime	75	74	69	64	58	52	47	43	40
Nighttime	69	67	62	54	47	41	36	32	32

Source: Illinois Administrative Code Title 35, Subtitle H, Chapter I, Section 901.102 for sound emitted from Class C land (agricultural) to Class A land (residential).

An operational sound model was developed and utilized to estimate the sound levels generated by Project equipment, including sound from the proposed eighteen (18) wind turbine generators and one (1) substation transformer. The sound modeling assumed all sources would operate during daytime and nighttime and that Nordex N163 turbines with serrated trailing edge blades would be utilized in normal operating mode. Sound levels were estimated at residential receptor locations (Class A land use) identified within 1.25 miles of the Project limits. Receptors were reviewed to confirm that the sound level contour demonstrating compliance with the IPCB limits did not cross the residential use (e.g., yard, outbuilding, parking area, etc.) surrounding the residence. The sound modeling results demonstrate that the Project will be operated in compliance with applicable IPCB and County noise limits at the Class A land through use of turbines with serrated trailing edge blades, which generate less sound than standard blades. Project-generated sound levels are modeled to comply with the IPCB sound limits in all octave bands.

The sound modeling report is provided in **Appendix O.**

D. Wildlife (§IX.D)

Results of IDNR Consultation and EcoCAT Response Letter
Virden Wind initiated consultation with the IDNR through the IDNR's EcoCAT on December 6, 2023. The EcoCAT report and IDNR response letter (dated February 5, 2024) is provided in **Appendix F**.

Per Section IX.D.c of the Ordinance, Virden Wind will follow the recommendations provided by the IDNR in the EcoCAT natural resource review report under 17 Ill. Admin. Code Part 1075. Virden Wind intends to curtail wind turbine operations below wind speeds of 6.9 meters per second, from sunset to sunrise,

between July 15 and October 15 while a state Conservation Plan for the black-billed cuckoo, upland sandpiper, northern long-eared bat is prepared in support of a state Incidental Take Authorization (ITA). Once an ITA is issued, Virden Wind will operate the turbines in accordance with the wind speeds set forth in the ITA.

The Project will comply with the IDNR recommendations, listed in the February 5, 2023 EcoCAT letter **(Appendix F)**, to avoid and minimize potential impacts to aquatic species by implementing a 300-foot setback from perennial streams (Figure 3). In addition, a 1,000-foot setback will be implemented at all forested riparian corridors, 5-acre forested blocks, and Conservation Reserve Enhancement Program (CREP) enrolled properties to avoid and minimize impacts to wildlife species as suggested by the IDNR (Figure 3).

U.S. Fish and Wildlife Service Coordination
Per Section IX.D.b of the Ordinance, Virden Wind requested an Official Species List for the Project through the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) website. The IPaC results are included in **Appendix P**.

Virden Wind intends to curtail wind turbine operations below wind speeds of 6.9 meters per second, from sunset to sunrise, between July 15 and October 15, while a Habitat Conservation Plan (HCP) is developed with the USFWS in support of a federal ITP (section 10 of the ESA, see Table 5 above). Once an ITP is issued, Virden Wind will operate the turbines in accordance with the wind speeds set forth in the ITP.

VII. Liability Insurance (§X)

The Montgomery County WECS Ordinance requires that an applicant maintain a current general liability policy covering bodily injury and property damage with limits of at least $10,000,000 per occurrence and $40,000,000 in the aggregate. The Applicant must provide a certificate of insurance to Montgomery County with the County added as an additional insured, with the designation of primary and non-contributory. The Applicant must increase the County adopts revisions to the WECS Ordinance that increase the amount and notifies the Applicant in writing.

In accordance with these requirements, Virden Wind will maintain and pay for a general liability insurance policy or policies in an amount equal to or greater than the amounts specified in the paragraph above and ensure that such policy or policies will be in place at the time of its WECS Pre-Construction Submittal and will be maintained without interruption through the lifetime of the Project. Virden Wind will further ensure that the certificates of insurance are filed with the County prior to the commencement of any work on the WECS and upon renewal or replacement of any required insurance policy. Evidence of liability insurance and certificates of insurance will be provided in the Pre-Construction Submittal for the County's review and approval.

VIII. Decommissioning (§XIV)

Section XIV of the Ordinance requires a decommissioning plan that complies with the AIMA (provided in **Appendix Q**). Section 21 of the AIMA, executed February 9, 2024 by the Illinois Department of Agriculture and the Project, imposes specific decommissioning and financial assurance requirements. Accordingly, a decommissioning plan that complies with these requirements has been prepared for the Project and included in **Appendix B**.

Stantec prepared a decommissioning plan with estimated costs to complete the decommissioning and restoration activities based on the requirements stated in the WECS Ordinance and the AIMA. The costs

were estimated based on a variety of factors and assumptions, including the future land use after decommissioning, engineering and construction practices, access road and turbine design and removal methods, and salvage value of the recyclable Project materials. The estimated decommissioning cost in current dollars is expected to be approximately 234,641 per turbine, including a prorated cost of the substation and electrical generation tie-in line costs, a ten percent (10% contingency), and factoring in revenue from salvage value. According to the decommissioning plan, all other interests in the salvage value are subordinate to the County's interests.

On or before the first anniversary of the Project's COD, Virden Wind will provide a surety bond that complies with Section 21.D of the AIMA. A bond is a legal agreement under which a separate company (known as a surety) guarantees that Virden Wind performs its decommissioning obligations under its WECS Permit for the benefit of Montgomery County. In exchange for this guarantee, Virden Wind pays the surety an annual premium. The bond ensures that if something should happen to Virden Wind, Montgomery County can draw on the bond to ensure that decommissioning is completed without Montgomery County having to pay for it. The Landowners are named as secondary beneficiaries.

IX. WECS Pre-Construction Submittal Checklist

Virden Wind provides a draft checklist of items either required by the Ordinance and/or committed to in this Application that will be included in the WECS Pre-Construction Submittal. As discussed throughout this Application, some final reports, studies, plans, and agreements were not available at the time of Application submittal. Therefore, this checklist provides a summary of those items. Additional items may be added through conditions imposed by the County Board and/or additional information collected prior to this Pre-Construction Submittal. Upon submission of all items, or as agreed upon by the Applicant and Montgomery County Engineer, and signatures by both parties, Virden Wind may proceed with construction.

Table 10
WECS Pre-Construction Submittal Checklist – Virden Wind Energy Project

WECS Ordinance Reference	Checklist Item
IV.	Executed Road Use Agreements with Montgomery County and Road Authorities
V.B.c and VI.F.	Final Site Plan and Construction Document Sealed by Professional Engineer Licensed in Illinois
	Anticipated Construction Timeline
VI.E	Compliance with the Federal Aviation Administration Rules
	DNHs for turbines
	ADLS location approvals
VII.A.b	Site Specific Design of Foundation Certified by Structural Engineer
VII.A.c.	Geotechnical Boring Reports for each WECS tower location
VII.E.	Compliance with the Federal Aviation Administration Requirements
	DNHs for turbines
	ADLS location approvals
	Updated Lighting Plan with FAA Recommendations
VIII.C.a.	FCC/NTIA Approval Letter

Table 10
WECS Pre-Construction Submittal Checklist – Virden Wind Energy Project

WECS Ordinance Reference	Checklist Item	
X.A.	Evidence of Liability Insurance and Certificate of Insurance Naming County as Additional Insured	
AIMA	Form of Montgomery County Financial Assurance for Decommissioning	
55 ILCS 5/5-12020(j-5).	Updated Farmland Drainage Plan: Locations of any potentially impacted drainage district facilities	
Signed:	Virden Wind LLC: _____	Montgomery County Engineer: _____

Figure No.

2

Title

Project Location

Client/Project 193709934

Virden Wind Energy Project, LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

Prepared by DP on 2024-01-12
TR by RA on 2024-02-26
IR by XX on 2024-XX-XX

N

0 2,000 4,000 US Feet

(At original document size of 11x17)
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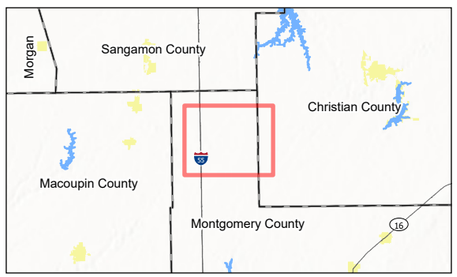
Legend

Project Boundary



Notes

1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Data Sources: Stantec, Virden Esri, NADS
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

Figure No.
3

Title
DNR Suggested Setbacks

Client/Project
Virden Wind Energy Project, LLC
Virden Wind Energy Project

193709934

Project Location
Montgomery County, Illinois

Prepared by DP on 2024-01-12
TR by RA on 2024-02-26
IR by XX on 2024-XX-XX

N

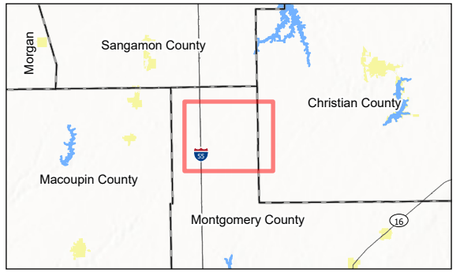
0 2,000 4,000 Feet
(At original document size of 11x17)
1:48,000

Legend
- Project Boundary
- Turbine Location
- Forested Riparian Corridor
- 5-Acre Forested Block*
- CREP Properties*

National Hydrography Dataset
- Perennial Stream

DNR Suggested Setbacks
- Perennial Stream - 300 Feet
- Forested Riparian Corridor - 1000 Feet
- 5-Acre Forested Block - 1000 Feet*
- CREP Properties - 1000 Feet*

*No features within data frame



Notes
1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Data Sources: Stantec, Virden, NADS, USGS
3. Background: NAIP 2021

Stantec

Appendix A Economic Impact Analysis

Appendix B Decommissioning Plan

Appendix C Site Plan

Appendix D Landowner Contact Information

Appendix E Drainage Plan

Appendix F Illinois DNR EcoCAT Results and Consultation Letter

Appendix G Documentation of Financial Capability

Appendix H Interconnection Agreement

Appendix I Design Safety Certifications

Appendix J Turbine Model Specifications

Appendix K Lighting Plan

Appendix L Communications Studies

Appendix M Draft Emergency Management Plan

Appendix N Shadow Flicker Modeling Report

Appendix O Sound Modeling Report

Appendix P USFWS IPaC Results

Appendix Q Agricultural Impact Mitigation Agreement

Strategic Economic Research, LLC

ECONOMIC IMPACT ANALYSIS FOR THE VIRDEN WIND PROJECT

February 2024

Dr. David G. Loomis,
Bryan Loomis, and
Chris Thankan

Strategic Economic Research, LLC
strategiceconomic.com
815-905-2750

About the Authors

Dr. David G. Loomis, PhD

Professor Emeritus of Economics, Illinois State University
Co-Founder of the Center for Renewable Energy
President of Strategic Economic Research, LLC

Dr. David G. Loomis is Professor Emeritus of Economics at Illinois State University and Co-Founder of the Center for Renewable Energy. He has over 20 years of experience in the renewable energy field. He has served as a consultant for 43 renewable energy development companies. He has testified on the economic impacts of energy projects before the Illinois Commerce Commission, Iowa Utilities Board, Missouri Public Service Commission, Illinois Senate Energy and Environment Committee, the Wisconsin Public Service Commission, Kentucky Public Service Commission, Ohio Public Siting Board, and numerous county boards. Dr. Loomis is a widely recognized expert and has been quoted in the Wall Street Journal, Forbes Magazine, Associated Press, and Chicago Tribune as well as appearing on CNN.

Dr. Loomis has published 40 peer-reviewed articles in leading energy policy and economics journals. He has raised and managed over $7 million in grants and contracts from government, corporate and foundation sources. He received the 2011 Department of Energy's Midwestern Regional Wind Advocacy Award and the 2006 Best Wind Working Group Award. Dr. Loomis received his Ph.D. in economics from Temple University in 1995.

Bryan Loomis, MBA

Vice President of Strategic Economic Research, LLC

Bryan Loomis has been conducting economic impact, property tax, and land use analyses at Strategic Economic Research since 2019. He has performed or overseen over 100 wind and solar analyses, and he has provided expert testimony for permitting hearings and open houses in many states, including Colorado, Kansas, Indiana, Illinois, and Iowa. He improved the property tax analysis methodology at SER by researching various state taxing laws and implementing depreciation, taxing jurisdiction millage rates, and other factors into the tax analysis tool. Before working with SER, Bryan ran a consulting agency, working with over 30 technology startups on growth and marketing. Bryan received his MBA from Belmont University in 2016.

Chris Thankan

Economic Analyst

Christopher Thankan assists with the production of the economic impact studies including sourcing, analyzing, and graphing government data. He also performs economic and property tax analysis for wind, solar, and transmission projects. Chris has a Bachelor of Science degree in Sustainable & Renewable Energy and minored in Economics.

Strategic Economic Research, LLC (SER) provides economic consulting for renewable energy projects across the U.S. We have produced over 250 economic impact reports in 32 states. Research Associates who performed work on this project include Ethan Loomis, Madison Schneider, Zoë Calio, Patrick Chen, Kathryn Keithley, Morgan Stong, Mandi Mitchell, Tim Roberts, Russell Piontek, Drew Kagel, Cedric Volkmer, Paige Afram, Clara Lewis, Rachel Swanson, and Ashley Thompson.

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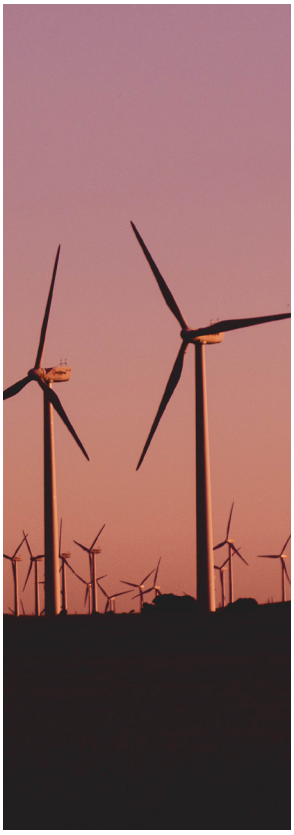


SER Strategic Economic Research, LLC

Table of Contents - Figures & Tables

I. Executive Summary

UKA is developing the Virden Wind Project in Montgomery County, Illinois. The purpose of this report is to evaluate the economic impact of this Project on Montgomery County and the State of Illinois. The basis of this analysis is to study the direct, indirect, and induced impacts on job creation, wages, and total economic output.

The Virden Wind Project consists of an estimated 100 megawatts ("MW") of capacity of wind turbines and the associated access roads, transmission and communication equipment, storage areas, and control facilities (the "Project"). For purposes of this report, a total name plate capacity of 100 MW in Montgomery County was assumed. The Project represents an investment of over $136 million in Montgomery County. The total development is anticipated to result in the following:

Jobs

- 60 new jobs during construction for Montgomery County
- 227 new jobs during construction for the State of Illinois
- 9.2 new long-term jobs for Montgomery County
- 16.2 new long-term jobs for the State of Illinois

Earnings

- Over $4.8 million in new earnings during construction for Montgomery County
- Over $22.1 million in new earnings during construction for the State of Illinois
- Over $536 thousand in new long-term earnings for Montgomery County annually
- Over $1.2 million in new long-term earnings for the State of Illinois annually

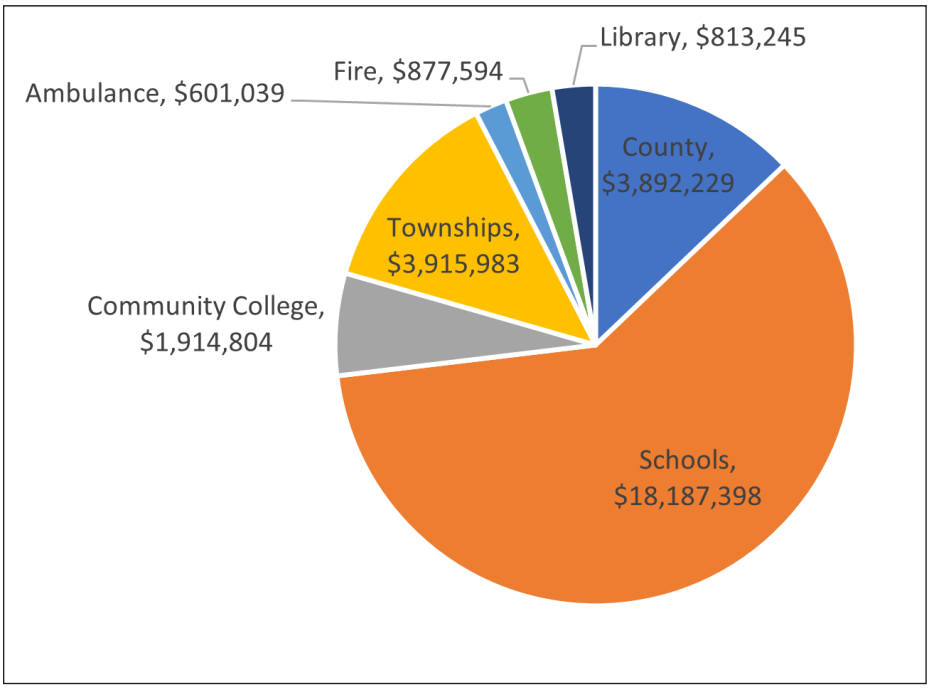
Output - the value of production in the state or local economy. It is an equivalent measure to the Gross Domestic Product.

- Over $12.9 million in new output during construction for Montgomery County
- Over $55.8 million in new output during construction for the State of Illinois
- Over $3.0 million in new long-term output for Montgomery County annually
- Over $4.9 million in new long-term output for the State of Illinois annually

Property Taxes

- Over $18.1 million in total school district revenue over the life of the Project
- Over $3.8 million in total county property taxes for Montgomery County over the life of the Project
- Over $30.2 million in property taxes in total for all taxing districts over the life of the Project

Figure 1 – Total Property Taxes Paid by the Virden Wind Project



II. Wind Industry Growth and Economic Development

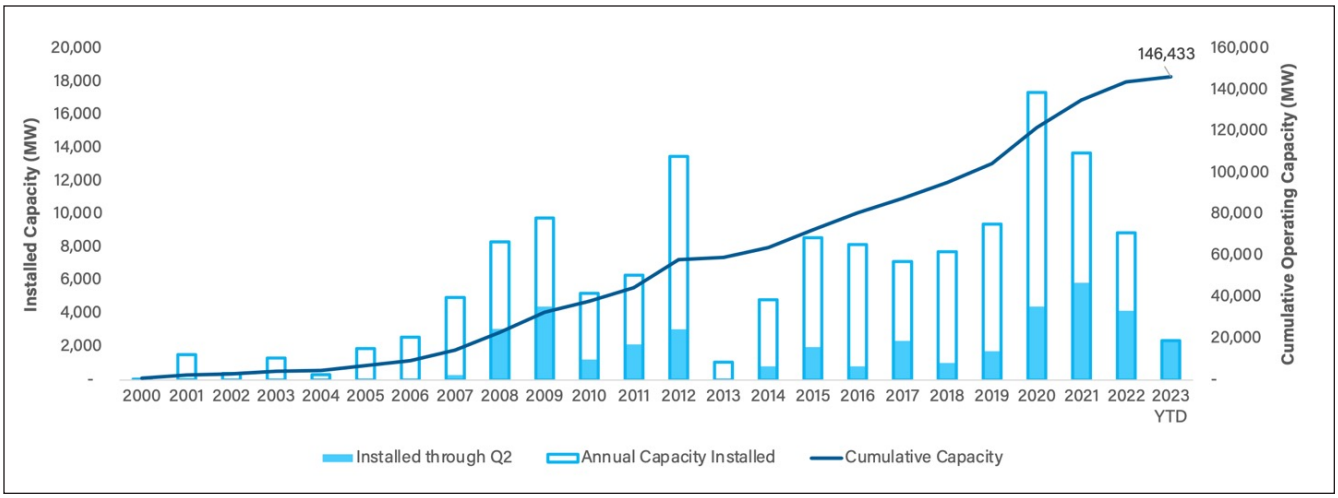
a. United States Wind Industry Growth

The United States wind industry grew at a rapid pace from 2006-2020, pausing only in 2013 due to federal policy uncertainty. In 2020, the U.S. set a new record of 16,913 MW far surpassing the previous annual peak of 13,131 MW of wind power installed in 2012 (American Clean Power (ACP), 2021). The total wind capacity installed in 2021 was 13,400 MW (ACP, 2022). In 2022, there was a total capacity of 8,511 MW installed which is about equal to the 2015-2019 annual installation amounts (ACP, 2023).

The total amount of wind capacity in the U.S. by the end of 2022 was 144,184 MW (ACP, 2023). China is the global leader with 333,998 MW of installed capacity, with Germany in third place with 58,958 MW of installed capacity (2022 figures with the United States in second place) (GWEC, 2023). Figure 2 shows the growth in installed annual capacity and cumulative capacity in the U.S. and Figure 3 shows the state-by-state breakdown of installed capacity by the end of 2022.

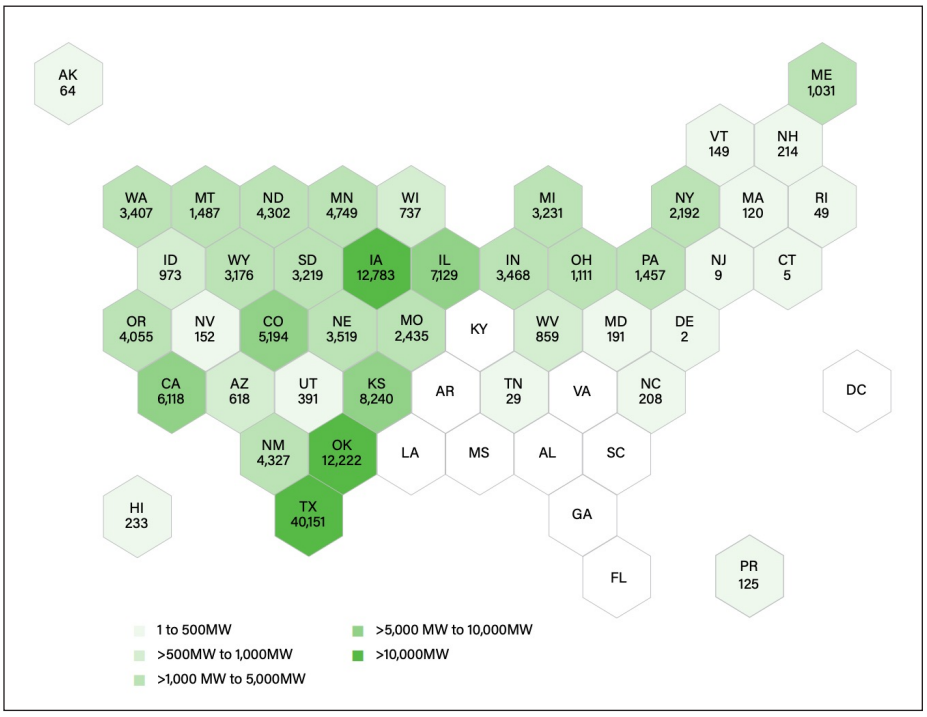
Several factors have spurred the continued growth of wind energy in recent years. First, new technology and rigorous competition among turbine manufacturers lowered the cost of wind turbines. Second, larger capacity wind turbines and higher hub heights produced more output and lowered the cost of wind energy production. Finally, several large corporate buyers increased the demand for wind energy beyond the traditional electric utility market.

Figure 2 – United States Annual and Cumulative Wind Power Capacity Growth



Source: ACP, Clean Power Market Report Q3 2023

Figure 3 – Total Wind Capacity by State



Source: ACP, Clean Power Annual Market Report 2022

b. Illinois Wind Industry Growth

Table 1 - Illinois Wind Projects

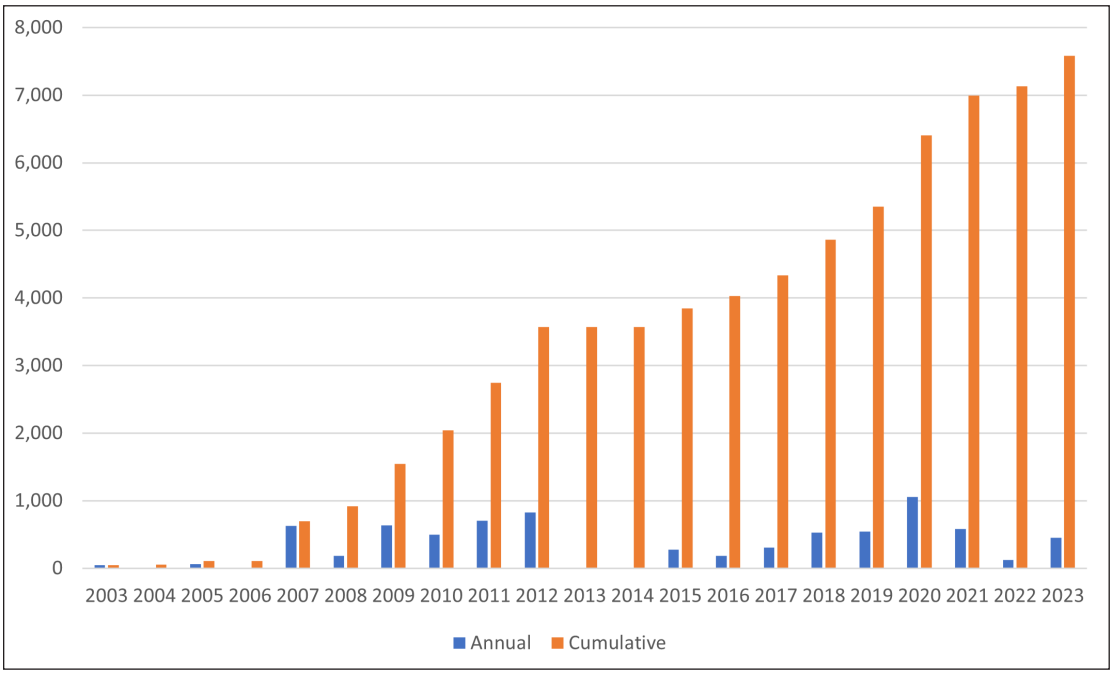
Wind Farm	Capacity (MW)	Year Online
Alta Farms	200.5	2023
Bennington	93.1	2021
Big Sky Wind Facility	250.3	2011
Bishop Hill	424.5	2012
Blooming Grove	260.9	2020
Bright Stalk Wind Farm (Lexington Chenoa)	205.2	2019
California Ridge	217.1	2012
Camp Grove	150	2007
Cardinal Point	150	2020
Crescent Ridge	61	2005
EcoGrove	100.5	2009
Ford Ridge	120.4	2022
Glacier Sands	184.9	2021
Grand Ridge	210	2008
Green River	194.3	2019
Harvest Ridge Wind Farm (Broad-lands)	199.8	2020
HillTopper	185	2018
Hoopeston Wind	98	2015
Kelly Creek	184	2016
Lee/DeKalb	217.5	2009
Lincoln Land	301.7	2021
Lone Tree	88.1	2020
Mendota Hills Wind Farm	76.1	2019
Minonk	200	2012
Otter Creek	158.2	2020
Pilot Hill	175.1	2015
Pioneer Trail Wind Farm	150.4	2011
Providence Heights Wind Farm	72	2008
Radford's Run	305.8	2017
Rail Splitter	100.5	2009
Sapphire Sky	253.8	2023
Settlers Trail Wind Farm	150.4	2011
Shady Oaks	109.5	2012
Streator Cayuga Ridge Wind	300	2010
Sugar Creek	202	2020
Top Crop Wind Farm	300	2009
Twin Groves	396	2007
Walnut Ridge	212	2018
White Oak Energy Center	150	2011
Whitney Hill	66.1	2019

Illinois is a national leader in the wind energy industry (American Clean Power, 2023). As of June 2023, Illinois is ranked 5th in the United States in existing wind, solar, and energy storage capacity with over 8,643 MW (ACP, 2023). Table 1 has a list of the operational wind farms in Illinois through 2023 (some small projects below 50 MW were omitted from the table). The year-by-year and cumulative growth in Illinois' wind energy capacity is shown in Figure 4. In 2009, Illinois had sixteen projects completed with an annual total installed capacity of 638.3 MW. Eight projects were completed in 2012 with an annual total installed capacity of 823.3 MW. Growth exploded in 2020 with six projects completed with the largest total annual installed capacity of 1,059 MW.

The Energy Information Administration (EIA) calculated the number of megawatt-hours generated from different energy sources in 2022. As shown in Figure 5, the greatest percentage of electricity generated in Illinois comes from nuclear energy with 52.1% followed by coal with 21.5% and natural gas with 12.8%. Approximately 12.2% of the total electricity power generated in Illinois came from wind in 2022.

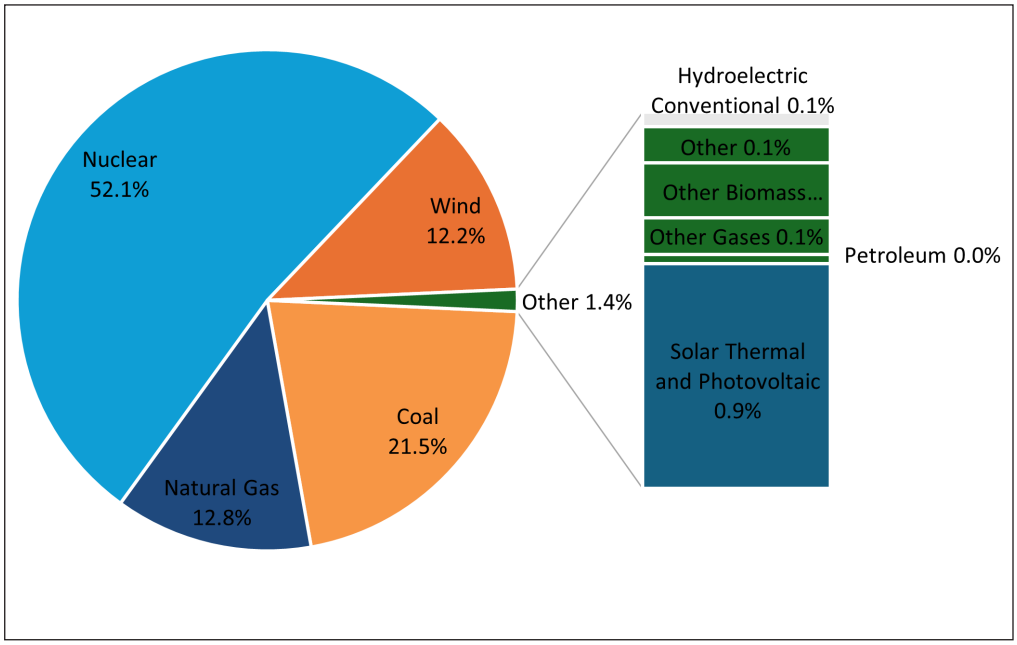
The U.S. Department of Energy sponsors the U.S. Energy and Employment Report each year. Electric Power Generation covers all utility and non-utility employment across electric generating technologies, including fossil fuels, nuclear, and renewable technologies. It also includes employees engaged in facility construction, turbine and other generation equipment manufacturing, operations and maintenance, and wholesale parts distribution for all electric generation technologies. According to Figure 6, employment in Illinois in the wind energy industry (9,285) is much larger than solar energy generation (6,579), natural gas generation (4,340), and nuclear generation (4,099).

Figure 4 – Installed Capacity of Illinois Wind Projects



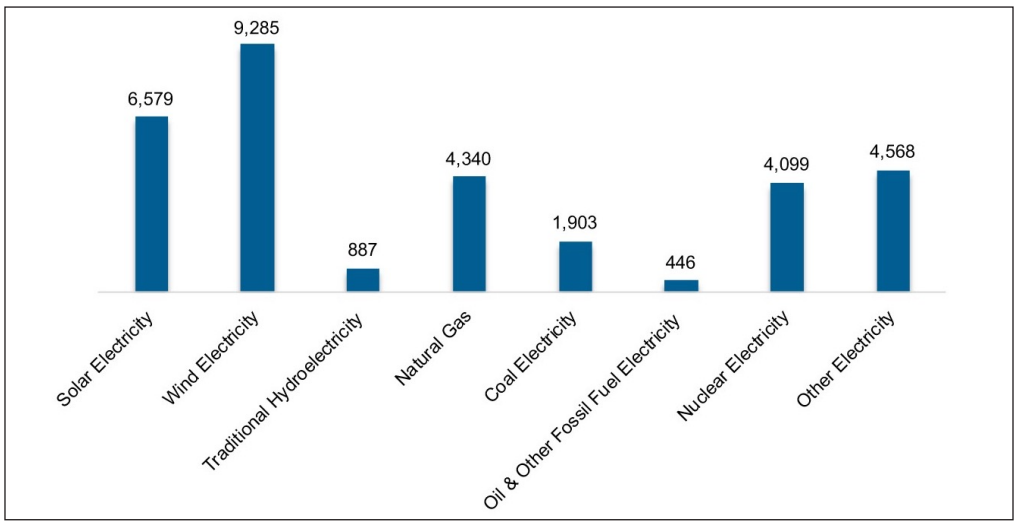
Source: American Clean Power, August 2023, Illinois

Figure 5 - Electric Generation by Fuel Type for Illinois in 2022



Source: U.S. Energy Information Association (EIA): Illinois, 2022

Figure 6 - Electric Generation Employment by Technology



Source: U.S. Energy and Employment Report 2023: Illinois

c. Economic Benefits of Wind Farms

Wind farms create numerous and significant economic benefits that continue to last for decades. Wind farms create job opportunities in the local area during both the short-term construction phase and the long-term operational phase. Short-term construction jobs include both workers at the wind farm site and jobs created along the supply chain. Long-term operational jobs include wind turbine technicians, supervisors, and supply chain jobs.

Wind developers typically lease the land for the turbines from local landowners without materially affecting ongoing agricultural uses. Only a small portion of the total project footprint is used for the turbines, access roads, feeder lines and substations. For most wind projects, it is anticipated that approximately 1-2% of the total leased land will contain facilities. Each turbine and the associated access road will use approximately half an acre to one acre of farmland. Lease payments made to landowners provide a reliable source of long-term income to offset the fluctuating prices received from crops or the impact of weather events on production. Landowners then have additional funds to make purchases in the local economy and elsewhere.

Wind projects enhance the equalized assessed value of property within the county. Typically, wind developers pay taxes based on that improved value unless preempted by law or mutual agreement. Wind farms strengthen the local tax base helping to improve county services, schools, police and fire departments and fund infrastructure improvements, such as public roads. UKA plans to pay property taxes to these local taxing districts for the life of the project.

Numerous studies have quantified the economic benefits across the United States. The National Renewable Energy Laboratory has produced economic impact reports for the State of Arizona (NREL, 2008a), State of Idaho (NREL, 2008b), State of Indiana (NREL, 2014), State of Iowa (NREL, 2013), State of Maine (NREL, 2008c), State of Montana (NREL, 2008d), State of New Mexico (NREL, 2008e), State of Nevada (NREL, 2008f), State of North Carolina (NREL, 2009), State of Pennsylvania (NREL, 2008g), State of South Dakota (NREL, 2008h), State of Utah (NREL 2008i), State of West Virginia (NREL, 2008j), and the State of Wisconsin (NREL, 2008k).

The Center for Renewable Energy at Illinois State University released a report examining the economic impact of Illinois' wind farms and the economic impact of the related wind turbine supply chain in Illinois (see https://renewableenergy.illinoisstate.edu/wind/pubs.php). According to the Economic Impact: Wind Energy Development in Illinois (June 2016), "the 25 largest wind farms in Illinois:

- Created approximately 20,173 full-time equivalent jobs during construction periods
- Support approximately 869 permanent jobs in rural Illinois areas
- Support local economies by generating $30.4 million in annual property taxes
- Generate $13.8 million annually in extra income for Illinois landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of $6.4 billion over the life of the projects."

Loomis (2020) estimates the economic impact of wind and solar energy in Illinois resulting from the proposed Path to 100 legislation. The legislation is expected to result in constructing over 15,000 MW of wind and solar over the next 15 years yielding over 53,000 jobs during construction and over 3,200 jobs during operations. The analysis also looks at the 39 largest existing wind farms in Illinois and finds that they supported 29,295 jobs during construction and 1,307 jobs during operations for a total economic benefit of $10.2 billion over the life of the projects. In addition, a review of historical property tax records finds that existing utility-scale wind and solar projects paid over $305 million in property taxes statewide since 2003 and over $41.4 million in 2019 alone.

Jenniches (2018) performed a review of the literature assessing the regional economic impacts of renewable energy sources. After reviewing all of the different techniques for analyzing the economic impacts, he concludes "for assessment of current renewable energy developments, beyond employment in larger regions, IO [Input-Output] tables are the most suitable approach" (Jenniches, 2018, 48). Input-Output analysis is the basis for the methodology used in the economic impact analysis of this report.

Finally, Brunner and Schwegman (2022) examined the economic impacts of wind installations across the United States from 1995 to 2018. They found that wind energy projects resulted in "economically meaningful increases in county GDP per-capita, income per-capita, median household income, and median home values" (p. 165).

III. Project Description and Location

a. Virden Wind Project

UKA is developing the Virden Wind Project in Montgomery County, Illinois. The Project consists of an estimated 100 megawatts ("MW") of capacity of wind turbines and the associated access roads, transmission and communication equipment, storage areas, and control facilities. The Project represents an investment of over $136 million.

b. Montgomery County, Illinois

Montgomery County is located in the central part of Illinois (see Figure 7). It has a total area of 710 square miles, and the U.S. Census estimates that the 2022 population was 28,020 with 12,527 housing units. The county has a population density of 40 (persons per square mile) compared to 232 for the State of Illinois (2020). Median household income in the county was $61,796 (U.S. Census Bureau, 2021).

Figure 7 – Location of Montgomery County, Illinois

i. Economic and Demographic Statistics

As shown in Table 2, the largest industries in the county are "Retail Trade" followed by "Health Care and Social Assistance," "Administrative Government," and "Agriculture, Forestry, Fishing and Hunting." These data for Table 2 come from IMPLAN covering the year 2022 (the latest year available).

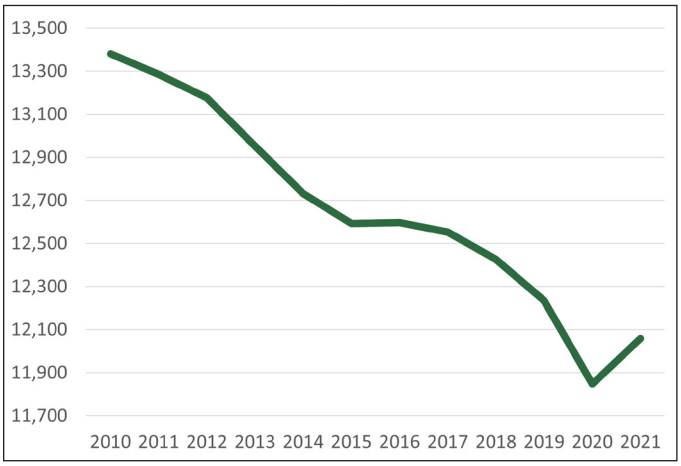
Table 2 provides the most recent snapshot of total employment but does not examine the historical trends within the county. Figure 8 shows employment from 2010 to 2021. Total employment in Montgomery County was at its highest at 13,381 in 2010 and its lowest at 11,847 in 2020 (BEA, 2023).

Table 2 - Employment by Industry in Montgomery County

Industry	Number	Percent
Retail Trade	1,566	12.7%
Health Care and Social Assistance	1,419	11.5%
Administrative Government	1,340	10.8%
Agriculture, Forestry, Fishing and Hunting	1,210	9.8%
Transportation and Warehousing	893	7.2%
Accommodation and Food Services	865	7.0%
Other Services (except Public Administration)	807	6.5%
Manufacturing	723	5.8%
Finance and Insurance	703	5.7%
Construction	676	5.5%
Wholesale Trade	439	3.6%
Professional, Scientific, and Technical Services	369	3.0%
Administrative and Support and Waste Management and Remediation Services	350	2.8%
Real Estate and Rental and Leasing	297	2.4%
Mining, Quarrying, and Oil and Gas Extraction	193	1.6%
Government Enterprises	133	1.1%
Information	121	1.0%
Arts, Entertainment, and Recreation	109	0.9%
Utilities	62	0.5%
Management of Companies and Enterprises	52	0.4%
Educational Services	33	0.3%

Source: Impact Analysis for Planning (IMPLAN), County Employment by Industry, 2022

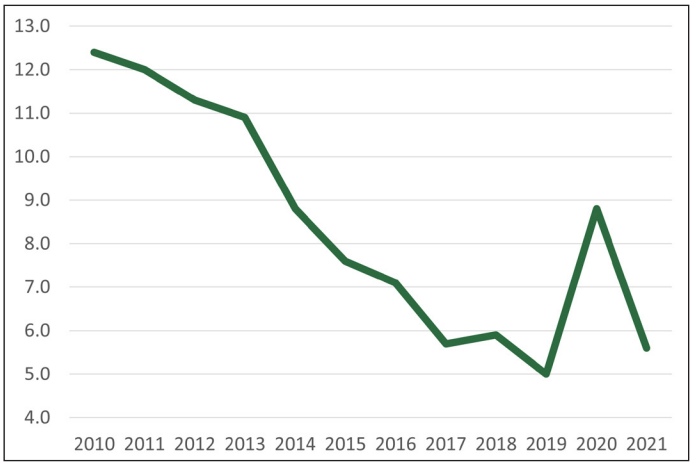
Figure 8 - Total Employment in Montgomery County from 2010 to 2021



Source: Bureau of Economic Analysis, Regional Data, GDP and Personal Income, 2010-2021

The unemployment rate signifies the percentage of the labor force without employment in the county. Figure 9 shows the unemployment rates from 2010 to 2021. Unemployment in Montgomery County was at its highest at 12.4% in 2010 and at its lowest at 5.0% in 2019 (FRED, 2023). The unemployment rate spiked to 8.8% in 2020 but recovered to 5.6% by 2021.

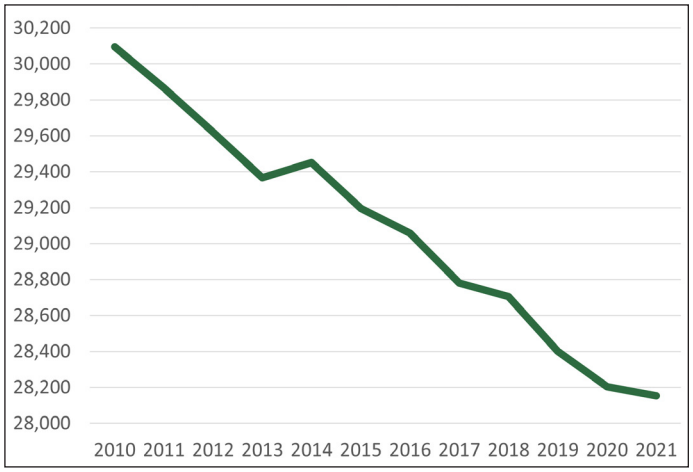
Figure 9 - Unemployment Rate in Montgomery County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Unemployment Rates, 2010-2021

The overall population in the county has decreased steadily, as shown in Figure 10. Montgomery County's population was 30,095 in 2010 and 28,154 in 2021, a loss of 1,941 people (FRED, 2023). The average annual population decrease over this time period was 176 people.

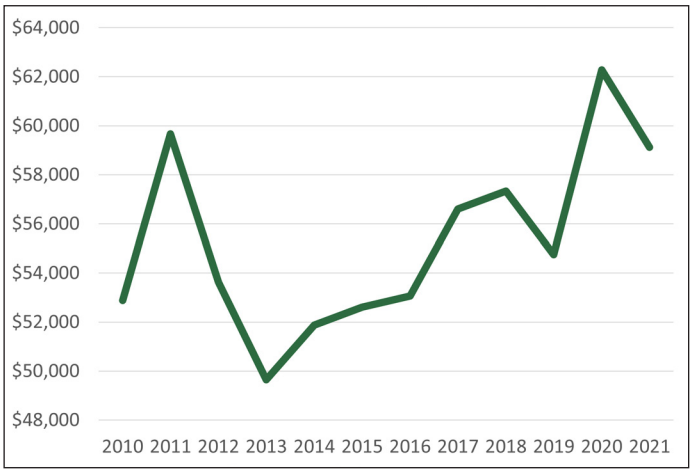
Figure 10 - Population in Montgomery County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Population Estimates, 2010-2021

Unlike the population trend, household income has fluctuated significantly in the county. Figure 11 shows the real median household income in Montgomery County from 2010 to 2021. Using the national Consumer Price Index (CPI), the nominal median household income for each year was adjusted to 2021 dollars. Household income was at its lowest at $49,644 in 2013 and its highest at $62,275 in 2020 (FRED, 2023).

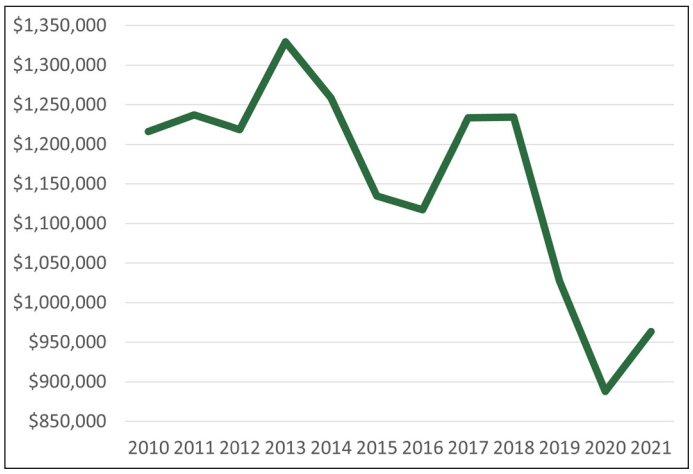
Figure 11 – Real Median Household Income in Montgomery County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Estimate of Median Household Income, 2010-2021

Real Gross Domestic Product (GDP) is a measure of the value of goods and services produced in an area and adjusted for inflation over time. The Real GDP for Montgomery County has trended downward since hitting a high in 2013, as shown in Figure 12 (BEA, 2023).

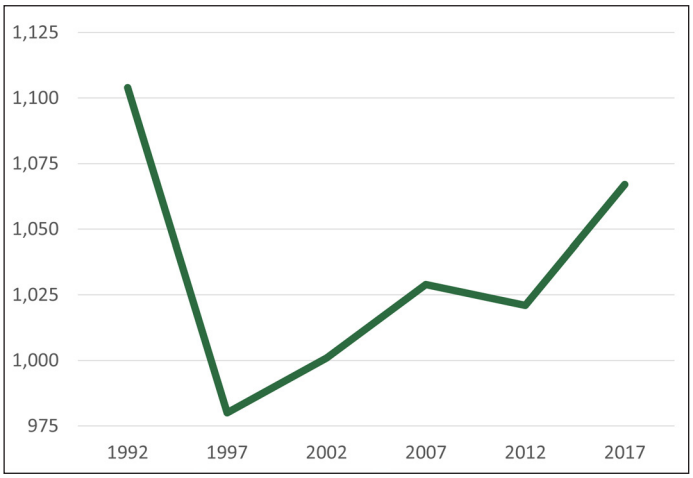
Figure 12 - Real Gross Domestic Product (GDP) in Montgomery County from 2010 to 2021



Source: Federal Reserve Bank of St. Louis Economic Data, U.S. Census Bureau, Real Gross Domestic Product, 2010-2021

The farming industry fluctuated significantly in Montgomery County. As shown in Figure 13, the number of farms hit a high of 1,104 in 1992 and a low of 980 in 1997. The number of farms increased to 1,067 by 2017.

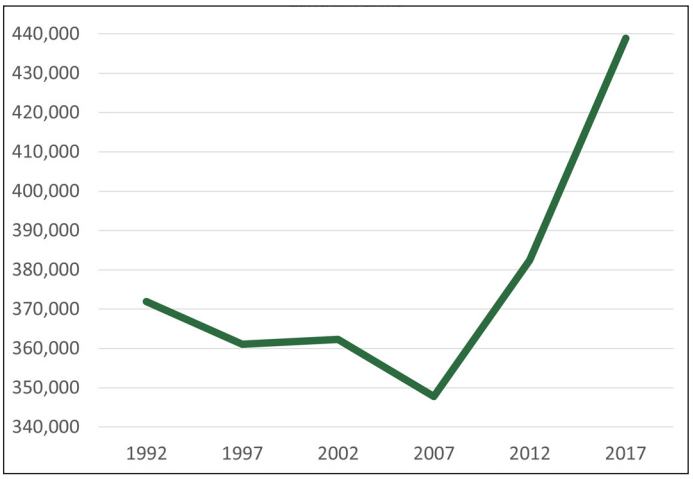
Figure 13 – Number of Farms in Montgomery County from 1992 to 2017



Source: USDA National Agricultural Statistics Service, Census of Agriculture, 1992-2017

The amount of land in farms has fluctuated significantly as well. The county farmland hit a low of 347,765 acres in 2007 and a high of 438,834 acres in 2017, according to Figure 14.

Figure 14 – Land in Farms in Montgomery County from 1992 to 2017



Source: USDA National Agricultural Statistics Service, Census of Agriculture, 1992-2017

IV. Methodology

The economic analysis of the wind power development presented here utilizes the National Renewable Energy Laboratory's (NREL's) latest Jobs and Economic Development Impacts (JEDI) Wind Energy Model (W6-28-19). NREL is the U.S. Department of Energy's primary national laboratory for renewable energy and energy efficiency research and development. The JEDI Wind Energy Model is an input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output. Essentially, JEDI is an input-output model which takes into account the fact that the output of one industry can be used as an input for another. For example, when a wind farm developer purchases turbines to build a wind farm, those wind turbines are made of components such as fiberglass, aluminum, steel, copper, etc. Therefore, purchases of wind turbines impact the demand for these components. In addition, when a wind farm developer purchases a wind turbine from a manufacturing facility, the manufacturer uses some of that money to pay employees, and then the employees spend that money on goods and services within their community. In essence, JEDI reveals how purchases of wind project materials not only benefit turbine manufacturers but also the local industries that supply the concrete, rebar, and other materials (Reategui et al., 2009). The JEDI model uses construction cost data, operating cost data, and data relating to the percentage of goods and services acquired in the state to calculate jobs, earnings, and economic activities that are associated with this information. The results are broken down into the construction period and the operation period of the wind project. Within each period, impacts are further divided into direct, turbine and supply chain (indirect), and induced impacts.

The JEDI Model was developed in 2002 to demonstrate the economic benefits associated with developing wind farms in the United States. The model was developed by Marshall Goldberg of MRG & Associates, under contract with the National Renewable Energy Laboratory. The JEDI model utilizes state specific industry multipliers obtained from IMPLAN (IMpact Analysis for PLANning). IMPLAN software and data are managed and updated by the Minnesota IMPLAN Group, Inc. using data collected at federal, state, and local levels. The JEDI model considers 14 aggregated industries that are impacted by the construction and operation of a wind farm: agriculture, construction, electrical equipment, fabricated metals, finance/insurance/real estate, government, machinery, mining, other manufacturing, other services, professional service, retail trade, transportation/communication/public utilities, and wholesale trade (Reategui, 2009). This study does not analyze net jobs. It analyzes the gross jobs that the new wind farm development supports.

Direct impacts during the construction period refer to the changes that occur in the onsite construction industries in which the direct final demand (i.e., spending on construction labor and services) change is made. Final demands are goods and services purchased for their ultimate use by the end user. Onsite construction-related services include engineering, design, and other professional services.

Direct impacts during operating years refer to the final demand changes that occur in the onsite spending for wind farm workers. Direct jobs consist primarily of onsite wind turbine technicians.

The initial spending on the construction and operation of the wind farm creates a second layer of impacts, referred to as "turbine and supply chain impacts" or "indirect impacts."

Indirect impacts during the construction period consist of the changes in inter-industry purchases resulting from the direct final demand changes, and include construction spending on materials and wind farm equipment and other purchases of goods and offsite services. Essentially, these impacts result from "spending related to project development and on-site labor such as equipment costs (turbines, blades, towers, transportation), manufacturing of components and supply chain inputs, materials (transformer, electrical, HV line extension, HV substation and interconnection materials), and the supply chain of inputs required to produce these materials" (JEDI Support Team, 2023). Concrete that is used in turbine foundations increases the demand for gravel, sand, and cement. As a result of the expenditure for concrete, there is increased economic activity at quarries and cement factories, and these changes are indirect impacts. The accountant for the construction firm and the banker who finances the contractor are both considered indirect impacts. All supply chain component impacts/ manufacturing-related activities are included under indirect impacts; therefore, the late-stage turbine assembly process, which includes gearbox assembly, blade production, and steel rolling, are all included under the construction period indirect impacts category.

Indirect impacts during operating years refer to the changes in inter-industry purchases resulting from the direct final demand changes. Essentially, these impacts result from "expenditures related to on-site labor, materials, and services needed to operate the wind farms (e.g., vehicles, site maintenance, fees, permits, licenses, utilities, insurance, fuel, tools and supplies, replacement parts/equipment); the supply chain of inputs required to produce these goods and services; and project revenues that flow to the local economy in the form of land lease revenue, property tax revenue, and revenue to equity investors" (JEDI Support Team, 2023). All land lease payments and property taxes show up in the operating-years portion of the results because these payments do not support the day-to-day operations and maintenance of the wind farm but instead are more of a latent effect that results from the wind farm being present.

Induced impacts during construction refer to the changes that occur in household spending as household income increases or decreases due to the direct and indirect effects of final demand changes. Included in this is local spending by employees working directly or indirectly on the wind farm project who receive their paychecks and then spend money in the community. Additional local jobs and economic activity are supported by these purchases of goods and services. Thus, for example, the increased economic activity at quarries and cement factories results in increased revenues for the affected firms and raises individual incomes. Individuals employed by these companies then spend more money in the local economy, e.g., as workers receive income, they may decide to purchase more expensive clothes or higher quality food along with other goods and services from local businesses. This increased economic activity may result from "construction workers who spend a portion of their income on lodging, groceries, clothing, medicine, a local movie theater, restaurant, or bowling alley;" or a "steel mill worker who provides the inputs for turbine production and spends his money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy" (JEDI Support Team, 2023).

Induced impacts during operating years refer to the changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects from final demand changes. Some examples include a "wind farm technician who spends income from working at the wind farm on buying a car, a house, groceries, gasoline, or movie tickets;" or a "worker at a hardware store who provides spare parts and materials needed at the wind farm and who spends money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy" (JEDI Support Team, 2023).

This methodology has been validated by a paper in peer-reviewed economics literature. In the article, "Ex Post Analysis of Economics Impacts from Wind Power Development in U. S. Counties," the authors conduct an ex post econometric analysis of the county-level economic development impacts of wind power installations from 2000 through 2008. They find an aggregate increase in county-level personal income and employment of approximately $11,000 and 0.5 jobs per megawatt of wind power capacity during that time which is consistent with the JEDI results at the county level (Brown, 2012).

V. Results

The results were derived from project cost estimates supplied by UKA. In addition, UKA helped estimate the percentages of project materials and labor that will be coming from within Montgomery County and the State of Illinois.

Two separate JEDI models were run to show the economic impact of the Project. The first JEDI model used the 2022 Montgomery County multipliers from IMPLAN. The second JEDI model used the 2022 State of Illinois multipliers from IMPLAN and the same project costs. Because the multipliers and the local content percentage are different for the two models, the results are independent from one another. However, any local content coming from Montgomery County obviously comes from the State of Illinois as well. Similarly, the State of Illinois multipliers will generally be larger than Montgomery County multipliers, but some individual sectors of the economy could be stronger.

The output from these models is shown in Tables 3 to 5. Table 3 lists the total employment impact from the Project for Montgomery County and the State of Illinois. Table 4 shows the impact on total earnings, and Table 5 contains the impact on total output. The results are divided into one-time construction impacts and ongoing annually recurring operations impacts that are expected to last for the full life of the Project which is estimated to be 30-55 years. Project Development and Onsite Labor Impacts correspond to direct impacts as defined in the methodology section. Turbine and Supply Chain Impacts are the indirect impacts during construction and Local Revenue and Supply Chain Impacts are indirect impacts during operations.

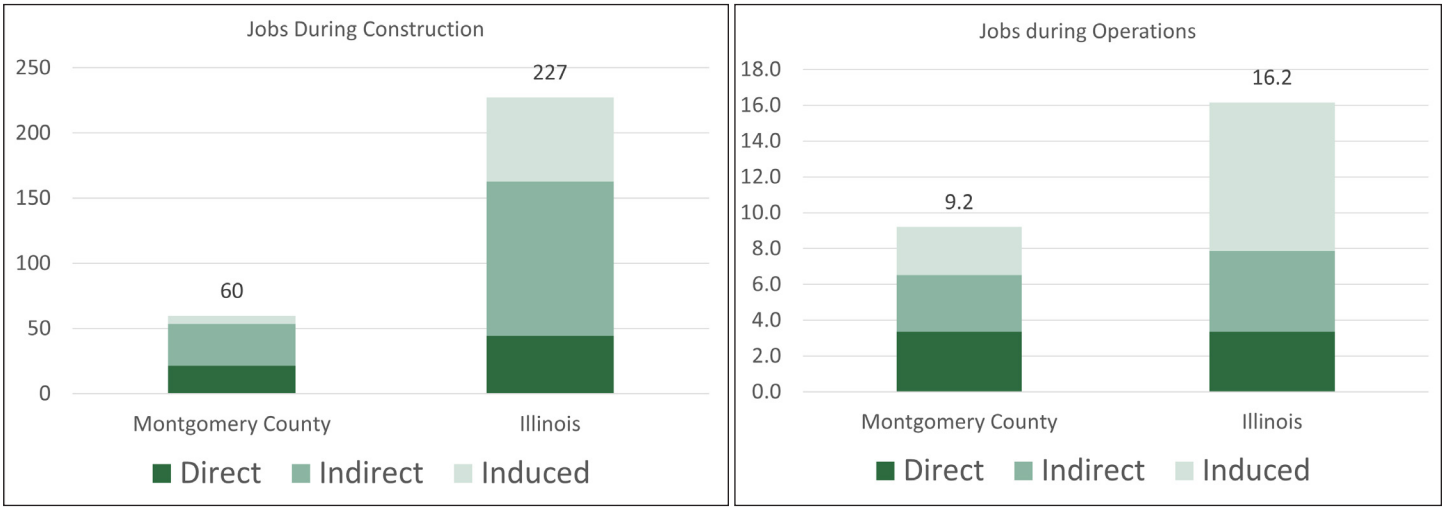
Table 3 – Total Employment Impact from the Virden Wind Project

	Montgomery County Jobs	State of Illinois Jobs
Construction		
Project Development and Onsite Labor Impacts	21	45
Turbine and Supply Chain Impacts	32	118
Induced Impacts	7	64
New Local Jobs during Construction	60	227
Operations		
Onsite Labor Impacts	3.4	3.4
Local Revenue and Supply Chain Impacts	3.2	4.5
Induced Impacts	2.6	8.3
New Local Long-Term Jobs	9.2	16.2

The results from the JEDI model show significant employment impacts from the Virden Wind Project. Employment impacts can be broken down into several different components. Direct jobs created during the construction phase typically last anywhere from 6 months to over a year depending on the size of the project; however, the direct job numbers present in Table 3 from the JEDI model are based on a full-time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2,080 hours worked in a year. A part time or temporary job would constitute only a fraction of a job according to the JEDI model. For example, the JEDI model results show 21 new onsite jobs during construction in Montgomery County, though the construction of the Project could actually involve hiring closer to 42 workers for 6 months.

As shown in Table 3, new local jobs created or retained during construction total 60 for Montgomery County and 227 for the State of Illinois. New local long-term jobs created from the Project total 9.2 for Montgomery County and 16.2 for the State of Illinois.

Figure 15 – Total Employment Impact for the Virden Wind Project



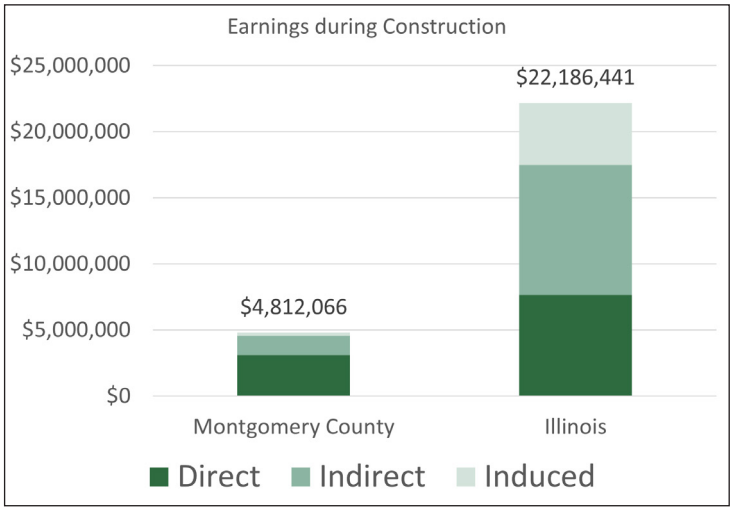
Direct jobs created during the operational phase last the life of the wind farm, typically 25-40 years. Direct construction jobs and operations and maintenance jobs both require highly-skilled workers in the fields of construction, management, and engineering. These well-paid professionals boost economic development in rural communities where new employment opportunities are welcome due to economic downturns.

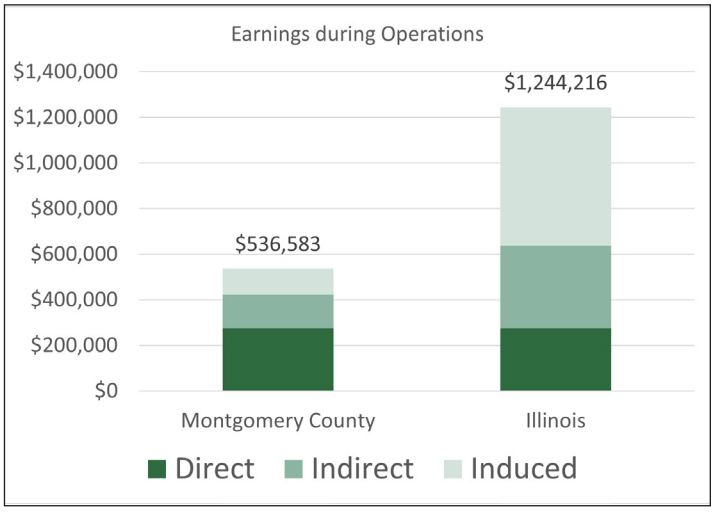
Accordingly, it is important to not just look at the number of jobs but also the earnings that they produce. The earnings impacts from the Project are shown in Table 4 and are categorized by construction impacts and operations impacts. The new local earnings during construction total over $4.8 million for Montgomery County and over $22.1 million for the State of Illinois. The new local long-term earnings total over $536 thousand for Montgomery County and over $1.2 million for the State of Illinois.

Table 4 – Total Earnings Impact from the Virden Wind Project

	Montgomery County	State of Illinois
Construction		
Project Development and Onsite Earnings Impacts	$3,102,638	$7,645,890
Turbine and Supply Chain Impacts	$1,451,130	$9,837,941
Induced Impacts	$258,298	$4,702,610
New Local Earnings during Construction	$4,812,066	$22,186,441
Operations (Annual)		
Onsite Labor Impacts	$275,471	$275,471
Local Revenue and Supply Chain Impacts	$147,161	$363,034
Induced Impacts	$113,951	$605,711
New Local Long-Term Earnings	$536,583	$1,244,216

Figure 16 – Total Earnings Impact from the Virden Wind Project





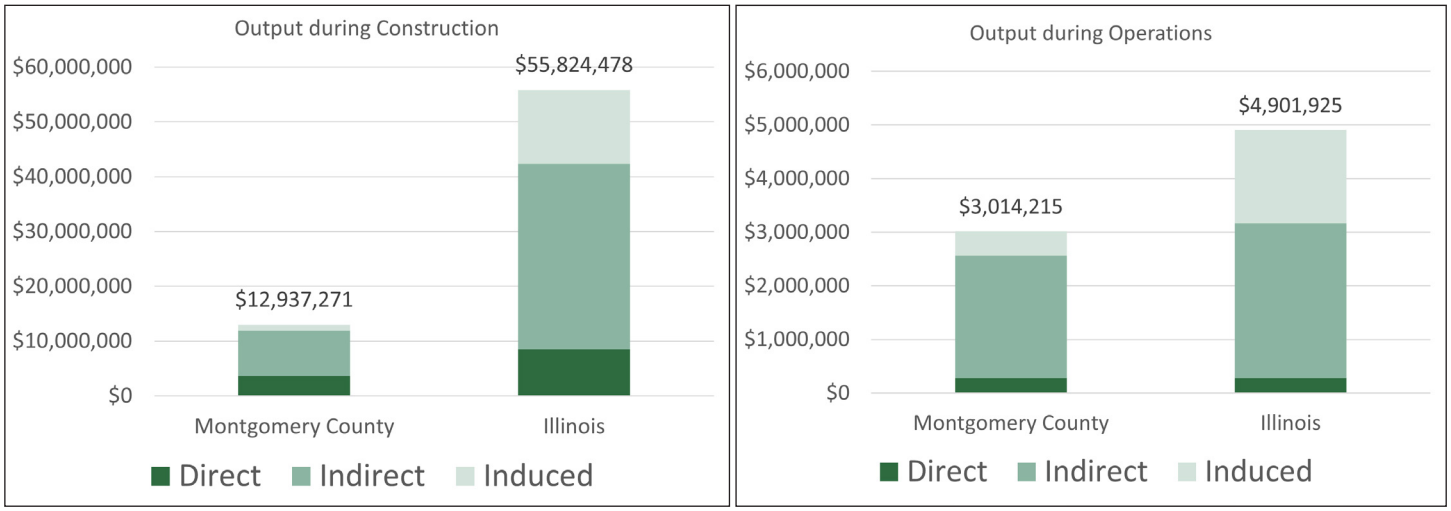
Output refers to economic activity or the value of production in the state or local economy. Economic output includes the earnings reported in Table 4 but also measures other factors such as landowner payments, property taxes, and other economic activity that is not earnings and benefits from employment. Local Revenue and Supply Chain Impacts include ongoing property taxes and are detailed in the next section.

According to Table 5, the new local output during construction totals over $12.9 million for Montgomery County and over $55.8 million for the State of Illinois. The new local long-term output totals over $3.0 million for Montgomery County and over $4.9 million for the State of Illinois. For reference, nominal (not inflation-adjusted) economic output for all of Montgomery County is $1.3 billion for 2022.

Table 5 – Total Output Impact from the Virden Wind Project

	Montgomery County	State of Illinois
Construction		
Project Development and Onsite Jobs Impacts on Output	$3,693,433	$8,524,425
Turbine and Supply Chain Impacts	$8,224,941	$33,826,167
Induced Impacts	$1,018,897	$13,473,886
New Local Output during Construction	$12,937,271	$55,824,478
Operations (Annual)		
Onsite Labor Impacts	$275,471	$275,471
Local Revenue and Supply Chain Impacts	$2,289,538	$2,891,184
Induced Impacts	$449,206	$1,735,270
New Local Long-Term Output	$3,014,215	$4,901,925

Figure 17 – Total Output Impact from the Virden Wind Project



VI. Property Taxes

Wind power projects increase the property tax base of a county creating a new revenue source for education and other local government services such as fire protection, park districts, and road maintenance. According to state law (Public Act 095-0644), the fair cash value for a utility-scale wind turbine in Illinois is $360,000 per megawatt of capacity beginning in 2007 and is annually adjusted for inflation and depreciation. The inflation adjustment, as known as the Trending Factor, increases each year according to the Bureau of Labor Statistics' Consumer Price Index for all cities for all items. According to the Illinois Department of Revenue, "[t]he trending factor for assessment year 2023 is 1.47"(https://www2.illinois.gov/rev/localgovernments/property/Documents/WindEnergyTrendingFactors.pdf). Depreciation is allowed at 4% per year up to a maximum total depreciation of 70% of the trended real property cost basis (calculated by taking the fair cash value of the turbine and multiplying by the Trending Factor).

Tables 6 to 10 detail the tax implications of the Virden Wind Project. There are several important assumptions built into the analysis in these tables.

- First, the analysis assumes that the valuation of the wind farm is the same as set forth in Public Act 095-0644.
- Second, the tables assume future inflation is constant at 2.4% annually and the depreciation is 4% annually until it reaches the maximum of 70%.
- Third, all tax rates are assumed to stay constant at their 2023 (2022 tax year) rates. For example, the Montgomery County tax rate is assumed to stay constant at 0.80697% through 2055
- Fourth, the analysis assumes that the Project is placed in service on January 1, 2026 at a fair cash value of $57.8 million according to Public Act 095-0644.
- Fifth, it assumes that the Project is decommissioned in 30 years and pays no more taxes after that date.
- Sixth, the percentage of turbines in each taxing jurisdiction was estimated based on the current project boundaries. If the project boundaries change, the exact tax revenue could change.
- Seventh, the comprehensiveness and accuracy of the analysis below is dependent upon the assumptions listed above and used to calculate the property tax results. The analysis is to serve as a projection of property tax benefits to the local community and is not a guarantee of property tax revenue.
- Eighth, if the inputs received from UKA, the laws surrounding renewable energy taxation in Illinois, or the tax rates in Montgomery County change in a material way after the completion of this report, this analysis may no longer accurately reflect the property taxes to be paid by the Virden Wind Project.
- Ninth, no comprehensive tax payment was calculated, and these calculations are only to be used to illustrate the economic impact of the Project.

Figure 18 - Percentages of Property Taxes Paid to Taxing Jurisdictions

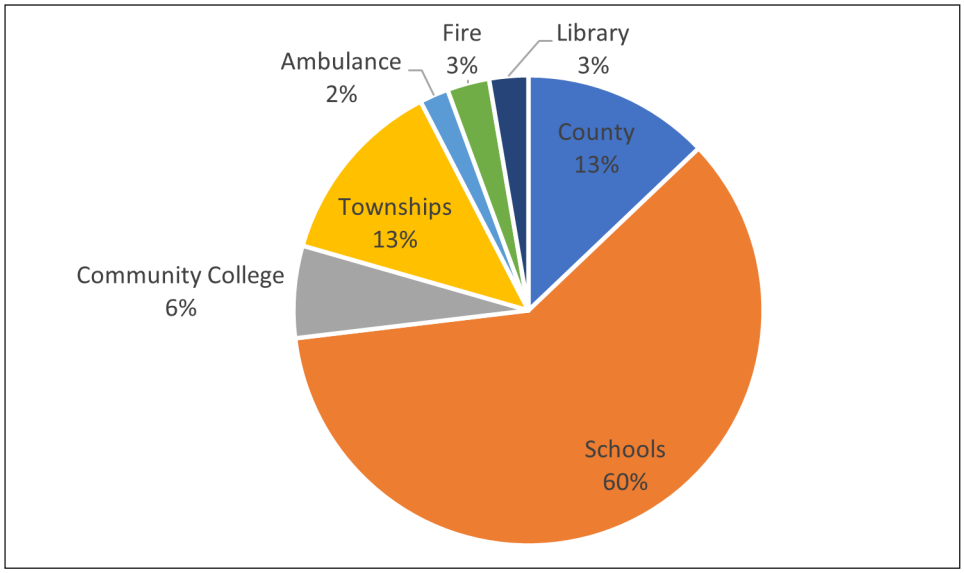


Table 6 – Total Property Taxes Paid by the Virden Wind Project

Year	Total Taxes Paid
2026	$1,481,554
2027	$1,456,427
2028	$1,429,240
2029	$1,399,909
2030	$1,368,348
2031	$1,334,465
2032	$1,298,167
2033	$1,259,359
2034	$1,217,940
2035	$1,173,808
2036	$1,126,855
2037	$1,076,973
2038	$1,024,048
2039	$967,961
2040	$908,593
2041	$845,818
2042	$779,506
2043	$709,523
2044	$681,142
2045	$697,490
2046	$714,229
2047	$731,371
2048	$748,924
2049	$766,898
2050	$785,304
2051	$804,151
2052	$823,451
2053	$843,213
2054	$863,450
2055	$884,173
TOTAL	**$30,202,291**
AVG ANNUAL	**$1,006,743**

As shown in Table 6, a conservative estimate of the total annual property taxes paid by the Project starts out at over $1.4 million and declines due to depreciation (and offset by the trending factor) until it reaches the maximum depreciation in 2044. After that, the Project is fully depreciated, and the trending factor causes the taxable value and taxes to increase. The expected total property taxes paid over the 30-year lifetime of the Project are over $30.2 million, and the average annual property taxes paid will be over $1.0 million.

Table 7 shows an estimate of the likely taxes paid to the following taxing bodies: Montgomery County Tax, Community Mental Health, CES Extension Service, Senior Social Services, and Veterans Assistance.

According to Table 7, the total amounts paid are over $3.1 million for Montgomery County Tax, over $493 thousand for Community Mental Health, over $110 thousand for CES Extension Service, over $79.7 thousand for Senior Social Services, and over $38.3 thousand for Veterans Assistance over the life of the Project.

Table 8 shows an estimate of the likely taxes paid to the following taxing bodies: Harvel Township, Harvel Road District, Bois D'Arc Township, Bois D'Arc Road District, and Bois D'Arc-Harvel-Pitman-Zanesville Multi-Township Assessor.

According to Table 8, the total amounts paid are over $512 thousand for Harvel Township, over $1.1 million for Harvel Road District, over $453 thousand for Bois D'Arc Township, over $1.7 million for Bois D'Arc Road District, and over $83.8 thousand for Bois D'Arc-Harvel-Pitman-Zanesville Multi-Township Assessor over the life of the Project.

Table 9 shows an estimate of the likely taxes paid to the following taxing bodies: Lincoln Land Community College, Raymond-Harvel Ambulance, Farmersville-Waggoner Ambulance, Farmersville-Waggoner Fire, and Farmersville-Waggoner Library.

According to Table 9, the total amounts paid are over $1.9 million for Lincoln Land Community College, over $177 thousand for Raymond-Harvel Ambulance, over $423 thousand for Farmersville-Waggoner Ambulance, over $877 thousand for Farmersville-Waggoner Fire, and over $813 thousand for Farmersville-Waggoner Library over the life of the Project.

Table 7 – Tax Revenue from the Virden Wind Project for the County[1]

Year	Montgomery County Tax	Community Mental Health	CES Extension Service	Senior Social Services	Veterans Assistance
2026	$155,512	$24,228	$5,398	$3,912	$1,881
2027	$152,875	$23,817	$5,306	$3,846	$1,849
2028	$150,021	$23,372	$5,207	$3,774	$1,814
2029	$146,942	$22,893	$5,100	$3,696	$1,777
2030	$143,630	$22,376	$4,985	$3,613	$1,737
2031	$140,073	$21,822	$4,862	$3,524	$1,694
2032	$136,263	$21,229	$4,730	$3,428	$1,648
2033	$132,190	$20,594	$4,588	$3,325	$1,599
2034	$127,842	$19,917	$4,437	$3,216	$1,546
2035	$123,210	$19,195	$4,277	$3,099	$1,490
2036	$118,281	$18,427	$4,106	$2,975	$1,431
2037	$113,045	$17,612	$3,924	$2,844	$1,367
2038	$107,490	$16,746	$3,731	$2,704	$1,300
2039	$101,603	$15,829	$3,527	$2,556	$1,229
2040	$95,371	$14,858	$3,310	$2,399	$1,153
2041	$88,782	$13,832	$3,082	$2,233	$1,074
2042	$81,821	$12,747	$2,840	$2,058	$990
2043	$74,476	$11,603	$2,585	$1,873	$901
2044	$71,497	$11,139	$2,482	$1,799	$865
2045	$73,212	$11,406	$2,541	$1,842	$885
2046	$74,970	$11,680	$2,602	$1,886	$907
2047	$76,769	$11,960	$2,665	$1,931	$928
2048	$78,611	$12,247	$2,729	$1,978	$951
2049	$80,498	$12,541	$2,794	$2,025	$974
2050	$82,430	$12,842	$2,861	$2,074	$997
2051	$84,408	$13,150	$2,930	$2,123	$1,021
2052	$86,434	$13,466	$3,000	$2,174	$1,045
2053	$88,508	$13,789	$3,072	$2,227	$1,070
2054	$90,633	$14,120	$3,146	$2,280	$1,096
2055	$92,808	$14,459	$3,221	$2,335	$1,122
TOTAL	**$3,170,205**	**$493,895**	**$110,038**	**$79,749**	**$38,342**
AVG ANNUAL	**$105,673**	**$16,463**	**$3,668**	**$2,658**	**$1,278**

[1] The assumed tax rates are 0.80697% for Montgomery County, 0.12572% for Community Mental Health, 0.02801% for CES Extension Service, 0.02030% for Senior Social Services, and 0.00976% for Veterans Assistance.

Table 8 – Tax Revenue from the Virden Wind Project for the Townships[2]

Year	Harvel Township	Harvel Road District	Bois D'Arc Township	Bois D'Arc Road District	Bois D'Arc-Harvel-Pitman-Zanesville MTA
2026	$25,117	$54,480	$22,226	$86,160	$4,112
2027	$24,691	$53,556	$21,849	$84,699	$4,043
2028	$24,230	$52,556	$21,441	$83,118	$3,967
2029	$23,733	$51,478	$21,001	$81,412	$3,886
2030	$23,198	$50,317	$20,528	$79,576	$3,798
2031	$22,624	$49,071	$20,019	$77,606	$3,704
2032	$22,008	$47,737	$19,475	$75,495	$3,603
2033	$21,350	$46,310	$18,893	$73,238	$3,496
2034	$20,648	$44,786	$18,271	$70,829	$3,381
2035	$19,900	$43,164	$17,609	$68,263	$3,258
2036	$19,104	$41,437	$16,905	$65,532	$3,128
2037	$18,258	$39,603	$16,157	$62,632	$2,989
2038	$17,361	$37,657	$15,363	$59,554	$2,843
2039	$16,410	$35,594	$14,521	$56,292	$2,687
2040	$15,404	$33,411	$13,631	$52,839	$2,522
2041	$14,339	$31,103	$12,689	$49,189	$2,348
2042	$13,215	$28,664	$11,694	$45,332	$2,164
2043	$12,029	$26,091	$10,644	$41,262	$1,969
2044	$11,548	$25,047	$10,218	$39,612	$1,891
2045	$11,825	$25,648	$10,464	$40,563	$1,936
2046	$12,109	$26,264	$10,715	$41,536	$1,983
2047	$12,399	$26,894	$10,972	$42,533	$2,030
2048	$12,697	$27,540	$11,235	$43,554	$2,079
2049	$13,002	$28,201	$11,505	$44,599	$2,129
2050	$13,314	$28,877	$11,781	$45,669	$2,180
2051	$13,633	$29,570	$12,064	$46,766	$2,232
2052	$13,960	$30,280	$12,353	$47,888	$2,286
2053	$14,295	$31,007	$12,650	$49,037	$2,341
2054	$14,638	$31,751	$12,953	$50,214	$2,397
2055	$14,990	$32,513	$13,264	$51,419	$2,454
TOTAL	**$512,031**	**$1,110,608**	**$453,090**	**$1,756,419**	**$83,835**
AVG ANNUAL	**$17,068**	**$37,020**	**$15,103**	**$58,547**	**$2,794**

[2] The assumed tax rates are 0.39101% for Harvel Township, 0.84811% for Harvel Road District, 0.173% for Bois D'Arc Township, 0.67064% for Boris D'Arc Road District, and 0.02134% for Bois D'Arc-Harvel-Pitman-Zanesville Multi-Township Assessor.

Table 9 – Tax Revenue from the Virden Wind Project for Other Taxing Bodies[3]

Year	Lincoln Land Community College	Raymond-Harvel Ambulance	Farmersville-Waggoner Ambulance	Farmersville-Waggoner Fire	Farmersville-Waggoner Library
2026	$93,929	$8,714	$20,769	$43,050	$39,893
2027	$92,336	$8,567	$20,417	$42,320	$39,217
2028	$90,613	$8,407	$20,036	$41,530	$38,485
2029	$88,753	$8,234	$19,625	$40,677	$37,695
2030	$86,752	$8,049	$19,182	$39,760	$36,845
2031	$84,604	$7,849	$18,707	$38,776	$35,933
2032	$82,303	$7,636	$18,198	$37,721	$34,955
2033	$79,842	$7,407	$17,654	$36,593	$33,910
2034	$77,217	$7,164	$17,074	$35,390	$32,795
2035	$74,419	$6,904	$16,455	$34,108	$31,607
2036	$71,442	$6,628	$15,797	$32,743	$30,342
2037	$68,279	$6,335	$15,098	$31,294	$28,999
2038	$64,924	$6,023	$14,356	$29,756	$27,574
2039	$61,368	$5,693	$13,569	$28,126	$26,064
2040	$57,604	$5,344	$12,737	$26,401	$24,465
2041	$53,624	$4,975	$11,857	$24,577	$22,775
2042	$49,420	$4,585	$10,927	$22,650	$20,989
2043	$44,983	$4,173	$9,946	$20,617	$19,105
2044	$43,184	$4,006	$9,549	$19,792	$18,341
2045	$44,220	$4,103	$9,778	$20,267	$18,781
2046	$45,282	$4,201	$10,012	$20,754	$19,232
2047	$46,368	$4,302	$10,253	$21,252	$19,693
2048	$47,481	$4,405	$10,499	$21,762	$20,166
2049	$48,621	$4,511	$10,751	$22,284	$20,650
2050	$49,788	$4,619	$11,009	$22,819	$21,146
2051	$50,983	$4,730	$11,273	$23,366	$21,653
2052	$52,206	$4,843	$11,544	$23,927	$22,173
2053	$53,459	$4,960	$11,821	$24,501	$22,705
2054	$54,742	$5,079	$12,104	$25,089	$23,250
2055	$56,056	$5,201	$12,395	$25,692	$23,808
TOTAL	**$1,914,804**	**$177,648**	**$423,391**	**$877,594**	**$813,245**
AVG ANNUAL	**$63,827**	**$5,922**	**$14,113**	**$29,253**	**$27,108**

[3] The assumed tax rates are 0.48741% for Lincoln Land Community College, 0.13566% for Raymond-Harvel Ambulance, 0.16166% for Farmersville-Waggoner Ambulance, 0.22339% for Farmersville-Waggoner Fire, and 0.20701% for Farmersville-Waggoner Library.

The largest taxing jurisdictions for property taxes are local school districts. However, the tax implications for school districts are more complicated than for other taxing bodies. School districts receive state aid based on the assessed value of the taxable property within its district. As assessed value increases, the state aid to the school district is decreased.

Table 10 shows the direct property tax revenue coming from the Project to Panhandle Community School District 2 and Pawnee Community School District 11. This tax revenue uses the assumptions outlined earlier to calculate the other tax revenue and assumes that 89% of the turbines are in Panhandle Community School District 2 and 11% are in Pawnee Community School District 11. Over the 30-year life of the Project, the school districts are expected to receive over $18.1 million in tax revenue.

Table 10 – Tax Revenue from the Virden Wind Project for the School Districts[4]

Year	Panhandle Community School District 2	Pawnee Community School District 11
2026	$807,826	$84,345
2027	$794,125	$82,915
2028	$779,301	$81,367
2029	$763,309	$79,697
2030	$746,099	$77,900
2031	$727,625	$75,971
2032	$707,833	$73,905
2033	$686,673	$71,696
2034	$664,089	$69,338
2035	$640,025	$66,825
2036	$614,424	$64,152
2037	$587,226	$61,312
2038	$558,368	$58,299
2039	$527,787	$55,106
2040	$495,416	$51,726
2041	$461,187	$48,153
2042	$425,030	$44,377
2043	$386,872	$40,393
2044	$371,397	$38,778
2045	$380,310	$39,708
2046	$389,438	$40,661
2047	$398,784	$41,637
2048	$408,355	$42,636
2049	$418,156	$43,660
2050	$428,191	$44,708
2051	$438,468	$45,781
2052	$448,991	$46,879
2053	$459,767	$48,004
2054	$470,801	$49,156
2055	$482,101	$50,336
TOTAL	**$16,467,972**	**$1,719,425**
AVG ANNUAL	**$548,932**	**$57,314**

[4] The assumed tax rates are 4.71588% for Panhandle Community School District 2 and 3.93909% for Pawnee Community School District 11.

Having considered all these benefits, it is still important to determine the net impact of the wind energy project after taking into account the reduction in school funding from the State of Illinois. Determining the reduction in state aid is complicated by the fact that there is a new law for distributing state funds to education.

On August 31, 2017, Governor Rauner signed into law PA 100-0465 that fundamentally changes the way that the state distributes state aid to school districts. The funding consists of two parts – a Base Funding Minimum and a Tier Funding. The Base Funding Minimum in FY18 is based on what the district received in FY 17 under the old funding formula. Some call this the "Hold Harmless" provision and ensures that there are no "losing" districts in the transition to the new funding formula. The Tier Funding is additional money and goes in higher portion to the districts that demonstrate a higher need under the new formula. Because of the "Hold Harmless" provision, no school district will see a reduction in their GSA from what they received in the year before the wind farm was installed. However, the higher EAV caused by the wind farm will reduce its eligibility for new money allocated in the state budget.

There are several sources of uncertainty with the new school funding formula concerning this new money. First, the total amount of new funding to be distributed over the next ten years is unknown at this point. It will be determined year-by-year in the state budget passed by the legislature and signed by the governor. For FY21, no new money was allocated for the school funding formula though the FY22 does have new money in the budget. Second, data for the formula funding changes each year based on the school's student population and its "need" and it is difficult to forecast its school's student population over time. Third, each school district is competing with all other school districts for this new funding and so the EAV and student population for all other school districts in the state will impact what a single school district receives. Fourth, the school district's EAV could also change due to other property changes in the district.

In order to determine the net impact of the Project on a school district's eligibility for new state aid money, we can make the following assumptions: (1) that the State of Illinois continues to provide $350 million in NEW state aid to education ANNUALLY. For reference, the new law passed in 2017 provided $350 million and the FY19 state budget has $350 million. The state budget has failed to include this increase in FY20 and FY21; (2) that the school districts will forfeit ALL of the new Tier funding for schools. It seems more likely that the school districts will switch tiers rather than lose all funding; (3) that the school districts would be entitled to the same tiered funding annually for the 10 years covered by the new school funding law without the wind farm; (4) that other school districts in the State of Illinois have a constant EAV and Evidence Based Funding needs.

For FY24, Panhandle Community Unit School District 2 had 94% adequacy, was assigned Tier 3 status, and will receive $6,561 in "new money." Pawnee Community School District 11 had 165% adequacy, was assigned Tier 4 status, and will receive $436 in "new money." As outlined in Table 10, there is no year in which the school districts receive less than $38,778. If new money is allocated in the future, it is unlikely that these districts will lose all of the "new money" and their EBF funding cannot go down from the previous year. Thus, the school districts will receive a net positive flow of funds because of the wind project if "new money" remains the same.

VII. Glossary

Bb

Battery Energy Storage Systems (BESS)

An array of hundreds or thousands of small batteries that enable energy from renewables, like solar and wind, to be stored and released at a later time.

Cc

Consumer Price Index (CPI)

An index of the changes in the cost of goods and services to a typical consumer, based on the costs of the same goods and services at a base period.

Dd

Direct impacts

During the construction period: the changes that occur in the onsite construction industries in which the direct final demand change is made.

During operating years: the final demand changes that occur in the onsite spending for the solar operations and maintenance workers.

Ee

Equalized Assessed Value (EAV)

The product of the assessed value of property and the state equalization factor. This is typically used as the basis for the value of property in a property tax calculation.

Ff

Farming profit

The difference between total revenue (price multiplied by yield) and total cost regarding farmland.

Full-time equivalent (FTE)

A unit that indicates the workload of an employed person. One FTE is equivalent to one worker working 2,080 hours in a year. One half FTE is equivalent to a half-time worker or someone working 1,040 hours in a year.

Hh

HV line extension

High-voltage electric power transmission links used to connect generators to the electric transmission grid.

Ii

IMPLAN (IMpact analysis for PLANning)

A business who is the leading provider of economic impact data and analytic applications. IMPLAN data is collected at the federal, state, and local levels and used to create state-specific and county-specific industry multipliers.

Indirect impacts

Impacts that occur in industries that make up the supply chain for that industry.

During the construction period: the changes in inter- industry purchases resulting from the direct final demand changes, including construction spending on materials and wind farm equipment and other purchases of good and offsite services.

During operating years: the changes in inter-industry purchases resulting from the direct final demand changes.

Induced impacts

The changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects of final demand changes.

Inflation

A persistent rise in the general level of prices related to an increase in the volume of money and resulting in the loss of value of currency. Inflation is typically measured by the CPI.

Mm

Median Household Income (MHI)

The income amount that divides a population into two equal groups, half having an income above that amount, and half having an income below that amount.

Millage rate

The tax rate, as for property, assessed in mills per dollar.

Multiplier

A factor of proportionality that measures how much a variable changes in response to a change in another variable.

MW

A unit of power, equal to one million watts or one thousand kilowatts.

MWac (megawatt alternating current)

The power capacity of a utility-scale solar PV system after its direct current output has been fed through an inverter to create an alternating current (AC). A solar system's rated MWac will always be lower than its rated MWdc due to inverter losses. AC is the form in which electric energy is delivered to businesses and residences and that consumers typically use when plugging electric appliances into a wall socket.

MWdc (megawatt direct current)

The power capacity of a utility-scale solar PV system before its direct current output has been fed through an inverter to create an alternating current. A solar system's rated MWdc will always be higher than its rated MWac.

Nn

Net economic impact

Total change in economic activity in a specific region, caused by a specific economic event.

Net Present Value (NPV)

Cash flow determined by calculating the costs and benefits for each period of investment.

NREL's Jobs and Economic Development Impacts (JEDI) Model

An input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output.

Oo

Output

Economic output measures the value of goods and services produced in a given area. Gross Domestic Product is the economic output of the United States as a whole.

Rr

Real Gross Domestic Product (GDP)

A measure of the value of goods and services produced in an area and adjusted for inflation over time.

Real-options analysis

A model used to look at the critical factors affecting the decision to lease agricultural land to a company installing a solar powered electric generating facility.

Ss

Stochastic

To have some randomness.

Tt

Tax rate

The percentage (or millage) of the value of a property to be paid as a tax.

Total economic output

The quantity of goods or services produced in a given time period by a firm, industry, county, or country.

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IX. Curriculum Vitae (Abbreviated)

David G. Loomis
Strategic Economic Research, LLC
2705 Kolby Court
Bloomington, IL 61704
815-905-2750
dave@strategiceconomic.com

Education

Doctor of Philosophy, Economics, Temple University, Philadelphia, Pennsylvania, May 1995

Bachelor of Arts, Mathematics and Honors Economics, Temple University, Magna Cum Laude, May 1985

Experience

2011-present Strategic Economic Research, LLC
President

- Performed economic impact analyses on policy initiatives and energy projects such as wind energy, solar energy, natural gas plants and transmission lines at the county and state level
- Provided expert testimony before state legislative bodies, state public utility commissions, and county boards
- Wrote telecommunications policy impact report comparing Illinois to other Midwestern states

1996-2023 Illinois State University, Normal, IL
Professor Emeritus – Department of Economics (2023 - present)
Full Professor – Department of Economics (2010-2023)
Associate Professor - Department of Economics (2002-2009)
Assistant Professor - Department of Economics (1996-2002)

- Taught Regulatory Economics, Telecommunications Economics and Public Policy, Industrial Organization and Pricing, Individual and Social Choice, Economics of Energy and Public Policy and a Graduate Seminar Course in Electricity, Natural Gas and Telecommunications Issues
- Supervised as many as 5 graduate students in research projects each semester
- Served on numerous departmental committees

1997-2023 Institute for Regulatory Policy Studies, Normal, IL
Executive Director (2005-2023)
Co-Director (1997-2005)

- Grew contributing membership from 5 companies to 16 organizations
- Doubled the number of workshop/training events annually
- Supervised 2 Directors, Administrative Staff and internship program
- Developed and implemented state-level workshops concerning regulatory issues related to the electric, natural gas, and telecommunications industries

2006-2018 Illinois Wind Working Group, Normal, IL
Director

- Founded the organization and grew the organizing committee to over 200 key wind stakeholders
- Organized annual wind energy conference with over 400 attendees
- Organized strategic conferences to address critical wind energy issues
- Initiated monthly conference calls to stakeholders
- Devised organizational structure and bylaws

2007-2018 Center for Renewable Energy, Normal, IL
Director

- Created founding document approved by the Illinois State University Board of Trustees and Illinois Board of Higher Education
- Secured over $150,000 in funding from private companies
- Hired and supervised 4 professional staff members and supervised 3 faculty members as Associate Directors
- Reviewed renewable energy manufacturing grant applications for Illinois Department of Commerce and Economic Opportunity for a $30 million program
- Created technical "Due Diligence" documents for the Illinois Finance Authority loan program for wind farm projects in Illinois
- Published 40 articles in leading journals such as AIMS Energy, Renewable Energy, National Renewable Energy Laboratory Technical Report, Electricity Journal, Energy Economics, Energy Policy, and many others
- Testified over 80 times in formal proceedings regarding wind, solar and transmission projects
- Raised over $7.7 million in grants
- Raised over $2.7 million in external funding

Bryan A. Loomis
Strategic Economic Research, LLC
Vice President

Education

Master of Business Administration (M.B.A.), Marketing and Healthcare, Belmont University, Nashville, Tennessee, 2017.

Experience

2019-present Strategic Economic Research, LLC, Bloomington, IL
Vice President
(2021-present)
Property Tax Analysis and Land Use Director
(2019-2021)

- Directed the property tax analysis by training other associates on the methodology and overseeing the process for over twenty states
- Improved the property tax analysis methodology by researching various state taxing laws and implementing depreciation, taxing jurisdiction millage rates, and other factors into the tax analysis tool
- Executed land use analyses by running Monte Carlo simulations of expected future profits from farming and comparing that to the solar lease
- Performed economic impact modeling using JEDI and IMPLAN tools
- Improved workflow processes by capturing all tasks associated with economic modeling and report-writing, and created automated templates in Asana workplace management software

2019-2021 Viral Healthcare Founders LLC, Nashville, TN
CEO and Founder

- Founded and directed marketing agency for healthcare startups
- Managed three employees
- Mentored and worked with over 30 startups to help them grow their businesses
- Grew an email list to more than 2,000 and LinkedIn following to 3,500
- Created a Slack community and grew to 450 members
- Created weekly video content for distribution on Slack, LinkedIn and Email

Christopher Thankan
Strategic Economic Research, LLC
Economic Analyst

Education

Bachelor of Science in Sustainable & Renewable Energy (B.S.), Minor in Economics, Illinois State University, Normal, IL, 2021

Experience

2021-present Strategic Economic Research, LLC, Bloomington, IL
Economic Analyst

- Create economic impact results on numerous renewable energy projects Feb 2021-Present
- Utilize IMPLAN multipliers along with NREL's JEDI model for analyses
- Review project cost Excel sheets
- Conduct property tax analysis for different US states
- Research taxation in states outside research portfolio
- Complete ad hoc research requests given by the president
- Hosted a webinar on how to run successful permitting hearings
- Research school funding and the impact of renewable energy on state aid to school districts
- Quality check coworkers JEDI models
- Started more accurate methodology for determining property taxes that became the main process used

by Dr. David G. Loomis,
Bryan Loomis, and Chris Thankan
Strategic Economic Research, LLC
strategiceconomic.com
815-905-2750

Decommissioning Plan
Virden Wind Energy Project
Montgomery County, Illinois

Prepared for:
Virden Wind Energy LLC
UKA North America LLC
1002 SE Monterey Commons Blvd,
Suite 300
Stuart, FL 34996

Prepared by:
Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, Wisconsin 54115

Project No.: 193709934

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This document entitled Decommissioning Plan – Virden Wind Energy Project, Montgomery County, Illinois, was prepared by Stantec Consulting Services Inc. ("Stantec") for the use of Virden Wind Energy LLC (the "Client"). The material in this document reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in this document are based on conditions and information existing at the time this document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others.

Michael Gerhart
Civil Engineer

JoAnne Blank
Senior Associate, Senior Scientist

Matthew A. Clementi, PE
Senior Project Engineer

PE CERTIFICATION

NAME:	**Matthew Clementi**
TITLE:	**Professional Engineer**
COMPANY:	**Stantec Consulting Services Inc.**
REGISTRATION NO:	**#062049423**
EXPIRATION:	**11/30/2025**
STATE:	**ILLINOIS**

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1.0 INTRODUCTION

Virden Wind Energy LLC (Virden Wind) is proposing to construct the Virden Wind Energy Project (the "Project") in Montgomery County, Illinois. The Project will have a total nameplate generating capacity of approximately 122.4 megawatts (MW) and will be located south of the City of Springfield, Illinois. Virden Wind is planning to use up to 18 Nordex N163 wind turbine generators (WTG or turbine) to be constructed on privately leased land.

This Decommissioning Plan (Plan) provides a description of the facility removal and restoration phase of the Project, including a list of the primary wind farm components, and sequence of dismantling and removal activities. A summary of estimated costs and revenues associated with the decommissioning phase is also included. This Plan has been prepared in accordance with the Montgomery County Ordinance - Regulating the Siting of Wind Energy Systems (No. 2023-24) and the Illinois Department of Agriculture (IDOA) Agricultural Impact Mitigation Agreement (AIMA) requirements for a deconstruction of a wind energy facility. The AIMA has been executed by Virden Wind and the IDOA as of February 9, 2024.

1.1 WIND FARM COMPONENTS

The main components of the Project include:

- Turbines (tower, nacelle, step-up transformer, hub, rotor and three rotor blades per WTG)
- Turbine foundations
- Access roads
- Crane pads (to be installed and subsequently removed during decommissioning)
- One meteorological tower
- Project substation and associated generation tie-in transmission line
- Underground electrical collection system

1.2 EXPECTED LIFETIME AND TRIGGERING EVENTS

If properly maintained, the lifetime of the Nordex utility-scale wind turbines is expected to be 30 years or more. Depending on market conditions and Project viability, the turbines may be retrofitted with updated components, such as nacelles, towers and/or blades to extend the life of the Project. In the event that the turbines are not retrofitted, or at the end of the Project's useful life, the turbines and associated components will be decommissioned and removed from the site.

The AIMA states the following definitions and events that could trigger the need for decommissioning:

- Abandonment (defined) - Occurs when Deconstruction has not been completed within 18 months after the wind energy facility reaches the end of its Useful Life.
- Useful Life (Defined) – A Commercial Wind Energy Facility will be presumed to have no remaining Useful Life if: (1) no electricity is generated for a continuous period of twelve (12) months and (2) the Commercial Wind Energy Facility Owner fails, for a period of 6 consecutive months, to pay the Landowner amounts owed in accordance with the Underlying Agreement.
- Paragraph 21.B of the AIMA states," The Facility Owner shall, at its expense, complete Deconstruction of a Commercial Wind Energy Facility within eighteen (18) months after the end of the useful life of the Facility".
- Paragraph 21.F of the AIMA also states: "Upon Abandonment, the County may take all appropriate actions for Deconstruction including drawing upon the Financial Assurance."

Turbine components that have resale value may be sold in the wholesale market. Components with no wholesale value will be salvaged and sold as scrap for recycling or disposed of at an offsite licensed solid waste disposal facility (e.g., landfill). Decommissioning activities will include removal of the turbines and associated components as listed in Section 1.1 and described in Section 2.

1.3 DECOMMISSIONING SEQUENCE

In accordance with the AIMA, wind facility decommissioning will occur within 18 months after the end of the facility's useful life. Monitoring and site restoration may extend beyond this time period to ensure successful revegetation and rehabilitation. The anticipated sequence of decommissioning and removal is described below; however, overlap of activities is expected.

- Reinforce access roads (e.g., turning radii) and prepare site (including installation of crane pads, as needed)
- Install temporary fencing and erosion control best management practices (BMPs) to protect sensitive resources.
- De-energize turbines
- Dismantle and remove rotors and nacelles
- Remove towers and internal components including step-up transformers
- Remove substation
- Remove collection system less than 60 inches below the ground surface
- Remove portions of wind turbine foundations less than 60 inches below the ground surface and backfill sites with approved materials
- Remove crane pads installed for decommissioning and grade turbine sites
- Remove access roads (unless there is mutual agreement in writing between the landowner and Virden Wind that the access road will remain)
- De-compact subsoils (if required), and remove rocks as required by the AIMA.
- Repair drain tiles damaged during construction, operation, or deconstruction of the Project per AIMA requirements.
- Restore and revegetate disturbed land as specified within the AIMA, landowner leases, or permit conditions, if any.

2.0 DECOMMISSIONING COMPONENTS AND ACTIVITIES

The wind farm components and decommissioning activities necessary to restore the Project area, as near as practicable, to pre-construction conditions are described within this section. Access roads may be left in place if requested in writing by the landowner and agreed to by Virden Wind. Concrete and other components of wind turbines and the underground electric collection system located 60 inches or more below the soil surface will not interfere with future agricultural activities and are assumed to be abandoned in place, pursuant to Paragraph 21 of the AIMA. Estimated quantities of materials to be removed and salvaged or disposed of are included in this section. During the decommissioning phase, debris and litter generated by contractor crews will be removed from the site. Public roads damaged or modified during the decommissioning and reclamation process shall be repaired upon completion of the Project.

2.1 WIND FARM SYSTEM OVERVIEW

The Project consists of Nordex N163 turbines, each with a nameplate generating capacity of approximately 6.8 MW. The decommissioning estimates provided in this report assume that eighteen (18) turbines are erected, powered, and subsequently decommissioned. Table 1 presents a summary of the primary components included in this decommissioning plan.

Table 1 Primary Components of Wind Farm at Decommissioning

Component	Quantity	Unit of Measure
Wind Turbines (including 1 tower, 1 nacelle, 1 hub and 1 rotor with 3 rotor blades, per turbine)	18 (54 blades)	Each
Step-up Transformers (located within turbine nacelle)	18	Each
Wind Turbine Foundations	18	Each
Underground Collection Cabling (to be abandoned in place if greater than 60 inches in depth)	305,406	Linear Foot (estimated)
Crane Pads or Mats	18	Each
Access Roads	30,466	Linear Foot (estimated)
Overhead Transmission Line	4.84	Linear Miles (estimated)
Substation	1	Each

2.2 WIND TURBINE GENERATORS

The wind turbine generators are each primarily comprised of a modular steel tower, nacelle, and rotor with three rotor blades attached to a hub. The approximate maximum height (hub height, rotor diameter, and tip height at highest point) are shown below:

Turbine Model	Quantity	Hub Height	Rotor Diameter	Combined Height (tip-height)
N163	18	118 meters (387.1 feet)	163 meters (534.8 feet)	199.5 meters (654.5 feet)

The components are modular in design, allowing for ease of construction, replacement, and disassembly during decommissioning. Turbine components in working condition may be refurbished and sold in a secondary market yielding greater revenue than selling as salvage material. For the purposes of this report, estimates will be based on the salvage value, as this will be the most conservative estimate of revenue.

Turbine Tower – The turbine towers are painted modular, monopole steel structures, primarily made of structural steel. The towers for the Nordex turbines are comprised of four sections with an approximate total weight of 313.68 metric tons. Calculations have assumed that the towers will consist of approximately 80 percent salvageable steel. Tower pieces will be transported off-site for salvaging; however, it is assumed they will be cut into pieces on site for transport. This Decommissioning Plan assumes that towers for eighteen (18) 118-meter towers for the N163 model turbines will be decommissioned.

Nacelle – The nacelle sits at the top of the turbine tower and has an overall weight of approximately 73.78 metric tons. The salvage value in this report has been calculated assuming 80% salvageable steel along with other non-salvageable materials. Non-salvageable material within the nacelle will be disposed of in an approved landfill.

Hub, Rotor, and Rotor Blades – The hub and nose cone assembly (without blades) has an overall weight of approximately 56.13 metric tons. It is mainly comprised of steel that will be salvaged along with the tower and nacelle. The salvage value has been based on an estimate of 90% salvageable steel per hub. The rotor blades are constructed of non-metallic materials such as fiberglass, carbon fibers, and epoxies. These materials will likely have no salvage value and thus will be properly disposed of in a licensed solid waste facility. New methods of utilizing the recycled blade components are emerging. Examples include incorporating the recycled blade components as a raw material in the cement manufacturing process and as a fuel source.

Other Turbine Components – In addition to the main components previously described, each turbine contains other items such as anchor bolts and internal electrical wiring that will have additional salvage value. The down-tower cabling contains copper, which will be 100% salvageable.

Decommissioning Activity – The wind turbines will be deactivated from the surrounding electrical system and made safe for disassembly. Improvements to access roads and crane pads will be completed to allow crane access to turbines for removal of components. Liquid wastes, including gear box oil and hydraulic fluids will be removed and properly disposed of or recycled according to regulations current at the time of decommissioning. Control cabinets, electronic components and internal electrical wiring will be removed and salvaged. The hub and rotors will be lowered to the ground as a unit for disassembly. The nacelle and turbine sections will be disassembled and removed in the reverse order of assembly.

2.3 STEP-UP TRANSFORMERS

Step-up transformers for the Nordex turbines are located within the nacelle. After deactivation, oil will be drained and recycled or disposed of at an approved solid waste management facility. The transformer will then be disassembled and removed. Depending on condition, the transformers may be sold for refurbishment and re-use. If not re-used, the transformer will be salvaged.

2.4 WIND TURBINE FOUNDATIONS

The octagonal spread foot foundations utilized for the Project turbines are predominantly located underground. The foundation design consists of a solid, reinforced circular concrete pedestal, approximately 6 feet high and 17 feet in diameter. Below the pedestal is the foundation base, an octagonal-shaped concrete structure approximately 55 to 60 feet in diameter and 9.0 feet deep. The entire foundation sits on supporting sub-grade approximately 13 feet below the ground surface.

Concrete demolition will be completed on the portion of the pedestal and foundation less than 60 inches below the ground surface. This will include the anchor bolts, rebar, conduits, cables, and concrete to the required depth. Using best efforts, the site will be backfilled with clean fill and graded to land contours to preconstruction conditions. Topsoil will be placed on the disturbed area, decompacted, as necessary, pursuant to Paragraph 8 of the AIMA, and revegetated. Excavated materials will be hauled off-site for recycling or disposal.

2.5 COLLECTION SYSTEM

The Project's electrical collection system is located within cable trenches buried at a minimum depth of 60 inches below the ground surface. The system voltage is 34.5 kilovolts (kV) and runs from the individual turbines to the Project substation. The total length of the Project collection system cable is estimated at 305,406 linear feet (57.84 miles). Junction boxes and collection cables less than 60 inches below the ground surface will be removed and salvaged. Topsoil and subsoil excavated for the removal will be stockpiled and replaced. Using best efforts, land will be graded, decompacted, as necessary, and pre-construction

contours restored. Cabling located at a depth 60 inches or greater below the surface will be abandoned in place.

2.6 CRANE PADS

Crane pads will be constructed at the base of each turbine to support the large cranes necessary for disassembly of the turbines. Pads will be approximately 40 feet by 60 feet and consist of compacted native soils and approximately twelve to fifteen inches of aggregate base fill. Crane pads will be recycled from turbine to turbine and aggregate base will be re-used; therefore, only approximately six (6) pads will require new materials. After decommissioning activities are completed the crane pad aggregate will be removed and the areas filled with stockpiled subsoil and topsoil, as necessary. Using best efforts, land will be graded, and pre-construction contours restored. Restoration will likely be performed in conjunction with the turbine foundation and/or access road restoration. Pursuant to Paragraph 8 of the AIMA, soils compacted during de-construction activities will be de-compacted. Labor for trucking and equipment is the primary expense for the crane pad removal.

2.7 ACCESS ROADS

Access roads are located at each turbine providing access from public roads to the turbine site. The final width of the roads is approximately sixteen (16) feet, widening near the turbine base. The total length of Project access roads is approximately 30,466 linear feet (5.77 miles). During the initial construction of the wind farm, the existing soils will be graded to match the typical contour of the adjacent land and compacted. Final operational access roads will consist of compacted subgrade surface followed by the placement of six (6) inches of aggregate material. Geotextile fabric may be in place beneath the gravel at low water crossing locations along the access road. The estimated quantity of these materials is provided in Table 2.

Table 2 Typical Access Road Construction Materials

Item	Number	Unit
Aggregate Material	9,027	Cubic Yards
Geogrid or geotextile fabric	121,860	Square Feet

Access roads will be removed from the Project area unless there is mutual agreement in writing between the landowner and Virden Wind that the access road be retained. Decommissioning activities include the removal and transportation of aggregate materials to a site for salvage preparation. Local townships or farmers may accept the material prior to processing for use on local roads or trails; however, for the purpose of this estimate it is conservatively assumed that all access roads will be removed from the Project area unless retained by landowner request.

The underlying geogrid or geotextile fabric (if present) will be removed during the decommissioning of the access roads. Fabric that is easily separated from the aggregate during excavation will be disposed of in an approved solid waste disposal facility. Fabric that remains with the aggregate will be sorted out at the processing site and properly disposed of. Following removal of aggregate and geotextile fabric, the access road areas will de-compacted (ripped to 18 inches), backfilled with subsoil and topsoil, as needed. Using best efforts, land contours will be restored to preconstruction conditions.

Approximately 50 percent of the aggregate base course removed from the access roads would have an expected reuse as base course. The remaining aggregate may be viable as general fill for use in a non-structural fill site. Although a salvage value for a portion of the aggregate surface material is anticipated; it has not been included in this estimate. The decommissioning estimates are based on removal of the

materials, as described, and include transportation of non-salvageable materials to a fill site within 25 miles of the turbine site.

2.8 PROJECT SUBSTATION AND OVERHEAD TRANSMISSION TIE-IN LINE

The Virden Wind Project includes a collector substation. The substation contains within its fenced perimeter, a gravel pad, a power transformer and footings, electrical control house, and concrete foundations, as needed. The substation will be removed unless an alternate use for the facility is obtained. The facility, foundations, and fencing will be removed and properly disposed of or recycled according to regulations current at the time of decommissioning. Due to the expected lifetime of the substation and its components, there would likely be a substantial resale value at the time of Project decommissioning. Although the resale value would be much higher than the estimated salvage value, this report assumes a conservative value of recycled revenue only. The substation site will be backfilled with subsoil and topsoil and graded, using best efforts to restore land contours to preconstruction conditions.

An approximately 25,576-foot-long (4.84-mile) dedicated 138 kV overhead transmission line connects the Project substation to a larger regional substation. If the Project substation is removed and there is no planned alternate use of the transmission line, the transmission line cable and supporting poles will be removed. Pole sites will be backfilled with native soils. An estimated cost to remove the transmission line is included in this Plan.

2.9 OPERATIONS AND MAINTENANCE BUILDING

Virden Wind will construct an operation and maintenance (O&M) building for the Project. Due to the size and value of the building at time of decommissioning, it is assumed to be sold or reverted back to the landowner for future use after wind energy production has ceased. The cost to remove the O&M building is therefore not included in this Plan.

3.0 LAND USE, RESTORATION, AND REVEGETATION

Virden Wind is committed to restoring and revegetating areas disturbed by Project operational and decommissioning activities pursuant to the requirements included in the executed AIMA. A brief summary of activities is provided in this section; however, it is understood that the conditions and requirements as stated in the AIMA provide a detailed outline of the commitments between Virden Wind and the IDOA, including but not exclusively, those stated in Paragraphs 5 through 18.

3.1 TOPSOIL RESTORATION AND REVEGETATION

Topsoil removal and replacement activities will be completed in compliance with Paragraph 5 of the AIMA. Project sites that have been excavated and backfilled during the decommissioning process will be graded as previously described, and best efforts employed to restore land contours to preconstruction conditions. Soils compacted during de-construction activities will be de-compacted, as necessary, to restore the land to pre-construction land use. In compliance with Paragraph 7 of the AIMA, rocks greater than three (3) inches that have emerged as a result of decommissioning activities will be removed from the site prior to placing topsoil.

Previously stockpiled subsoil and topsoil will be utilized and supplemented, as needed, in areas of excavation. Topsoil will be placed on disturbed areas and seeded with appropriate vegetation to reintegrate it with the surrounding environment. Project areas that were previously utilized for agricultural purposes will be restored to their preconstruction condition in accordance with the AIMA Paragraph 8 and landowner

lease agreements. Landowner preferences will be considered for the reseeding approach in agricultural lands. Work will be completed to comply with the conditions required by Montgomery County, local townships, or state regulations in effect at the time of decommissioning.

In compliance with, and as outlined in, Paragraph 17 of the AIMA, Virden Wind will provide weed control during decommissioning activities to prevent the spread of weeds into agricultural lands.

Pursuant to Paragraph 10 of the AIMA, if, within twenty-four (24) months after decommissioning, uneven settling occurs or surface drainage problems develop as a result of the decommissioning activities, Virden Wind will provide land leveling services within 45 days of receiving written notice from the landowner.

3.2 DRAIN TILE REPAIRS

Virden Wind will repair drain tiles that have been damaged during Project operation or decommissioning in compliance with Paragraph 6 of the AIMA. Repairs will be completed in a manner that assures the tile line's proper operation at the point of repair. Best practices will be employed to restore the drainage in the area to the condition it was in prior to commencement of the decommissioning activities. Virden Wind will complete the drain tile repairs as outlined in Paragraph 6 (A through H) of the executed AIMA, as applicable.

3.3 SURFACE WATER DRAINAGE AND CONTROL

The Project area is predominantly located in actively drained agricultural land. The Project facilities have been sited to avoid wetlands, waterways, and drainage ditches to the extent practicable. The existing Project site conditions and proposed BMPs to protect surface water features will be detailed in a Project Stormwater Pollution Prevention Plan (SWPPP) prior to the commencement of deconstruction activities.

Surface water conditions at the Project site will be reassessed prior to the decommissioning phase. Virden Wind will obtain the required water quality permits from the Illinois Department of Natural Resources (IDNR) and the U.S. Army Corp of Engineers (USACE), if needed, before decommissioning of the Project. Construction stormwater permits will also be obtained and a SWPPP prepared describing the protection needed to reflect conditions present at the time of decommissioning. BMPs may include improved construction entrances, temporary seeding, permanent seeding, mulching (in non-agricultural areas), erosion control matting, silt fence, filter berms, and filter socks. Costs for erosion/sediment control features, dust control, and street sweeping are included in the restoration costs of Table 3.

3.4 MAJOR EQUIPMENT REQUIRED FOR DECOMMISSIONING

Equipment required for the decommissioning activities is similar to what is needed to construct the solar facility and may include, but is not limited to: small cranes, low ground pressure (LGP) tracked excavators, backhoes, LGP tracked bulldozers and dump trucks, front-end loaders, deep rippers, water trucks, disc plows and tractors to restore subgrade conditions, and ancillary equipment. Standard dump trucks may be required to transport material removed from the site to disposal facilities.

3.5 ROADWAY IMPACTS

Virden Wind has improved local public roads as needed during construction of the Project. During the life of the Project, the roads will be maintained to withstand heavy equipment and maintenance vehicles. Virden Wind and the Montgomery County Road Authorities have an executed agreement covering the repair of roads required due to the construction, operation, and/or decommissioning of the Project.

4.0 DECOMMISSIONING COST ESTIMATE SUMMARY

Expenses and revenues associated with decommissioning the Project will be dependent on labor costs and market value of salvageable materials at the time of decommissioning. For the purposes of this report average 2023 market values were used to estimate both expenses and revenues. Fluctuation and inflation of the salvage values or labor costs were not factored into the estimates.

4.1 DECOMMISSIONING EXPENSES

Project decommissioning will incur costs associated with the disassembly, removal, excavation, and restoration of the proposed wind turbine sites and support infrastructure as described in Section 2. Table 3 summarizes the estimated costs for activities associated with the major components of decommissioning the Project. An overhead and management task is included to represent the estimated permitting and miscellaneous costs required by the contractor during the Project decommissioning phase. Miscellaneous costs may include items such as construction office trailers, security measures, and debris and litter removal. An additional contingency fund at ten percent (10%) of the total decommissioning cost has been added for the coverage of unforeseen expenses.

Table 3 Estimated Decommissioning Expenses

Activity	Unit	Number	Cost per Unit	Total
Overhead and management (includes estimated permitting required)	Lump Sum	1	$535,000	$535,000
Mobilization and demobilization	Lump Sum	1	$125,000	$125,000
Turbine and step-up transformer disassembly and removal from site				
• Crane and disassembly of turbine	Each	18	$74,500	$1,341,000
• Deconstruction into salvageable pieces		18	$52,100	$937,800
• Transport of materials to recycler (weighted turbine average)		18	$19,559	$352,062
– Steel transport (weighted turbine average)		18	$500	$9,000
– Copper transport (weighted turbine average)				
• Demolition, transport, and tipping for rotors (3) and nacelle cover		18	$4,100	$73,800
• Transformer (load only, refurbisher will haul)		18	$1,600	$28,800
Crane pad installation, excavation, removal, and transportation (6 new pads and 12 recycled pads)	Each (average cost)	18	$2,265	$40,770
Wind turbine foundation				
• Concrete demolition and disposal for 60-inch depth of pedestal	Each	18	$26,705	$480,690
• Backfill and site grading			$2,585	$46,530
Access road excavation and removal	Lump Sum	1	$88,610	$88,610

Activity	Unit	Number	Cost per Unit	Total
Access road backfill and restoration	Lump Sum	1	$299,250	$299,250
Meteorological Tower	Each	1	$23,000	$23,000
Overhead transmission line removal	Linear Mile	4.84	$250,000	$1,210,000
Substation removal and site grading	Lump Sum	1	$300,000	$300,000
Total Estimated Decommissioning Cost				**$5,891,312**
Contingency Fund (10% of Gross Decommissioning Cost)				**$589,131**
Total Decommissioning Cost Including Contingency				**$6,480,443**

4.2 DECOMMISSIONING REVENUES

Revenue from decommissioning the Project will be realized through the sale of wind farm components and construction materials. Turbine components may be sold within a secondary market or as salvage. For purposes of this report, estimated recovery values were based on the salvage value, as this is the more conservative estimate of revenue.

The market value of both steel and copper fluctuates daily and have varied widely over the past five years. Salvage value estimates were based on an approximate five-year-average price of steel and copper derived from sources including on-line recycling companies and United States Geological Survey (USGS) commodity summaries. The price used to value steel in this report is $275 per metric ton; the value of copper, $2.78 per pound ($6,127 per metric ton). The tower and nacelle are assumed to have 80 percent salvageable steel content. The hub is assumed to have 90 percent salvageable steel. Table 4 summarizes the potential salvage value for the wind turbine components and construction materials.

Table 4 Estimated Decommissioning Revenues

Item	Unit	Number	Salvage Price per Unit	Salvage Price per Turbine	Total
Wind Turbine Generators					
N163 118-Meter Turbine Tower (based on 18 turbines)	Tonnes of steel per turbine	250.9	$275	$68,998	$1,241,964
Nacelle (steel) (weighted average of all turbines)	Tonnes per nacelle	59.0	$275	$16,225	$292,050
Rotor Hub (weighted average of all turbines)	Tonnes per hub	50.5	$275	$13,888	$249,984
Anchor Bolts (steel)	Tonnes per turbine	2.0	$275	$550	$9,900
Transformer	Per turbine	1	$1,500	$1,500	$27,000

Item	Unit	Number	Salvage Price per Unit	Salvage Price per Turbine	Total
Copper	Tonnes per turbine	3.50	$6,127	$21,445	$386,010
Project Substation					
Substation Components (steel and two transformers)	Total	1	$50,000		$50,000
Total Potential Revenue					**$2,256,908**

4.3 NET DECOMMISSIONING COST SUMMARY

Table 5 provides a summary of the net estimated cost to decommission the Project, using the information detailed in Sections 3.1 and 3.2. Estimates are based on late 2023 prices, with no market fluctuations or inflation considered.

Table 5 Net Decommissioning Summary

Item	Cost/Revenue
Gross Decommissioning Expenses	$5,891,312
Contingency Fund (10%)	$589,131
Total Decommissioning Cost Including Contingency	$6,480,443
Potential Revenue – salvage value of turbine components and recoverable materials	$2,256,908
Net Decommissioning Cost	$4,223,535

This engineer's estimate produces a conservative estimate of the cost of decommissioning the Project based on the following considerations:

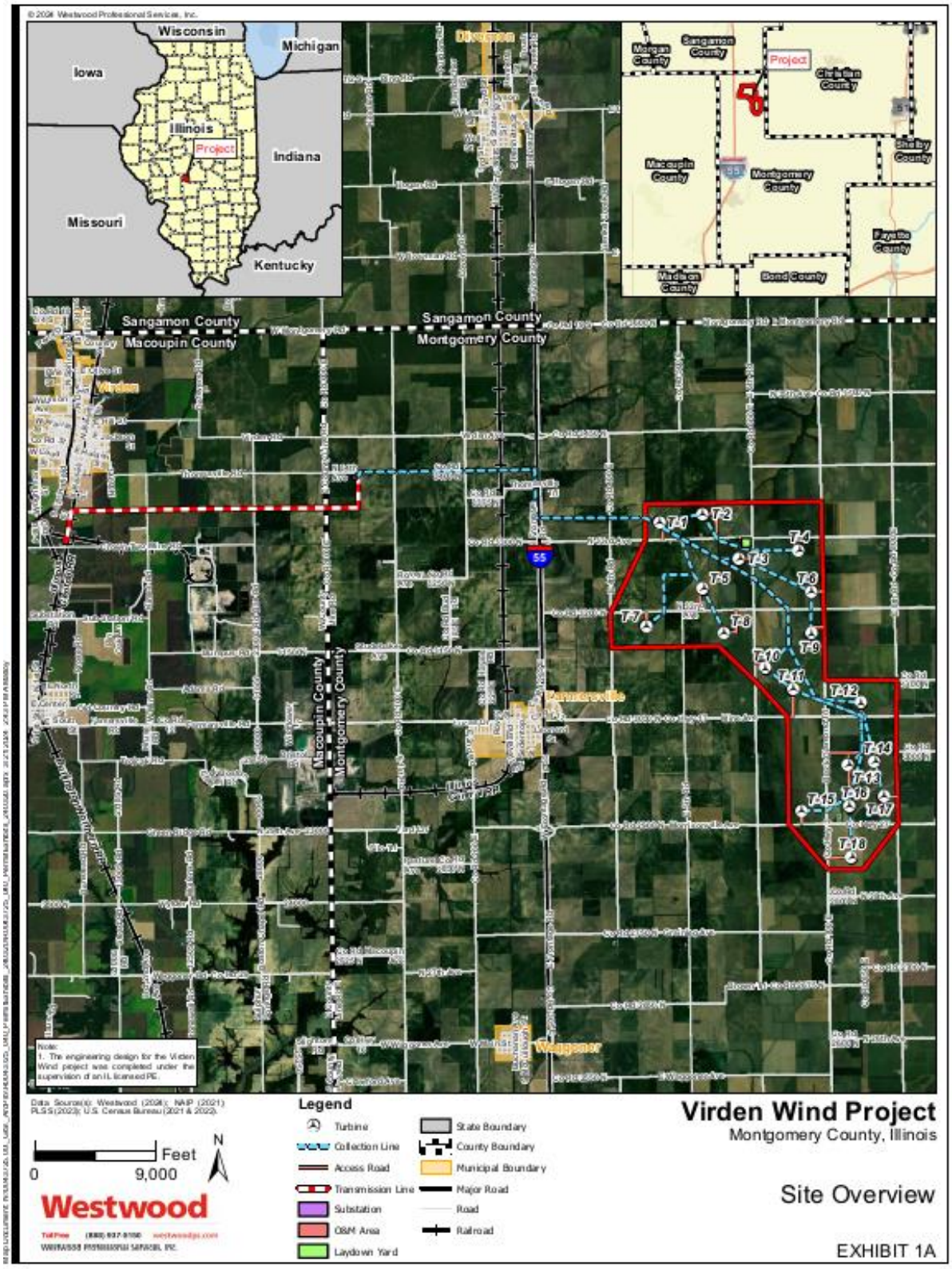
1) Each individual component of the plan has been conservatively estimated. It is our professional opinion that the actual cost to decommission the Project would be lower than the estimate presented here.
2) Given the growing demand and declining availability of raw materials, it is our opinion that the relative price paid for recycled materials will increase over time. Together with more refined recycling techniques, this will reduce the overall cost of decommissioning.
3) Decommissioning costs during the first 10 to 15 years following the Project's construction will likely be significantly lower than estimated as the turbines would be dismantled, sold, and reconstructed as used operational units. The engineer's estimates discussed in this Plan assume all materials are recycled or disposed of, which will produce a much lower return.
4) Virden Wind has indicated that the salvage value used to reduce the estimated costs of decommissioning for this Project is appropriate, as all other interests in the salvage value are subordinate to the County's interests in the salvage value should abandonment occur.

4.4 DECOMMISSIONING FINANCIAL ASSURANCE

In compliance with the Mongomery County, Illinois, Ordinance #2023-24 Regulating the Siting of Wind Energy Conversion Systems, Section XIV – Decommissioning, Virden Wind is providing this Decommissioning Plan. Virden Wind has indicated it will comply with Paragraph 21 of the executed AIMA, including, but not limited to, the following.

- An updated Decommissioning Plan will be provided to Montgomery County (the County) on or before the end of the tenth year of commercial operation, and every five years thereafter. The reevaluation will be performed by an independent third-party engineer licensed in the State of Illinois. Virden Wind understands that based on the reevaluation report, the County may require changes to the level of financial assurance used to calculate each of the phased coverages as described in Paragraph 21.D of the AIMA and summarized below. Virden Wind or facility owner at the time of the reevaluation will be responsible for the costs of the reevaluation reports.
- Financial Assurance, in the form of a surety bond, to cover the estimated net cost of decommissioning shall be phased in over the first 11 years of the Project's operation as follows:
    - On or before the first anniversary of the COD, Virden Wind shall provide the County with Financial Assurance to cover ten (10) percent of the estimated costs to decommission the facility as determined in this Plan. The County will be the primary beneficiary of the surety bond and the Landowners will be the secondary beneficiaries.
    - On or before the sixth anniversary of the COD, Virden Wind shall provide the County with Financial Assurance to cover fifty (50) percent of the estimated costs to decommission the facility as determined in this Plan.
    - On or before the eleventh anniversary of the COD, Virden Wind shall provide the County with Financial Assurance to cover one hundred (100) percent of the estimated net cost to decommission the facility as determined in the updated Decommissioning Plan provided during the tenth year of commercial operation.

FIGURES


Wisconsin
Michigan
Iowa
Illinois
Project
Indiana
Missouri
Kentucky
Sangamon County
Macoupin County
Montgomery County
Virden
Farmersville
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Note:
1. The engineering design for the Virden Wind project was completed under the supervision of an IL licensed PE.
Data Source(s): Westwood (2024); NAIP (2021); PLSS (2023); U.S. Census Bureau (2021 & 2022).
Legend
Turbine
Collection Line
Access Road
Transmission Line
Substation
O&M Area
Laydown Yard
State Boundary
County Boundary
Municipal Boundary
Major Road
Road
Railroad
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Feet
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Westwood
Virden Wind Project
Montgomery County, Illinois
Site Overview
EXHIBIT 1A

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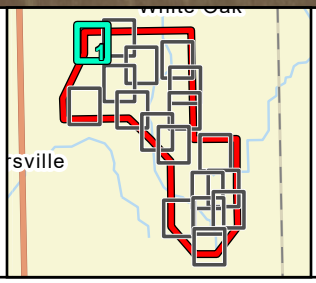

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
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- Transmission Line
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- NHD Flowline
- NHD Waterbody
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- Coal Mine
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- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 1

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

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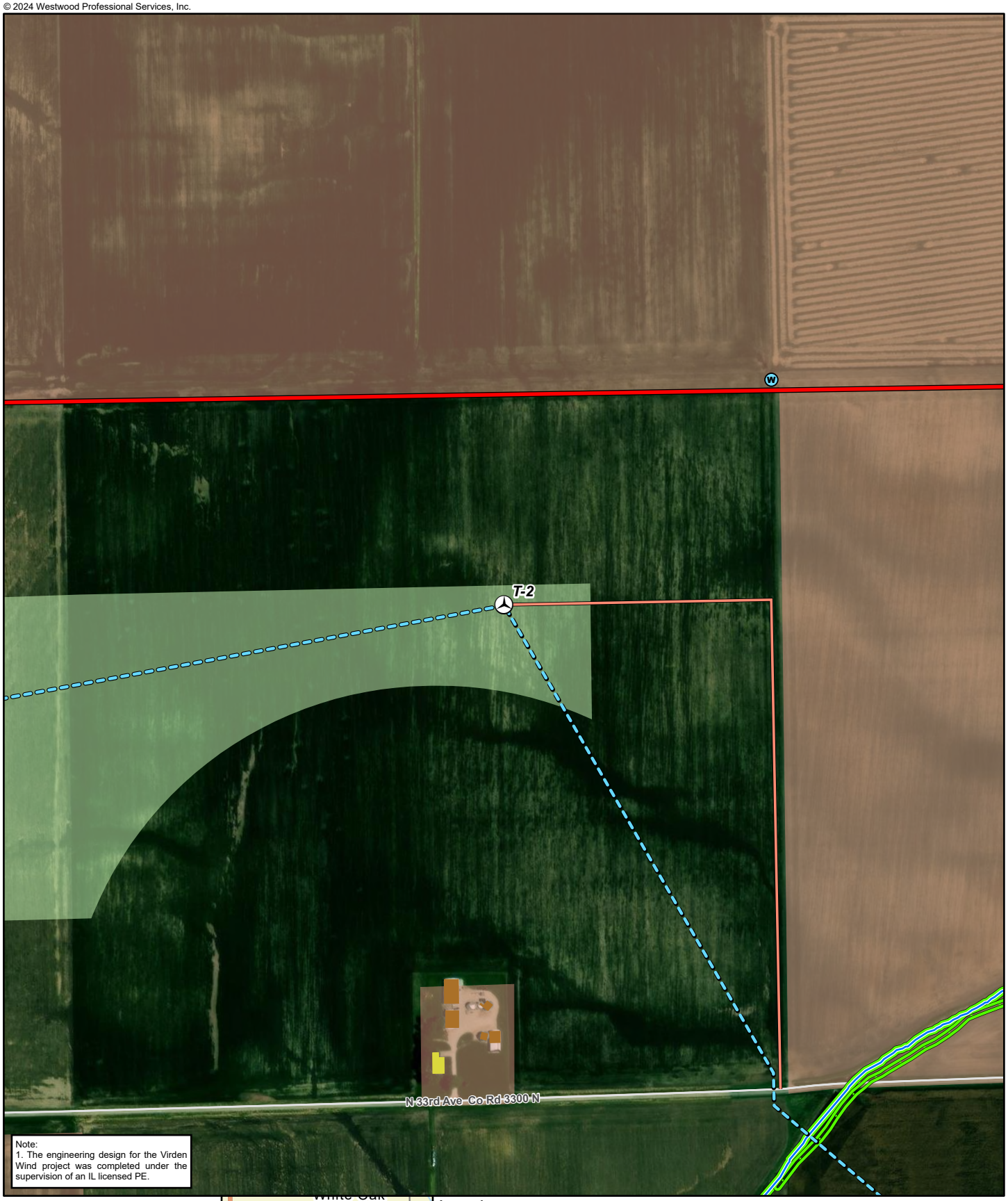

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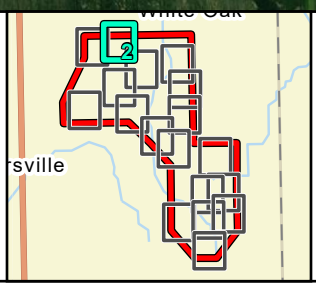

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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 2

Westwood
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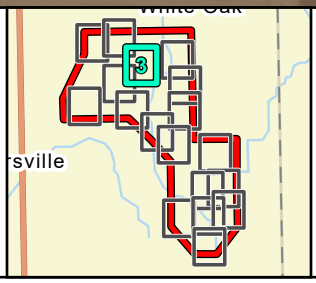

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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 3

Westwood
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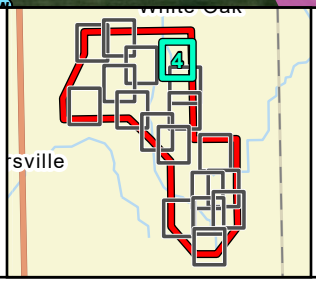

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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 4

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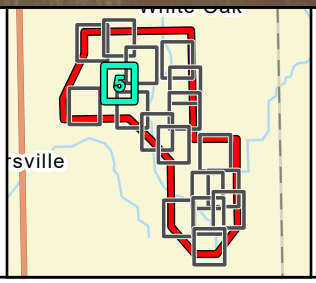

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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 5

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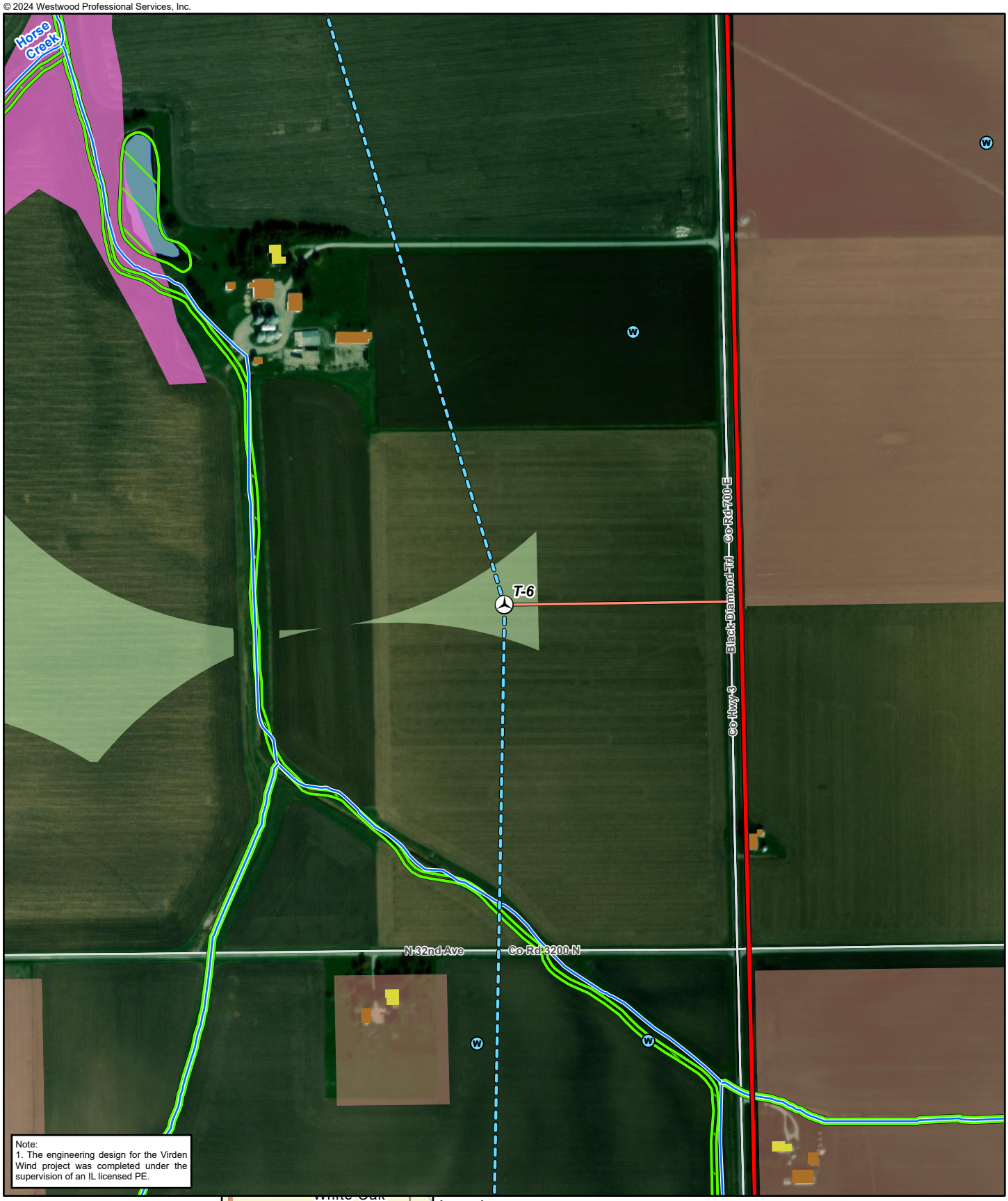

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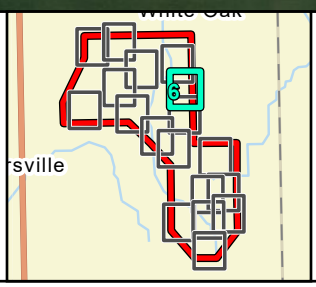
Westwood

Toll Free (888) 937-5150 westwoodps.com

Westwood Professional Services, Inc.



Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
- Outbuilding
- Residence
- Laydown Yard
- O&M Area
- NWI Wetland
- 100 Year Floodplain
- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

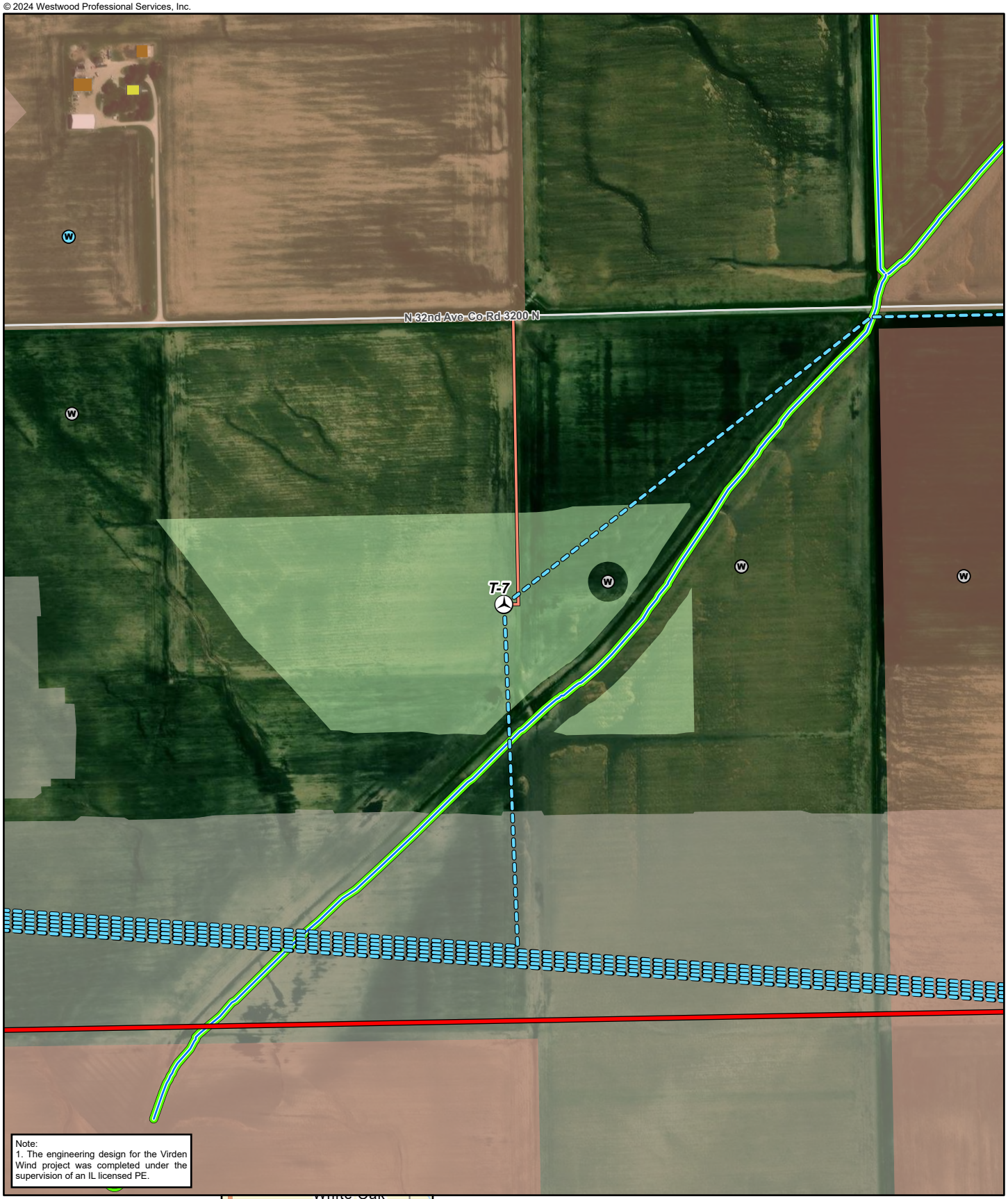
Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 6

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:50 PM AMalloy



Note:
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Data Source(s): Westwood (2024); ESRI World Imagery Basemap (Accessed 2024); PLSS (2023); U.S. Census Bureau (2021 & 2022).

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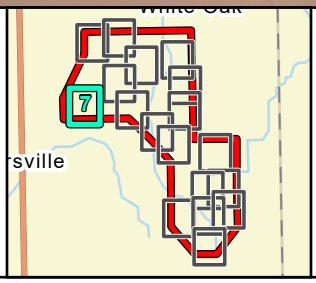

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 7

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Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:50 PM AMalloy

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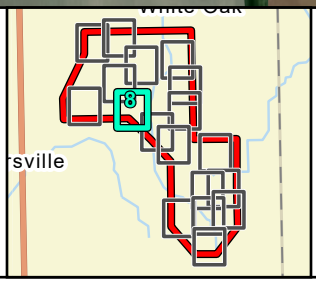

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
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- Residence
- Laydown Yard
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- 100 Year Floodplain
- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 8

Westwood
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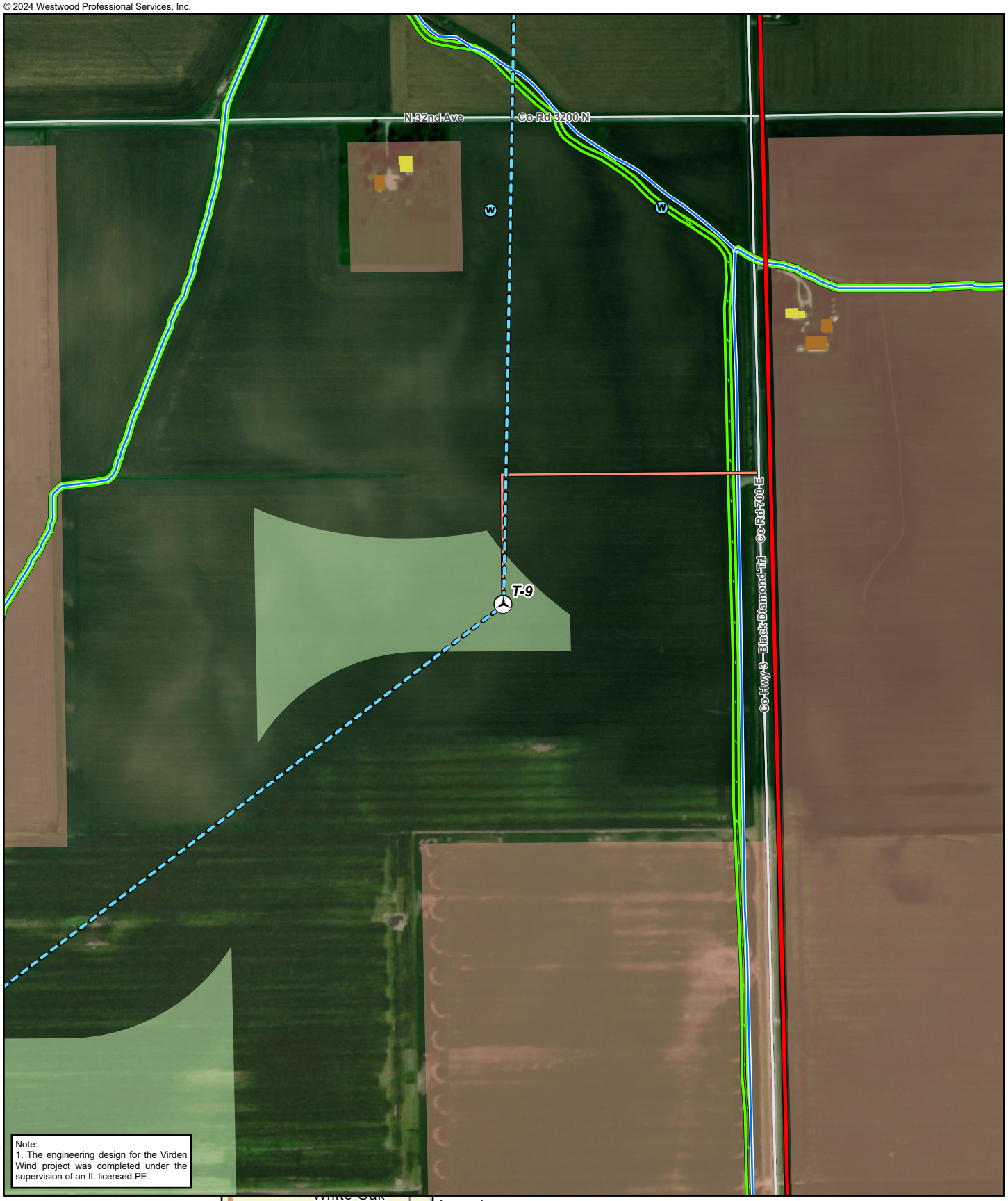
Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:50 PM AMalloy



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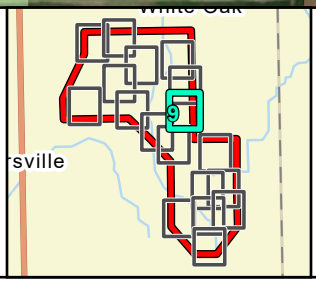

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
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- Major Road
- Road
- Railroad
- County Boundary
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 9

Westwood
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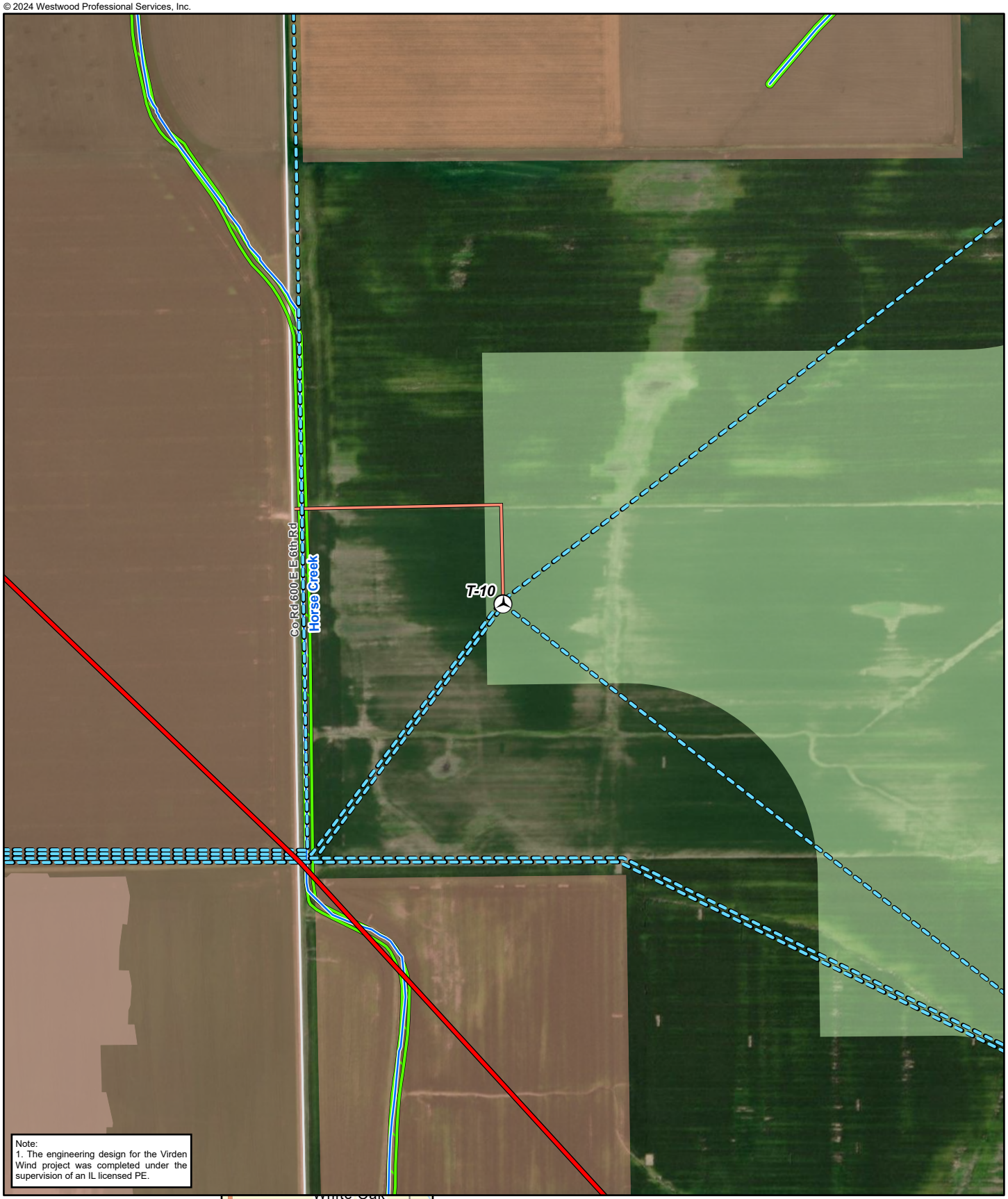
Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:50 PM AMalloy



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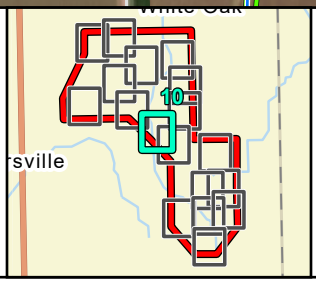

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 10

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:50 PM AMalloy

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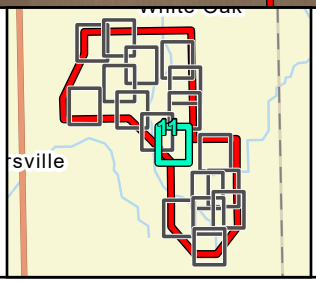

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 11

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Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy

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Westwood

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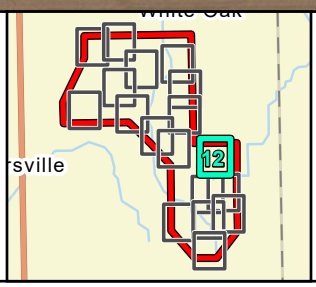

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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- Road
- Railroad
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 12

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy

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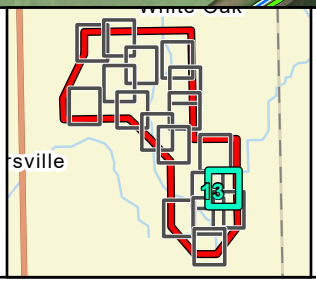

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 13

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy

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Westwood

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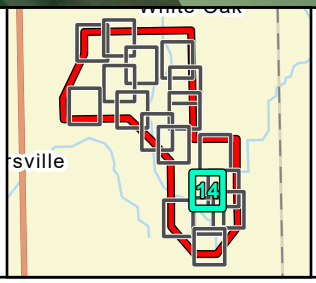

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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- Coal Mine
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- Railroad
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- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 14

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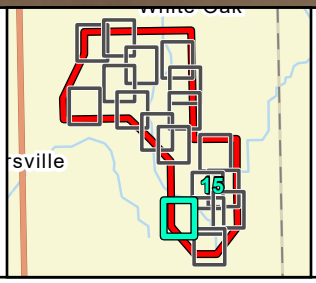

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
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- 100 Year Floodplain
- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 15

Westwood
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Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy

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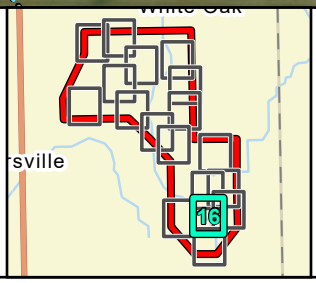

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
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- Transmission Line
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 16

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy

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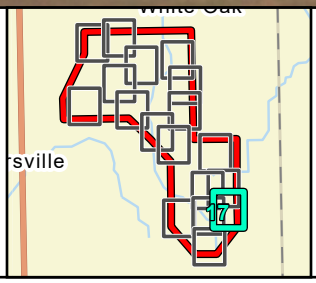

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
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- Road
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 17

Westwood
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Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy

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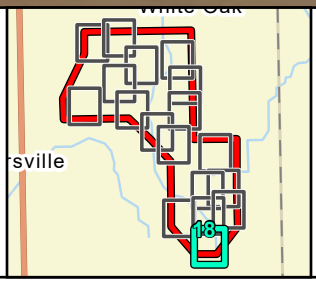

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
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- Collection Line
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- Transmission Line
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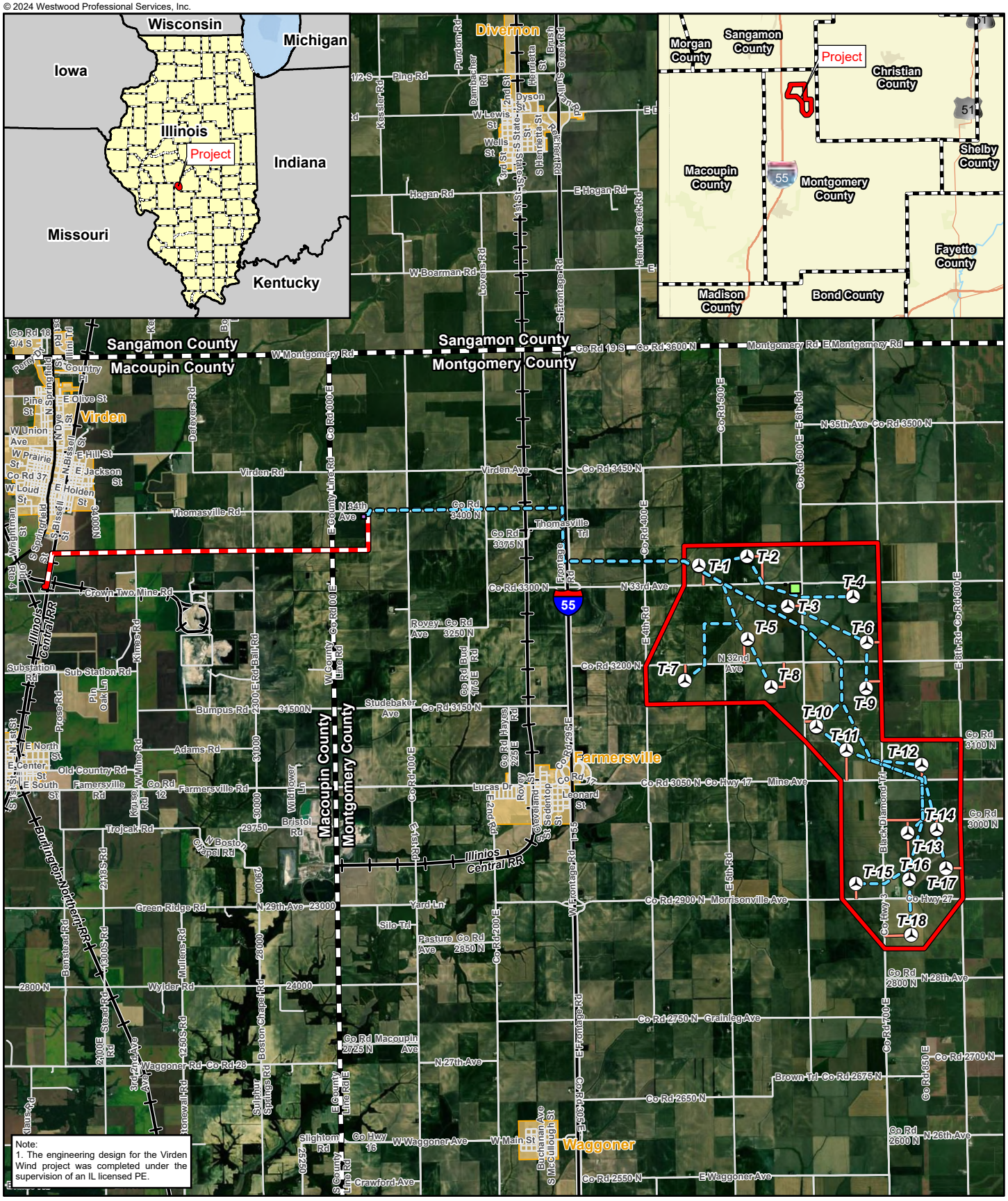
Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2B: Turbine 18

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:51 PM AMalloy



Data Source(s): Westwood (2024); NAIP (2021); PLSS (2023); U.S. Census Bureau (2021 & 2022).

Feet
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Legend

- Turbine
- Collection Line
- Access Road
- Transmission Line
- Substation
- O&M Area
- Laydown Yard
- State Boundary
- County Boundary
- Municipal Boundary
- Major Road
- Road
- Railroad

Virden Wind Project

Montgomery County, Illinois

Site Overview

EXHIBIT 1A

Westwood
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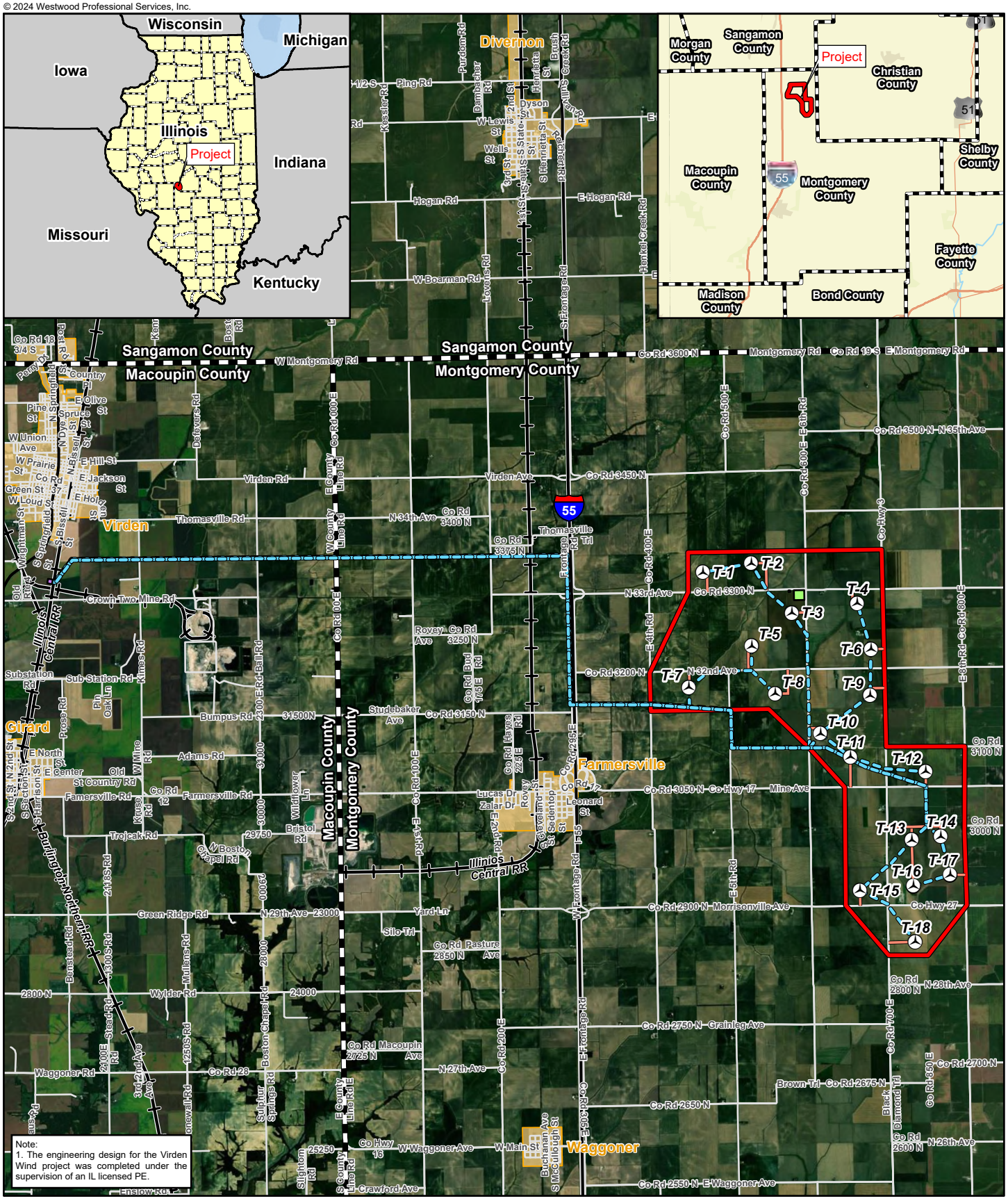
Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:43 PM AMalloy



Data Source(s): Westwood (2024); ESRI World Imagery Basemap (Accessed 2024); PLSS (2023); U.S. Census Bureau (2021 & 2022).

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Legend

- Project Area
- Turbine
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- Access Road
- Transmission Line
- Substation
- O&M Area
- Laydown Yard
- State Boundary
- County Boundary
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- Major Road
- Road
- Railroad

Virden Wind Project

Montgomery County, Illinois

Site Overview

EXHIBIT 1B

Westwood
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Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:54 PM AMalloy

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Westwood

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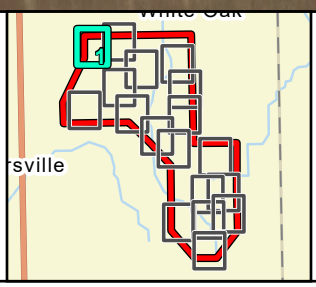

Legend

- Project Area
- Buildable Area
- Turbine
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- Water Well
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- Transmission Line
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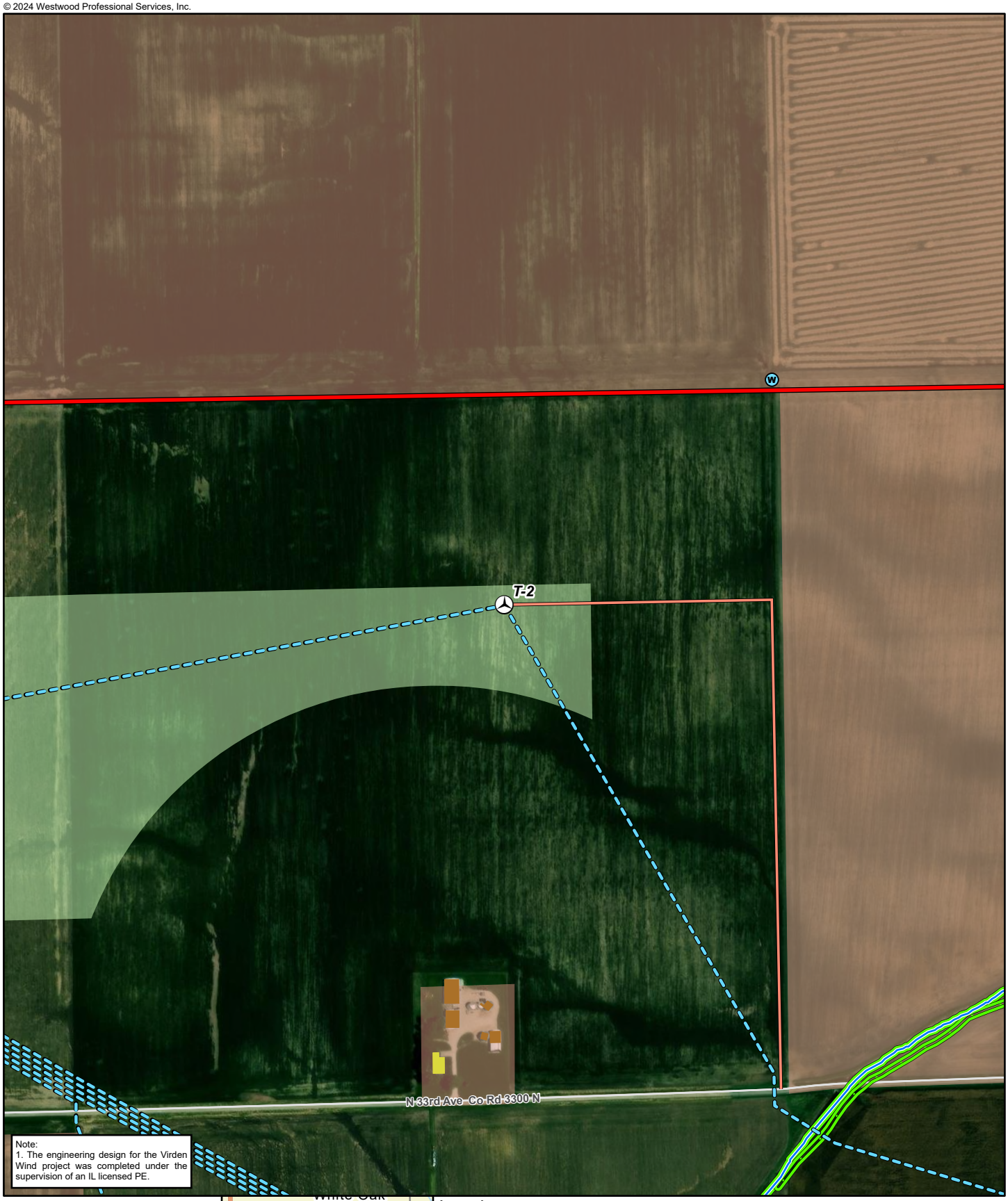
Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 1



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0 500 Feet

N

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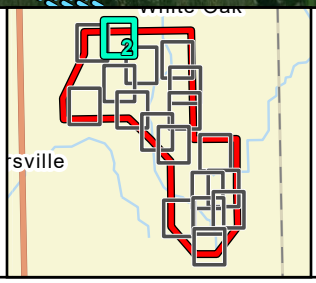
Toll Free (888) 937-5150 westwoodps.com

Westwood Professional Services, Inc.



Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
- Outbuilding
- Residence
- Laydown Yard
- O&M Area
- NWI Wetland
- 100 Year Floodplain
- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 2

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Note:
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Data Source(s): Westwood (2024); NAIP (2021); PLSS (2023); U.S. Census Bureau (2021 & 2022).

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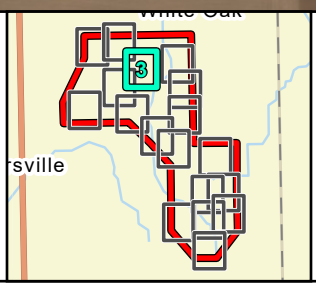
Westwood

Toll Free (888) 937-5150 westwoodps.com

Westwood Professional Services, Inc.



Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
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- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 3

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:44 PM AMalloy

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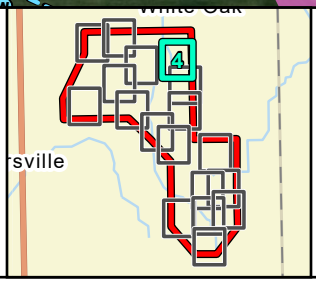

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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- Residence
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- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 4

Westwood
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Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:44 PM AMalloy

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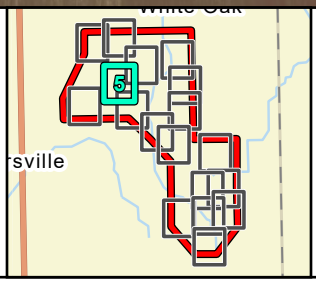

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
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- Residence
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- Major Road
- Road
- Railroad
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- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 5

Westwood
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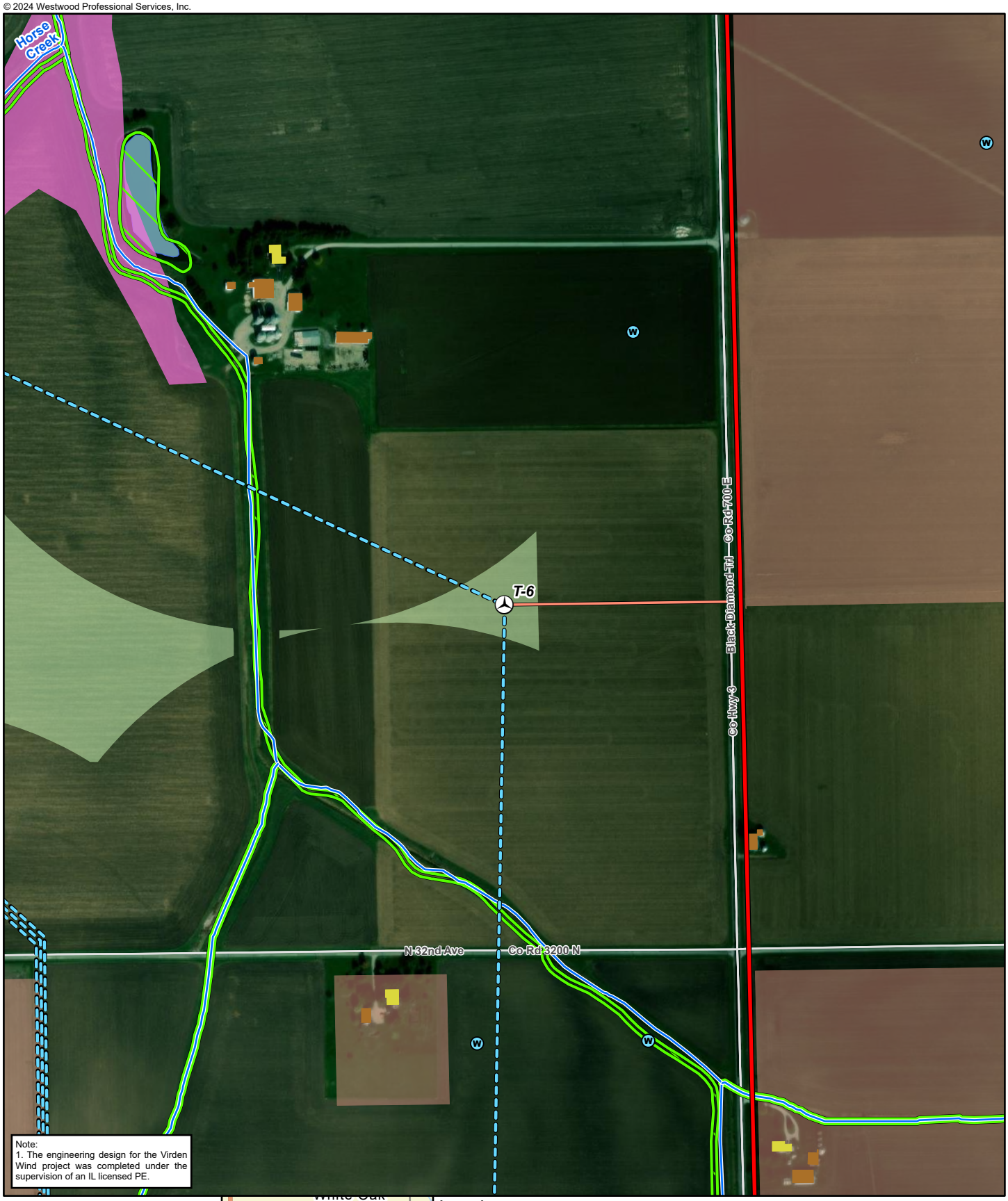

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Westwood

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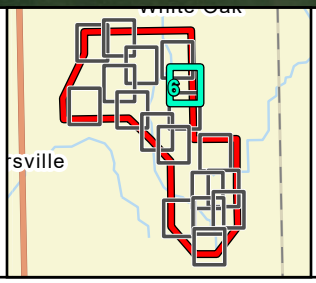

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

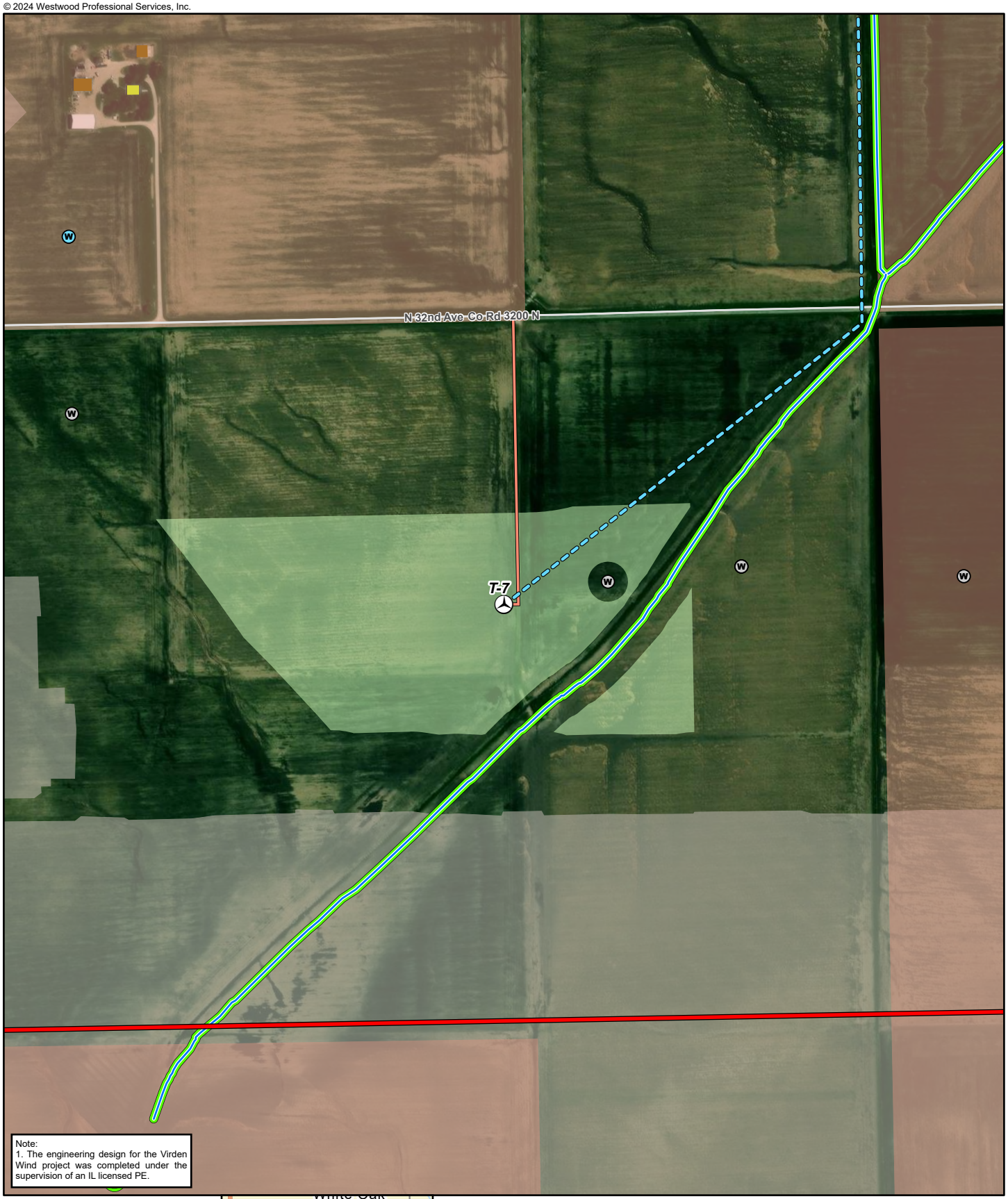
Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 6

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:44 PM AMalloy



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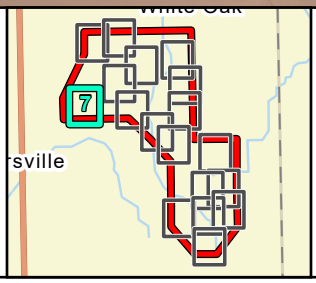

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 7

Westwood
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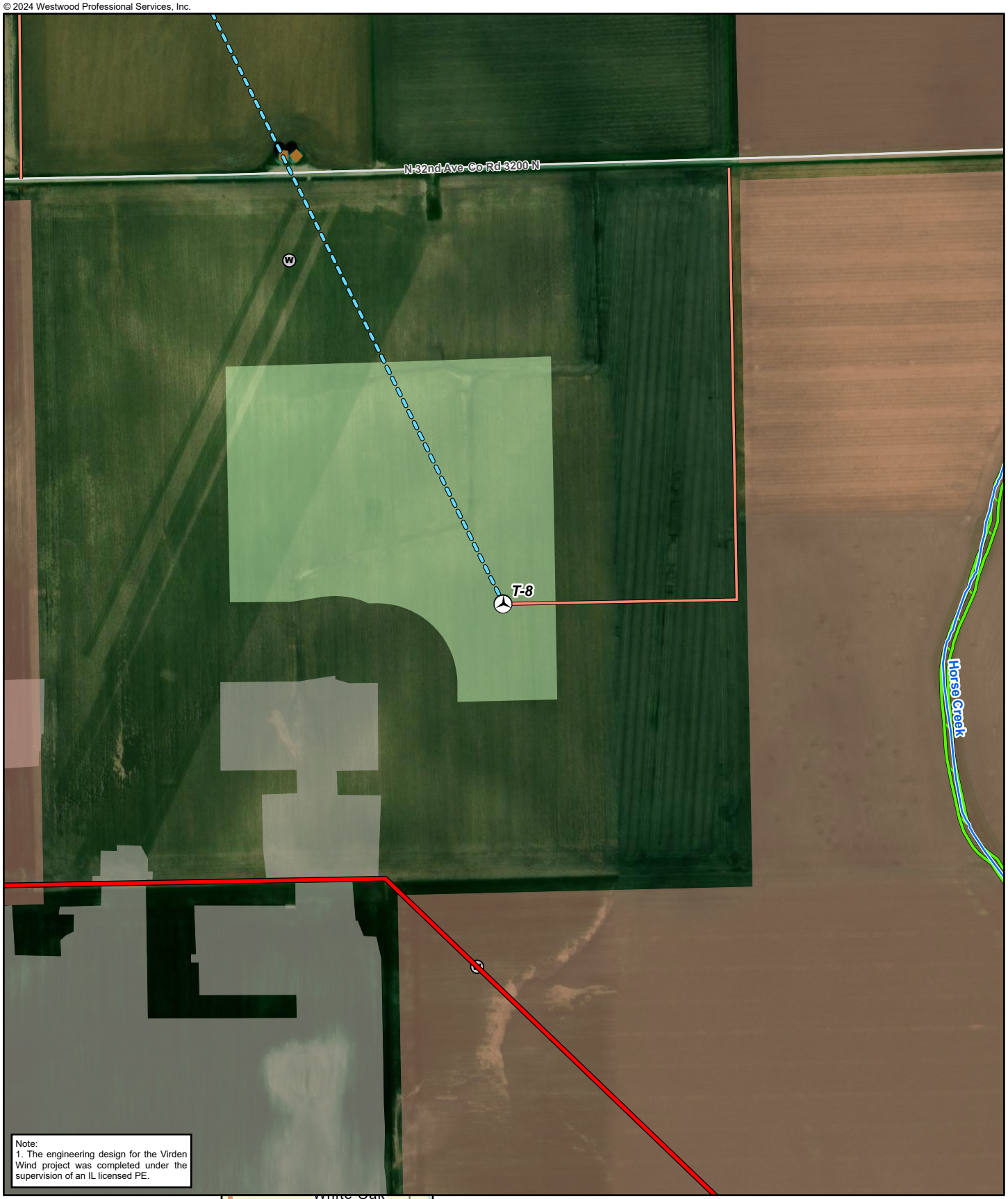
Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:44 PM AMalloy



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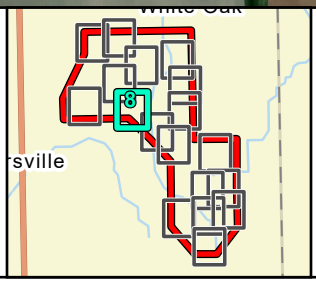

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
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- Transmission Line
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 8

Westwood
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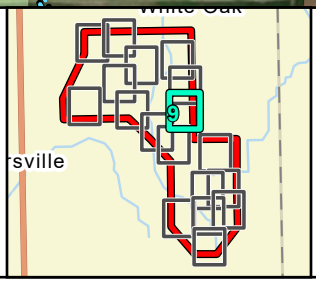

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 9

Westwood
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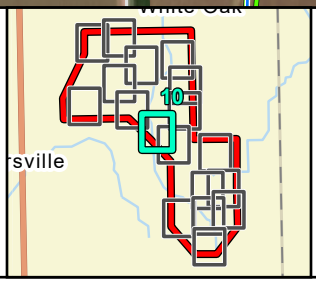

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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Virden Wind Project

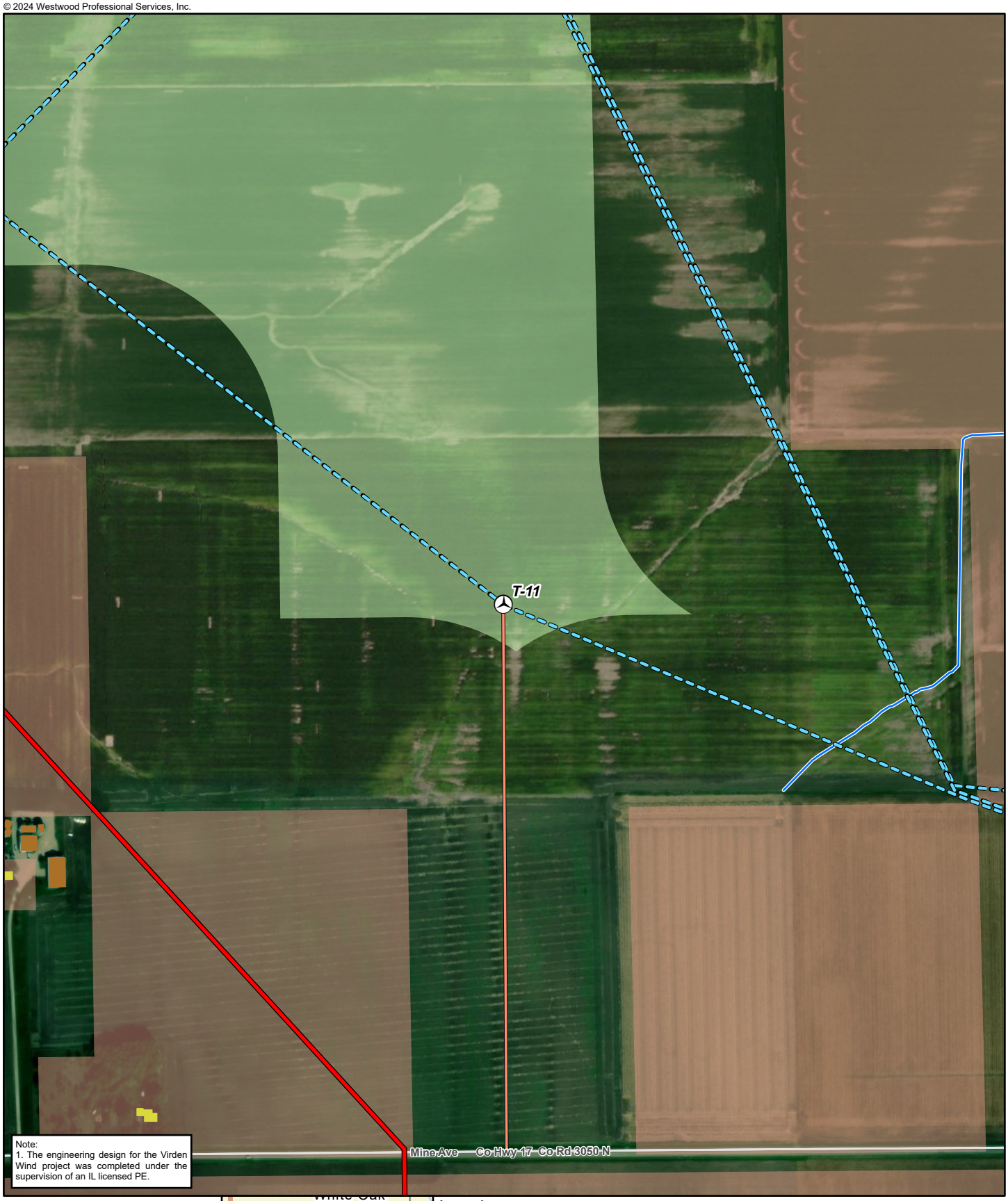
Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 10

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:45 PM AMalloy



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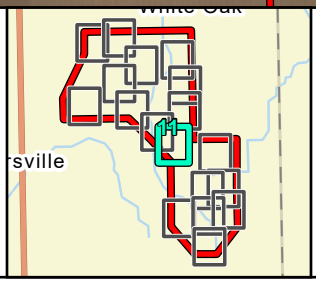

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 11

Westwood
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Westwood Professional Services, Inc.

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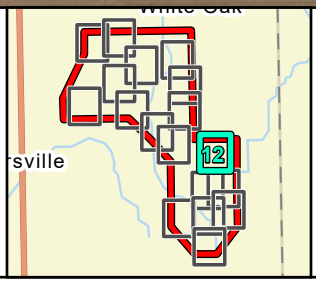

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
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Virden Wind Project

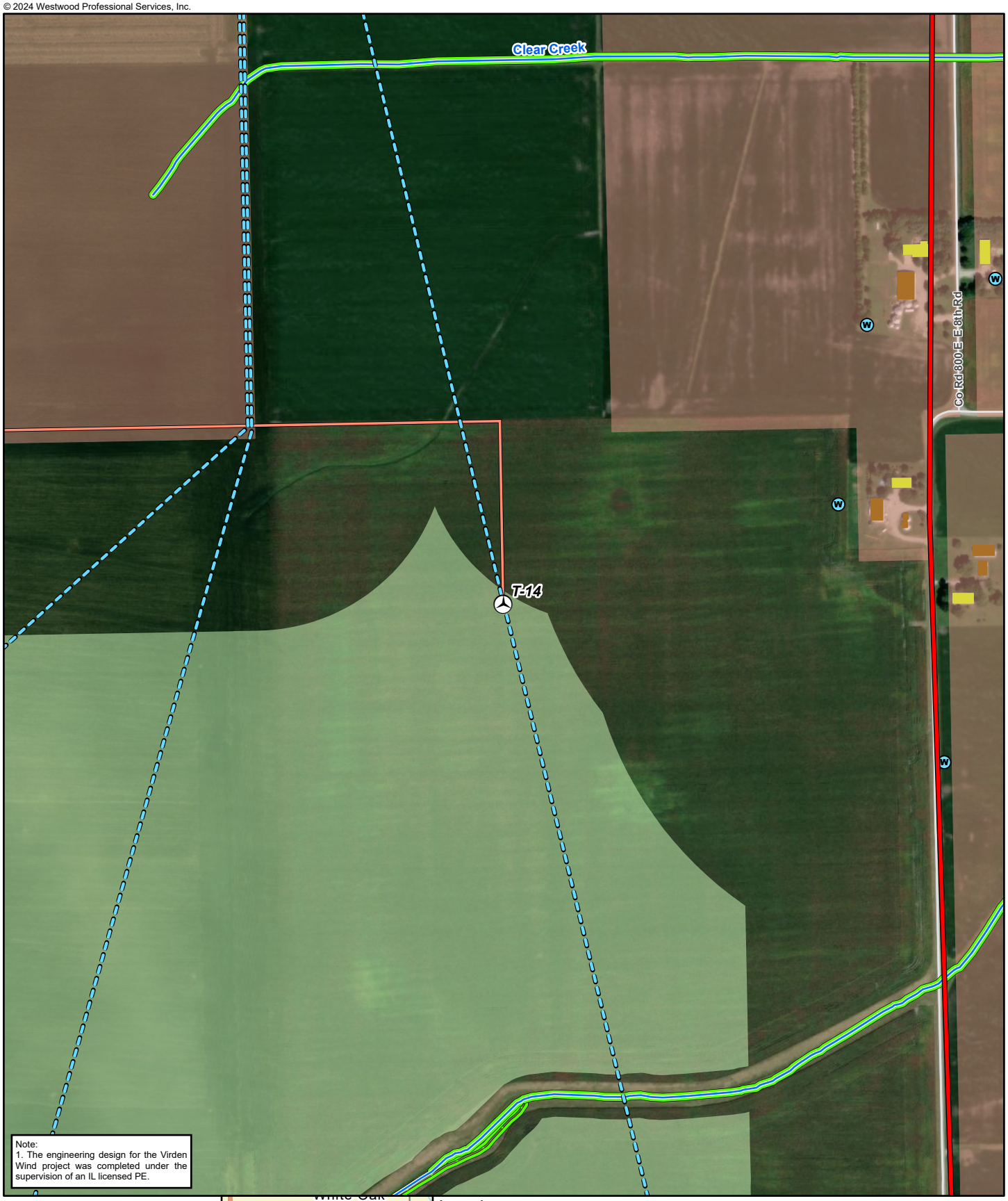
Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 12

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:45 PM AMalloy



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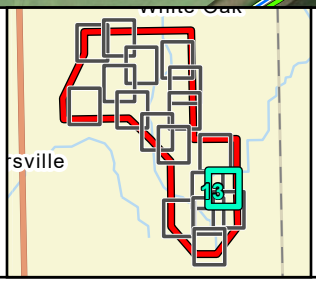

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
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- Laydown Yard
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 13

Westwood
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Westwood Professional Services, Inc.

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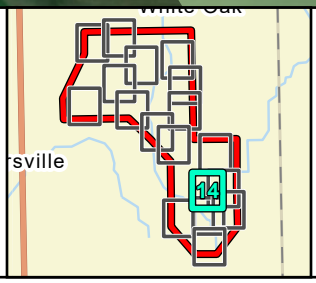

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 14

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:45 PM AMalloy

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Westwood

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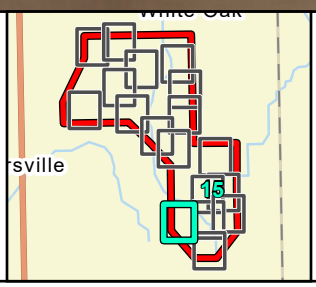

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
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- Railroad
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 15

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:45 PM AMalloy

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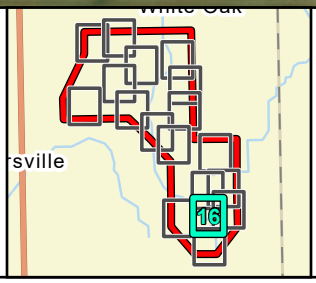

Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
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- Transmission Line
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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 16

Westwood
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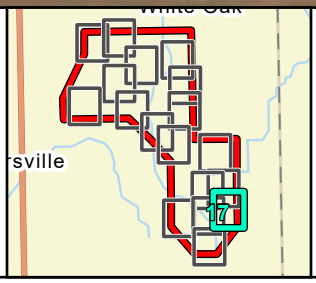

Legend

- Project Area
- Buildable Area
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- Laydown Yard
- O&M Area
- NWI Wetland
- 100 Year Floodplain
- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 17

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

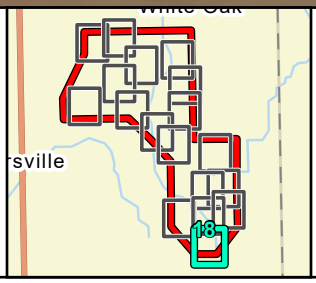
Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:45 PM AMalloy

Note:
1. The engineering design for the Virden Wind project was completed under the supervision of an IL licensed PE.

Data Source(s): Westwood (2024); NAIP (2021); PLSS (2023); U.S. Census Bureau (2021 & 2022).

0 500 Feet

N



Legend

- Project Area
- Buildable Area
- Turbine
- Oil and Gas Well
- Water Well
- Collection Line
- Access Road
- Transmission Line
- Hazardous Liquid Pipeline
- NHD Flowline
- NHD Waterbody
- Outbuilding
- Residence
- Laydown Yard
- O&M Area
- NWI Wetland
- 100 Year Floodplain
- Coal Mine
- Non-Participating Parcel
- Major Road
- Road
- Railroad
- County Boundary
- Municipal Boundary

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Virden Wind Project

Montgomery County, Illinois

Turbine Locations

EXHIBIT 2A: Turbine 18

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:45 PM AMalloy

Virden Wind Energy Project - Participating Properties Contact Information

Lessor	Tax Adress
James Wilson	15308 Black Diamond Rd, Pawnee IL 62558
Robert Simonson	1081 Bacom Point Rd, Divernon IL 62530
Jordan Family Farms, LLC	333 S Henrietta, Divernon IL 62530
Alexander Jordan	2310 Asheville Dr, Springfield IL 62711
Shawn Jordan	2310 Asheville Dr, Springfield IL 62711
WDMJM, LLC	29111 Black Diamond Tr, Harvel IL 62538
Donald Murphy	7051 Morrisonville Av, Harvel IL 62538
Diane Murphy	7051 Morrisonville Av, Harvel IL 62538
Harold Murphy	305 N East St, Farmersville IL 62533
Virginia Murphy	305 N East St, Farmersville IL 62533
Kevin Murphy	4670 Timberview Dr, Auburn IL 62615
Alvin Landrey	911 Carroll St, Pawnee IL 62558
Jean Landrey	911 Carroll St, Pawnee IL 62558
Scott Landrey	22867 Thomasville Rd, Virden IL 62690
Brenna Landrey	22867 Thomasville Rd, Virden IL 62690
Jon Hacker	6076 N 32nd Ave, Farmersville IL 62533
Linda Hacker	6076 N 32nd Ave, Farmersville IL 62533
Tellico Land Holdings, LLC	1218 Rafter Rd, Tellico Plains TN 37385
Michael Borgognoni	2376 Patron Ln, Montgomery IL 60538
Boarman Brothers, LLC	5815 Boarman Rd, Pawnee IL 62558
Linda Keller	603 S East St, Farmersville IL 62533
William Keller	616 E Main St, Carlinville IL 62626
Andrew Aherin	1127 Mine Av, Farmersville IL 62533
Andrew Aherin	59 Greentrail, Chatham IL 62629
Jonathan Aherin	59 Greentrail, Chatham IL 62629
Rachel Aherin	59 Greentrail, Chatham IL 62629
Neal Aherin	59 Greentrail, Chatham IL 62629
Nolan Aherin	59 Greentrail, Chatham IL 62629
Marilyn Brown	59 Greentrail, Chatham IL 62629
Steven Brown	59 Greentrail, Chatham IL 62629
Mathew Brown	59 Greentrail, Chatham IL 62629
Patrick Brown	59 Greentrail, Chatham IL 62629
Nathan Grintjes	59 Greentrail, Chatham IL 62629
Tina Grintjes	59 Greentrail, Chatham IL 62629
Judith Grintjes	59 Greentrail, Chatham IL 62629
Jeffrey Stasi	59 Greentrail, Chatham IL 62629
Evelyn Spelman	35404 W Frontage Rd, Virden IL 62690
James White	359 Beaman Dr, Illiopolis IL 62539
Charles Meeks	5356 Richland Woods Dr, Alton IL 62002
Mary Meeks	5357 Richland Woods Dr, Alton IL 62002
Black Diamond Farms Inc.	7051 Morrisonville Ave, Harvel IL 62538

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Virden Wind

Farmland Drainage Plan

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Virden Wind Farmland Drainage Plan Executive Summary

Virden Wind is committed to adhering to all relevant regulations and agreements, including the Agricultural Impact Mitigation Agreement (AIMA), in its construction activities, particularly in safeguarding public and private drainage facilities. To ensure compliance, Virden Wind will identify and document potentially affected drainage facilities and implement specific measures for their protection and repair.

For public drainage facilities, Virden Wind will meticulously adhere to specifications for crossings, ensuring minimal disruption and timely repair of any damage caused during construction. Onsite monitoring will be conducted to oversee the impact on drainage systems, with repairs undertaken promptly and in accordance with regulatory standards.

Similarly, for private drainage facilities, Virden Wind will work closely with landowners to identify and protect existing tile lines. During construction, measures will be taken to prevent damage, with immediate repair protocols in place should any incidents occur. Post-construction, Virden Wind will ensure restoration to pre-construction conditions, assuming responsibility for any necessary repairs.

In cases of dispute over repair methods, Virden Wind will engage professional engineers or defer to recommendations from the Montgomery County Soil and Water Conservation District to resolve issues amicably. Moreover, updated site plans will be provided to relevant authorities and landowners to facilitate transparency and future maintenance.

Ultimately, Virden Wind is committed to not only meeting regulatory requirements but also to fostering positive relationships with stakeholders by prioritizing the protection and repair of drainage facilities affected by its operations.

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Virden Wind Farmland Drainage Plan

The Illinois Counties Code, 55 ILCS 5/5-12020(j-5) states that a commercial wind energy facility "shall file a farmland drainage plan with the county and impacted drainage districts outlining how surface and subsurface drainage of farmland will be restored during and following construction or deconstruction of the facility."

The same subsection requires that a Farmland Drainage Plan include three components: (i) the location of any potentially impacted drainage district facilities to the extent this information is publicly available from the county or drainage district; (ii) plans to repair any subsurface drainage affected during construction or deconstruction using procedures outlined in the agricultural impact mitigation agreement; and (iii) procedures for repair and restoration of surface drainage affected during construction or deconstruction.

UKA North America, LLC will be submitting a Wind Energy Conversion System (WECS) Construction Permit application to Montgomery County seeking to construct and operate the Virden Wind Commercial Wind Energy Facility ("Project")

The Project will cross the following drainage districts within Montgomery County: Irish Flats Special Drainage District, UDD #1 BoisDarc & Harvel, UDD #2 BoisDarc & King, BoisDarc Drainage District #1, BoisDarc Drainage District #2, BoisDarc Drainage District #3, Dunlap Mutual Drainage District, UDD #1 BoisDarc & Girard. Therefore, UKA North America, LLC submits this Farmland Drainage Plan to Montgomery County as part of its WECS Construction Permit and to each of the above-named drainage districts to comply with 55 ILCS 5/5-12020(j-5), and to demonstrate the steps the Project is taking to protect public and private drainage systems in Montgomery County.

I. Definitions

Except as specifically defined herein, all capitalized terms used in this Plan shall have the definition used for them in the Agricultural Impact Mitigation Agreement ("**AIMA**") entered into between Virden Wind, LLC ("**Virden Wind**") and the Illinois Department of Agriculture on May 11, 2023 and attached here as Exhibit A.

II. Plans to Protect and Repair Public Drainage Facilities that are Affected During Construction or Deconstruction.

1. Compliance with the AIMA

Virden Wind shall comply with all applicable provisions of the AIMA as those documents relate to any drainage tile, tile lines, or other drainage systems subject to the jurisdiction of a drainage district pursuant to the Illinois Drainage Code.

2. Identification of Potentially Impacted Drainage District Facilities.

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A. Wind Farm Facilities

In connection with the development and construction of the Project, it may be necessary for Virden Wind and its contractors and subcontractors, suppliers, or designees to: (a) transport heavy equipment and materials over public drainage facilities, (b) make certain modifications and improvements (both temporary and permanent) to the public drainage facilities to allow access road construction or such equipment and materials to pass over them; (c) place certain electrical or fiber optic cables for the Project adjacent to, over, across, or beneath certain portions of public drainage facilities for the purposes of carrying electrical current or data from the Project to the Project substation; and (d) construct, operate and maintain other facilities adjacent to, over, across, or beneath the public drainage facilities (collectively, the "**Wind Farm Facilities**").

B. Identifying the Location of Potentially Impacted Public Drainage Facilities

To the extent publicly available from the county or drainage districts, Virden Wind will provide the location of potentially impacted drainage facilities in the Pre-Construction Submittal.

C. Crossing Specifications

All crossings of potentially impacted drainage district facilities shall be constructed in accordance with the following specifications.

(I) Crossing of Open Ditches or Natural Streams. Any installation across a drainage ditch or natural stream shall be in a horizontal plane at a minimum of five (5) feet below design grade of the ditch or stream or the existing hard bottom as determined by survey and shall be by boring only, no open trenches will be used. This depth is to extend to a point two (2) times the design base width of the ditch or stream either side of the centerline unless the existing base width is greater than the design base width. If the existing base width is greater than the design width, the depth is to extend to a point two (2) times the existing width. The rate of slope for transition from a normal installation laying depth to a crossing of drainage ditches or natural streams shall not be steeper than 4:1. If such crossings occur at points of outlets of the Affected Drains or within twenty five (25) feet of said outlets, such outlet facilities must be relocated to a point no less than twenty five (25) feet from such crossings.

(ii) Crossing of Drainage District Tile Lines. Any installation across a drainage district tile line must be by boring only and must be placed under existing drainage district tile lines. All underground installations shall maintain at least two (2) feet of clearance below the closest portion of any drainage district tile.

(iii) Construction Plans and Engineering Specifications. More detailed construction plans and engineering specifications related to the crossing of public drainage systems are depicted in Exhibit C attached hereto.

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D. Repair of Public Drainage Facilities

(i) General Obligation to Repair. In accordance with 55 ILCS 5/5-12020(s-5), Virden Wind shall repair or pay for the repair of all damage to any drainage system caused by the construction of the Virden Wind facility in accordance with the AIMA requirements for repair of drainage in a timely manner.

(ii) Monitoring During Construction. During construction, Virden Wind shall conduct onsite monitoring of its construction work that could affect public drainage facilities.

(iii) Repair Standards. Any repair of public drainage facilities undertaken by Virden Wind shall be done in accordance with the applicable AIMA provisions and any other applicable law or regulation.

III. Plans to Protect and Repair Private Drainage Facilities that are Affected During Construction or Deconstruction.

1. Compliance with the AIMA and Underlying Agreements

Virden Wind shall comply with all applicable provisions of the AIMA and any applicable Underlying Agreement as those documents relate to any drainage tile, tile lines, or other drainage systems located on the landowner's private property that are not otherwise subject to the jurisdiction of a drainage district pursuant to the Illinois Drainage Code.

In addition to complying with the AIMA and Underlying Agreements, Virden Wind will take the following steps to protect and restore private drainage facilities.

2. Pre-Construction Activities

A. Identify Tile Lines.

(i) Virden Wind will work with the Landowners to identify the tile lines traversing the property included within the Underlying Agreement.

(ii) To ensure all drainage tiles have been located, reasonable measures should be made to locate all existing tile in the vicinity of the private access roads by exploratory trench or other appropriate methods.

B. Pre-Construction Plans

(i) Once tile lines have been identified pursuant to Section 2(a)(i) and (ii), Virden Wind will, to the extent practicable, alert Construction and Deconstruction crews to the

existence and location of these systems and the possible need for tile line repairs.

(ii) To the extent practicable, there will be a minimum of one foot of separation between the tile line and the Underground Cable whether the Underground Cable passes over or under a tile line, and such separation will be shown on the Site Plans.

3. <u>Construction/Deconstruction Phase</u>

A. Tile Line Repair Standards

(i) If underground drainage tile is damaged by Construction or Deconstruction activities, it shall be repaired in a manner that assures the drainage tile's proper operation at the point of repair.

(ii) If an unexpected or unknown drain tile is discovered during excavation, and tile lines are severed by an excavation trench, repairs shall be made using the Department's Drain Tile Repairs, Figures 1 and 2. Copies of Figures 1 and 2 are attached to the AIMA.

(iii) If the tile line was damaged as part of the excavation for installation of an Underground Cable, the Underground Cable will be installed with a minimum one foot clearance below or over the tile line to be repaired or otherwise to the extent practicable.

(iv) The original tile line alignment and gradient shall be maintained to the greatest extent possible. If the tile needs to be relocated, the installation angle may vary due to site specific conditions and Landowner recommendations. A laser transit shall be used to ensure the proper gradient is maintained. A laser operated tiling machine shall be used to install or replace tiling segments of 100 linear feet or more.

B. Tile Line Repair Procedures

(i) Virden Wind will comply with the following procedures when repairing damages caused to drainage tiles:

(1) (a) record the date that the damage occurred, if observed by Virden Wind, and the date the damage was reported, if reported by a Landowner; (b) record the Global Positioning Systems (GPS) coordinates of broken tile; (c) complete an inspection form indicating that the tile has been damaged; and (d) log the form.

(2) Take a "before" photograph of the broken tile.

(3) Make repairs to the tile using methods prescribed by this Plan (to be determined on a case by case basis).

(4) Take an "after" photograph of the repaired tile.

(5) Provide all photographs and forms to Virden Wind's Operations staff for documentation and storage.

(6) Upon request, information about the tile repair will be provided to the impacted Landowner and Montgomery County.

C. Tile Line Repair Process and Schedule

(i) Tile lines that are damaged, cut, or removed shall be staked or flagged in such a manner they will remain visible until the permanent repairs are completed.

(ii) If water is flowing through any damaged tile line, Virden Wind shall utilize Best Efforts to immediately, upon discovery or notification, repair the tile line in a temporary manner until such time as Virden Wind can make permanent repairs.

(iii) All permanent tile line repairs must be made within 14 days of identification or notification of the damage; provided, however, if the tile lines are dry and water is not flowing, temporary repairs may be made if the permanent repairs cannot be completed within 14 days due to weather or soil conditions. As soon as practical, exposed tile lines will be screened or otherwise protected to prevent the entry of foreign materials or animals into the tile lines.

4. Post-Construction Phase

A Restoration and Tile Line Repair Obligations

(i) Following Construction and/or Deconstruction activities, Virden Wind will utilize best practices to restore the drainage in the area to the condition it was in before commencement of the Construction/Deconstruction activities.

(ii) Following completion of the work, Virden Wind will be responsible for correcting all tile line repairs that fail due to Construction and/or Deconstruction activities, provided those repairs were made by Virden Wind.

(iii) Notwithstanding Sections 4(A)(i) and (ii), for those Landowners that request to perform the tile line repairs themselves, Virden Wind shall offer to compensate the Landowners, at a commercially reasonable rate for the local area, for their machinery and labor costs and Virden Wind will not be responsible for such tile line repairs.

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B Dispute Resolution

(i) If the Landowner and Virden Wind cannot agree upon a reasonable method of permanent tile line repair, Virden Wind may, but is not required to, implement the recommendations of the Montgomery County Soil and Water Conservation District and such implementation will be deemed to have resolved the dispute. If Virden Wind chooses not to implement the recommendations of the Montgomery County Soil and Water Conservation District, it shall engage a Professional Engineer acceptable to Landowner and at Virden Wind's sole cost and expense to inspect the site and recommend a method of repair in accordance with the specifications set forth in this Plan. The Professional Engineer's recommendation shall be binding on Virden Wind and the Landowner, and shall be implemented by Virden Wind.

C Final Site Plans

(i) Virden Wind shall update the Site Plans with any underground field drainage tiles encountered during construction and not previously included in the Site Plans.

(ii) Virden Wind will provide such updated Site Plans to Montgomery upon reasonable request, and shall provide all affected Landowners with a copy of the portion of updated Site Plans showing tile repairs on their property with GPS coordinates identified as the electric cable crosses said property.

(iii) After Construction, in accordance with the AIMA, Virden Wind will provide the Department with "as built" drawings (strip maps) showing the location of all tile lines by survey station encountered during Construction so that the Department may distribute the drawings and GPS tile line repair coordinates to the Montgomery County Soil and Water Conservation District for the purpose of assisting Landowners with future drainage needs.

_____

Daniel DuBois
Virden Wind
Virden Wind Energy LLC
1002 SE Monterey Commons Boulevard
Suite 300
Stuart, Florida 34996

Exhibit A

AGRICULTURAL IMPACT MITIGATION AGREEMENT
between
VIRDEN WIND ENERGY LLC
and the
ILLINOIS DEPARTMENT OF AGRICULTURE
Pertaining to the Construction of a Commercial Wind Energy Facility
in
Montgomery **County, Illinois**

The following standards and policies are required by the Illinois Department of Agriculture (IDOA) to help preserve the integrity of any agricultural land that is impacted by the Construction and Deconstruction of a wind energy facility in accordance with the Renewable Energy Facilities Agricultural Impact Mitigation Act (Act), Public Act 100-0598. They were developed with the cooperation of agricultural agencies, organizations, Landowners, Tenants, drainage contractors, and wind energy companies to comprise this Agricultural Impact Mitigation Agreement (AIMA). This AIMA is made and entered into between the Commercial Wind Energy Facility Owner and the IDOA.

Virden Wind ENergy, LLC, an Delaware limited liability company authorized to transact business in Illinois, hereafter referred to as "Commercial Wind Energy Facility Owner or Facility Owner", plans to develop an approximately 100 MW Commercial Wind Energy Facility or "Facility" in Montgomery County, which will consist of approximately eighteen (18) turbines, access roads, an underground collection line, a switchyard, a substation, and an operation and maintenance building site.

If construction does not commence within four years after this AIMA has been fully executed, this AIMA will be revised, with the Facility Owner's input, to reflect the IDOA's most current Wind Farm Construction and Deconstruction Standards and Policies. This AIMA, and any updated AIMA, will be filed with the Montgomery County Board by the Facility Owner.

This AIMA is applicable to Construction and Deconstruction activities occurring partially or wholly on privately owned agricultural land.

Conditions of the AIMA

The actions set forth in this AIMA shall be implemented in accordance with the conditions listed below:

A. All Construction or Deconstruction activities may be subject to County or other local requirements. However, the specifications outlined in this AIMA shall be the minimum standards applied to all Construction or Deconstruction activities.

B. Except for Section 21(B-F), all actions set forth in this AIMA are subject to modification through negotiation by Landowners and a representative of the Facility Owner, provided such changes are negotiated in advance of any respective Construction or Deconstruction activities.

C. The Facility Owner may negotiate with Landowners to carry out the mitigative actions that Landowners wish to perform themselves. In such instances, the Facility Owner will offer Landowners the area commercial rate for their machinery and labor costs.

D. All mitigative actions will extend to associated future Construction, maintenance, repairs, and Deconstruction of the Commercial Wind Energy Facility.

E. The Facility Owner will exercise Best Efforts to determine all Landowners and Tenants affected by the Construction and Deconstruction of a Facility. The Facility Owner shall keep the Landowners and Tenants informed of the project's status, meetings, and other factors that may have an impact upon their farming operations.

F. The Facility Owner agrees to include a statement of its adherence to this AIMA in any environmental assessment and/or environmental impact statement that may be prepared in connection with the Project.

G. Execution of this AIMA shall be made a condition of any Conditional/Special Use Permit. A copy of this AIMA shall be mailed to each Landowner. Within 30 days of execution of this AIMA, the Facility Owner shall provide postage and mailing labels to the IDOA for mailing to all Landowners. If the Facility Owner becomes aware that a Landowner was not included on the list of Landowners to which a copy of this AIMA was mailed, the Facility Owner shall notify the Department and provide postage and a mailing label as soon as possible.

In the case of a new Underlying Agreement with a Landowner, the Facility Owner shall incorporate this AIMA into such Underlying Agreement.

H. The Facility Owner will implement all mitigative actions to the extent that they do not conflict with the requirements of any applicable federal, state and local rules and regulations and other permits and approvals that are obtained by the Facility Owner for the Project.

I. If any mitigative action(s) is held to be unenforceable, no other provision shall be affected by that holding, and the remainder of the mitigative actions shall be interpreted as if they did not contain the unenforceable provision.

J. No later than 45 days prior to the Construction and/or Deconstruction of a Commercial Wind Energy Facility, the Facility Owner will provide the Landowner(s) with a toll-free number the Landowner can call to alert the Facility Owner should the Landowner(s) have questions or concerns with the work which is being done or has been carried out on his/her property.

K. If the Facility is sold or transferred, the Facility Owner assuming ownership of the facility shall provide notice of such sale or transfer within ninety (90) days to the County and to Landowners, and the existing Financial Assurance requirements, plus the other terms of this AIMA, shall apply to the new Facility Owner.

L. After construction, the Facility Owner will provide the IDOA with "as built" drawings (strip maps) showing the location of all tiles lines damaged in the construction of the Wind Farm. The drawings and GPS tile lines repair coordinates will be provided on a county-by-county basis for distribution by the IDOA to the respective local Soil and Water Conservation District (SWCD) for the purpose of assisting Landowners with future drainage needs.

M. In addition, after all construction is complete, all affected Landowners will receive a copy of the tile repairs location map with GPS coordinates identified as the electric cable crosses their property.

N. The Facility Owner shall comply with all local, state and federal laws and regulations, specifically including the worker protection standards to protect workers from pesticide exposure.

Definitions

Abandonment -	Occurs when Deconstruction has not been completed within 18 months after the wind energy facility reaches the end of its Useful Life.
Aboveground Cable -	Electrical power lines installed above grade to be utilized for conveyance of power from the Wind Turbine(s) to the Wind Facility substation.
Agricultural Impact Mitigation Agreement (AIMA) -	The Agreement between the Commercial Wind Energy Facility Owner and the Illinois Department of Agriculture described herein.
Agricultural Land -	Land used for Cropland, hayland, pasture land, managed woodlands, truck gardens, farmsteads, commercial ag-related facilities, feedlots, livestock confinement systems, land on which farm buildings are located, and land in government set-aside programs used for purposes as set forth above.
Best Efforts -	Diligent, good faith, and commercially reasonable efforts to achieve a given objective or obligation.
Commercial Operation Date -	The calendar date on which the Commercial Wind Energy Facility produces power for commercial sale, not including test power. Within ten (10) calendar days of the Commercial Operation Date, the Commercial Wind Energy Facility Owner shall notify the County and the Department of the Commercial Operation Date in writing.
Commercial Wind Energy Facility (Facility) -	A wind energy conversion facility of equal or greater than 500 kilowatts in total nameplate generating capacity. "Commercial Wind Energy Facility" includes a wind energy conversion facility seeking an extension of a permit to construct granted by a county or municipality before the effective date of this Act. "Commercial Wind Energy Facility" does not include a wind energy conversion facility: (1) that has submitted a complete permit application to a county or municipality and for which the hearing on the completed application has commenced on the date provided in the public hearing notice, which must be before the effective date of this Act; (2) for which a permit to construct has been issued before the effective date of this Act; or (3) that was constructed before the effective date of this Act.
Commercial Wind Energy Facility Owner (Facility Owner) -	A commercial enterprise that owns or operates a Wind Energy Facility of equal to or greater than 500 kilowatts in total nameplate capacity.
County -	The County where the Commercial Wind Energy Facility is located.

Construction - The installation, preparation for installation and/or repair of a Commercial Wind Energy Facility.

Cropland - Land used for growing row crops, small grains, or hay; includes land which was formerly used as cropland, but is currently in a government set-aside program and pastureland comprised of Prime Farmland.

Deconstruction - The removal of a Commercial Wind Energy Facility from the property of a Landowner and the restoration of that property as provided in the Agricultural Impact Mitigation Agreement. The terms "Deconstruction" and "Decommissioning" have the same meaning and, therefore, may be interchanged with each other.

Deconstruction Plan - A plan prepared by a Professional Engineer, at the Commercial Wind Energy Facility Owner expense, that includes:

(1) the estimated Deconstruction cost per turbine, in current dollars at the time of filing, for the Commercial Wind Energy Facility, taking into account, among other things:

- i the number of Wind Turbines and related Commercial Wind Energy Facilities involved,
- ii the original Construction costs of the Commercial Wind Energy Facilities,
- iii the size and capacity of the Wind Turbines,
- iv the salvage value of the Commercial Wind Energy Facilities,
- v the Construction method and techniques for the Wind Turbines and other Commercial Wind Energy Facilities, and

(2) a comprehensive detailed description of how the Commercial Wind Energy Facility Owner plans to pay for the Deconstruction of the Commercial Wind Energy Facility.

Department - The Illinois Department of Agriculture (IDOA).

Financial Assurance - A reclamation bond or other commercially available financial assurance that is acceptable to the County, with the County as primary beneficiary and the Landowners as secondary beneficiaries.

Landowner - Any person with an ownership interest in property that is used for agricultural purposes and that is party to an Underlying Agreement.

Prime Farmland - Agricultural Land comprised of soils that are defined by the USDA Natural Resources Conservation Service (NRCS) as being "prime" soils (generally considered the most productive soils with the least input of nutrients and management).

Professional Engineer -	An engineer licensed to practice engineering in the State of Illinois, and who is determined to be qualified to perform the work described herein by mutual agreement of the County and the Commercial Wind Energy Facility Owner.
Soil and Water Conservation District - (SWCD)	A local unit of government that provides technical and financial assistance to eligible landowners for the conservation of soil and water resources.
Tenant -	Any person lawfully residing or leasing/renting land that is subject to an Underlying Agreement.
Topsoil -	The uppermost layer of the soil that has the darkest color or the highest content of organic matter; more specifically, it is defined as the "A" horizon.
Underlying Agreement -	The written agreement with a Landowner(s) including, but not limited to, an easement, option, lease, or license under the terms of which another person has constructed, constructs, or intends to construct a Commercial Wind Energy Facility on the property of the Landowner.
Underground Cable -	Electrical power lines installed below grade to be utilized for conveyance of power from the Wind Turbine(s) to the Wind Facility substation.
USDA Natural Resources Conservation Service (NRCS) -	NRCS provides America's farmers with financial and technical assistance to voluntarily put conservation on the ground, not only helping the environment but agricultural operations too.
Useful Life -	A Commercial Wind Energy Facility will be presumed to have no remaining Useful Life if: (1) no electricity is generated for a continuous period of twelve (12) months and (2) the Commercial Wind Energy Facility Owner fails, for a period of 6 consecutive months, to pay the Landowner amounts owed in accordance with the Underlying Agreement.
Wind Turbine -	A wind energy conversion unit equal to or greater than 500 kilowatts in total nameplate generating capacity.

Construction and Deconstruction Requirements

1. Support Structures

A. On Agricultural Land, only single pole support structures will be used for overland transmission not located adjacent to the Commercial Wind Energy Facility substation.

B. Where the electric line is adjacent and parallel to highway and/or railroad right-of-way, but on privately owned property, the support structures will be placed as close as reasonably practicable and allowable by the applicable County Engineer or other applicable authorities to the highway or railroad right-of-way. The only exceptions may be at jogs or weaves on the highway alignment or along highways or railroads where transmission and distribution lines are already present.

C. The highest priority will be given to locating the electric line parallel and adjacent to highway and/or railroad right-of-way. When this is not possible, Best Efforts will be expended to place all support poles in such a manner so as to minimize their placement on Cropland (i.e., longer than normal spans will be utilized when traversing Cropland).

2. Aboveground Facilities

Locations for Facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural activities occurring on the land that contains the facilities. The Facility Owner's compliance with applicable local, county, state, and federal statutes, rules, regulations, and ordinances, and its securing any variations or waivers to such statutes, rules, regulations, and ordinances in accordance with applicable law, in selecting such locations shall constitute compliance with this provision.

3. Guy Wires and Anchors

A. Best Efforts will be made to place guy wires and their anchors out of cropland, pastureland and hayland, placing them instead along existing utilization lines and on land not used for row crops, pasture or hay. Where this is not feasible, Best Efforts will be made to minimize guy wire impact on Cropland.

B. All guy wires will be shielded with highly visible guards.

4. Underground Cabling Depth

A. Underground electrical cables will be buried with:

1. a minimum of 5 feet of top cover where it crosses Cropland.
2. a minimum of 5 feet of top cover where it crosses pasture land or other Agricultural Land comprised of soils that are classified by the USDA as being prime soils.
3. a minimum of 3 feet of top cover where it crosses pasture land and other Agricultural Land not comprised of prime soils.
4. a minimum of 3 feet of top cover where it crosses wooded/brushy land.

B. Notwithstanding the foregoing, in those areas where (i) rock in its natural formation and/or (ii) a continuous strata of gravel exceeding 200 feet in length are encountered, the minimum top cover will be 30 inches.

5. Topsoil Removal and Replacement

A. Any excavation shall be performed in a manner to preserve topsoil. Best Efforts will be made to store the topsoil near the excavation site in such a manner that it will not become intermixed with subsoil materials.

B. Best Efforts will be made to store all disturbed subsoil material near the excavation site and separate from the topsoil.

C. When backfilling an excavation site, the stockpiled subsoil material will be placed back into the excavation site before replacing the topsoil.

D. Refer to Item No. 7.A. through 7.D for procedures pertaining to rock removal from the subsoil and topsoil.

E. Refer to Items No. 8.A. through 8.D. for procedures pertaining to the alleviation of compaction of the topsoil.

F. Best Efforts will be performed to place the topsoil in a manner so that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored as close as reasonably practicable. The same shall apply where excavations are made for road, stream, drainage ditch, or other crossings. In no instance will the topsoil materials be used for any other purpose unless agreed to otherwise by the Landowner.

G. Excess subsoil material resulting from wind turbine foundation excavation shall be removed from Landowner's property, unless otherwise agreed to by Landowner.

H. Topsoil stripping or separation is not required for the excavation of narrow trenches, those 24 inches wide or less.

6. Repair of Damaged Tile Lines

If underground drainage tile is damaged by Construction or Deconstruction, it will be repaired in a manner that assures the tile line's proper operation at the point of repair. The following shall apply to the tile line repair:

A. The Facility Owner will work with the Landowner to identify the tile lines traversing the property included within the Underlying Agreement which will be crossed or disturbed by the construction of the Facility. All tile lines identified in this manner will be shown on the Construction and Deconstruction Plans and staked or flagged in the locations where expected crossing or disturbance is anticipated prior to Construction or Deconstruction to alert Construction and Deconstruction crews to the possible need for tile line repairs.

B. Tile lines that are damaged, cut, or removed shall be staked or flagged with stakes or flags placed in such a manner they will remain visible until the permanent repairs are completed. In addition, the location of damaged drain tile lines will be recorded using Global Positioning Systems (GPS) technology.

C. If water is flowing through any damaged tile line, the Facility Owner shall utilize Best Efforts to immediately and temporarily repair the tile line until such time that the Facility Owner can make permanent repairs. If the tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repairs can be made by the Facility Owner within 14 days (weather and soil conditions permitting) of the time damage occurred; however, the exposed tile lines will be screened or otherwise protected to prevent the entry of foreign materials or animals into the tile lines.

D. Where tile lines are severed by an excavation trench, repairs shall be made using the IDOA Drain Tile Repairs, Figures 1 and 2.

   If there is any dispute between the Landowner and the Facility Owner on the method of permanent tile line repair, the appropriate Soil and Water Conservation District's opinion shall be considered by the Facility Owner and the Landowner.

E. To the extent practicable, there will be a minimum of one foot of separation between the tile line and the Underground Cable whether the Underground Cable passes over or under the tile line. If the tile line was damaged as part of the excavation for installation of the Underground Cable, the Underground Cable will be installed with a minimum one foot clearance below or over the tile line to be repaired or otherwise to the extent practicable.

F. The original tile line alignment and gradient shall be maintained. A laser transit shall be used to ensure the proper gradient is maintained. A laser operated tiling machine shall be used to install or replace tiling segments of 100 linear feet or more.

G. During Construction stage, all permanent tile line repairs must be made within fourteen (14) days of identification or notification of the damage, weather and soil conditions permitting. At other times, such repairs must be made at a time mutually agreed upon by the Facility Owner and the Landowner.

H. Following Construction and/or Deconstruction activities, the Facility Owner will utilize best practices to restore the drainage in the area to the condition it was before the commencement of the Construction/Deconstruction activities. If the Facility Owner cannot agree upon a reasonable method to complete this restoration, the Facility Owner may – but is not required to – implement the recommendations of the appropriate County SWCD and such implementation would resolve the dispute.

I. Following completion of the work, the Facility Owner will be responsible for correcting or paying for the correction of all tile line repairs that fail due to Construction and/or Deconstruction, provided any such failure was identified by Landowner within twenty-four (24) months after Construction or Deconstruction. The Facility Owner will not be responsible for tile line repairs that the Facility Owner pays the Landowner to perform. Facility Owner shall use Best Efforts to utilize a local drain tile repair company.

7. Rock Removal

The following rock removal procedures only pertain to rocks found in the uppermost 42 inches of soil, the common freeze zone in Illinois, which emerged on Landowner property as a result of Construction and/or Deconstruction.

A. Before replacing any Topsoil, Best Efforts will be taken to remove all rocks greater than 3 inches in any dimension from the surface of exposed subsoil which were brought to the site as a result of Construction and/or Deconstruction.

B. As topsoil is replaced, all rocks greater than 3 inches in any dimension will be removed from the topsoil which emerged at the site as a result of Construction and/or Deconstruction activities.

C. If trenching, blasting, or boring operations are required through rocky terrain, precautions will be taken to minimize the potential for oversized rocks to become interspersed with adjacent soil material.

D. Rocks and soil containing rocks removed from the subsoil areas, topsoil, or from any excavations, will be hauled off the Landowner's premises or disposed of on the Landowner's premises at a location that is mutually acceptable to the Landowner and the Facility Owner.

8. Compaction and Rutting

A. Unless the Landowner opts to do the restoration work, after the topsoil has been replaced, all areas that were traversed by vehicles and Construction and/or Deconstruction equipment will be ripped at least 18 inches deep, and all pasture and woodland will be ripped at least 12 inches deep to the extent practicable. The existence of tile lines or underground utilities may necessitate less depth. The disturbed area will then be disked. Decompaction shall be conducted according to the guidelines provided in Appendices A and B.

B. To the extent practicable, all ripping and disking will be done at a time when the soil is dry enough for normal tillage operations to occur on land adjacent to the right-of-way.

C. The Facility Owner will restore all rutted land to a condition as close as possible to its original condition.

D. If there is any dispute between the Landowner and the Facility Owner as to what areas need to be ripped/disked or the depth at which compacted areas should be ripped/disked, the appropriate County SWCD's opinion shall be considered by the Facility Owner and the Landowner.

9. Construction During Wet Weather

Except as provided below, construction activities are not allowed on farmland where normal farming operations, such as plowing, disking, planting or harvesting, cannot take place due to excessively wet soils. Wet weather conditions are to be determined on a field by field basis and not for the project as a whole.

A. Construction activities on prepared surfaces, surfaces where topsoil and subsoil have been removed, heavily compacted in preparation, or otherwise stabilized (e.g. through cement mixing) may occur at the discretion of the Facility Owner in wet weather conditions.

B. Construction activities on unprepared surfaces will be done only when work will not result in rutting which results in a mixing of subsoil and topsoil. Determination as to the potential of subsoil and topsoil mixing will be in consultation with the underlying Landowner, or, if approved by the Landowner, his/her designated Tenant.

10. Land Leveling

A. Following the completion of Construction and/or Deconstruction of a Commercial Wind Energy Facility, the Facility Owner will utilize Best Efforts to restore the disturbed area to its original pre-construction elevation and contour should uneven settling occur or surface drainage problems develop as a result of said activity.

B. If, within twenty-four (24) months after Construction or Deconstruction, uneven settling occurs or surface drainage problems develop as a result of the Construction or Deconstruction of a Facility, the Facility Owner will provide such land leveling services within 45 days of a Landowner's written notice, weather and soil conditions permitting.

C. If there is any dispute between the Landowner and the Facility Owner as to what areas need additional land leveling beyond that which is done at the time of Construction, the Facility Owner may – but is not required to – implement the recommendations of the appropriate SWCD and such implementation will resolve the dispute.

11. Prevention of Soil Erosion

A. The Facility Owner will work with Landowners to prevent excessive erosion on land that has been disturbed by Construction or Deconstruction of a Commercial Wind Energy Facility. Consultation with the local SWCD by the Facility Owner will take place to determine the appropriate methods to be implemented to control erosion. This is not a requirement, however, if the land is bare Cropland that the Landowner intends to leave bare until the next crop is planted.

B. If the Landowner and Facility Owner cannot agree upon a reasonable method to control erosion on the Landowner's right-of-way, the Facility Owner may – but is not required to – implement the recommendations of the appropriate SWCD and such implementation will resolve the dispute.

12. Repair of Damaged Soil Conservation Practices

Consultation with the local SWCD by the Facility Owner will be carried out to determine if there are soil conservation practices (such as terraces, grassed waterways, etc.) that will be damaged by the Construction and/or Deconstruction of a Commercial Wind Energy Facility. Those conservation practices will be restored to their preconstruction condition as close as reasonably practicable in accordance with USDA Natural Resources Conservation Service technical standards. All repair costs shall be borne by the Facility Owner.

13. Damages to Private Property

The Facility Owner will reasonably compensate Landowners for damages caused by the Facility Owner. Damage to Cropland will be reimbursed to the Landowner as prescribed in the applicable Underlying Agreement.

14. Clearing of Trees and Brush

A. If trees are to be removed for the Construction or Deconstruction of a Commercial Wind Energy Facility, the Facility Owner will consult with the Landowner to determine if there are trees of commercial or other value to the Landowner.

B. If there are trees of commercial or other value to the Landowner, the Facility Owner will allow the Landowner the right to retain ownership of the trees to be removed with the disposition of the removed trees to be negotiated prior to the commencement of land clearing.

C. Unless otherwise restricted by federal, state or local regulations, the Facility Owner will follow the Landowner's desires regarding the removal and disposal of trees, brush, and stumps of no value to the Landowner by burning, burial, etc., or complete removal from any affected property.

15. Interference with Irrigation Systems

A. If the Construction or Deconstruction of a Commercial Wind Energy Facility interrupts an operational (or soon to be operational) spray irrigation system, the Facility Owner will establish with the Landowner an acceptable amount of time the irrigation system may be out of service.

B. If, as a result of Construction or Deconstruction of a Facility, an irrigation system interruption results in crop damages, the Landowner will be compensated for all such crop damages per the applicable Underlying Agreement.

C. If it is feasible and mutually acceptable to the Facility Owner and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which a Facility is also being Constructed or Deconstructed.

16. Access Roads

A. To the extent practicable, access roads will be designed to not impede surface drainage and will be built to minimize soil erosion on or near the access roads.

B. Access roads may be left intact through mutual agreement of the Landowner and the Facility Owner unless otherwise restricted by federal, state, or local regulations after the Useful Life.

C. If the access roads are removed, Best Efforts will be expended to assure that the land shall be restored to equivalent condition(s) as existed prior to their construction, or as otherwise agreed to by the Facility Owner and the Landowner. All access roads that are removed shall be ripped to a depth of 18 inches. All ripping will be done consistent with Items 8.A. through 8.D.

17. Weed Control

A. The Facility Owner will provide for weed control in a manner that prevents the spread of weeds onto agricultural land affected by Construction or Deconstruction. Spraying will be done by a pesticide applicator that is appropriately licensed for doing such work in the State of Illinois.

B. The Facility Owner will be responsible for reimbursing all reasonable costs incurred by owners of agricultural land affected by Construction or Deconstruction where it has been determined that weeds have spread from land impacted by the Facility. Reimbursement is contingent upon written notice to the Facility Owner and failure to respond within forty-five (45) days after notice is received.

18. Pumping of Water from Open Excavations

A. In the event it becomes necessary to pump water from open excavations, the Facility Owner will pump the water in a manner that will avoid damaging agricultural land affected by Construction or Deconstruction. Such damages include, but are not limited to: inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of subsoil sediment and gravel in fields and pastures.

B. If it is impossible to avoid water-related damages as described in Item 18.A. above, the Facility Owner will compensate the Landowner for damages to crops as prescribed in the applicable Underlying Agreement.

C. All pumping of water shall comply with existing drainage laws, local ordinances relating to such activities and any other applicable laws, specifically including the Clean Water Act.

19. Advance Notice of Access to Private Property

A. The Facility Owner will provide the Landowner or Tenant with a minimum of 48 hours prior notice before accessing his/her property for the purpose of Construction or Deconstruction of a Commercial Wind Energy Facility.

B. Prior notice shall consist of either: (i) a personal contact, telephone contact or email contact, whereby the Landowner or tenant is informed of the Facility Owner's intent to access the land; or (ii) the Facility Owner mails or hand delivers to the Landowner or tenant's home a dated, written notice of the Facility Owner's intent. Such written or hand delivered notice shall include a toll-free number at which agents of the Facility Owner can be reached. The Landowner or tenant need not acknowledge receipt of the written notice before the Facility Owner can enter the Landowner's property.

20. Indemnification

The Commercial Wind Energy Facility Owner will indemnify all Landowners, their heirs, successors, legal representatives, and assigns from and against all claims, injuries, suits, damages, costs, losses, and reasonable expenses resulting from or arising out of Construction and/or Deconstruction, including damage to such Commercial Wind Energy Facility or any of its appurtenances, except where claims, injuries, suits, damages, costs, losses, and expenses are caused by the negligence or intentional acts, or willful omissions of such Landowners, and/or the Landowners heirs, successors, legal representatives, and assigns. In such circumstances, the Landowners, and the Landowners' heirs, successors, legal representatives, and assigns will indemnify the Facility Owner, its heirs, successors, legal representatives, and assigns from and against said claims, injuries, suits, damages, costs, losses, and reasonable expenses including but not limited to attorneys' fees and costs.

21. Deconstruction of Commercial Wind Energy Facilities and Financial Assurance

A. Deconstruction of a Facility shall include the removal/disposition of the following equipment/facilities utilized for operation of the Facility and located on Landowner property:

1. Wind Turbine towers and blades;

2. Wind Turbine generators;
3. Wind Turbine foundations (to depth of 5 feet);
4. Transformers;
5. Collection/interconnection substation (components, cable, and steel foundations), provided, however, that electrical collection cables at a depth of 5 feet or greater may be left in place;
6. Overhead collection system;
7. Operations/maintenance buildings, spare parts buildings and substation/ switching gear buildings unless otherwise agreed to by the Landowner;
8. Access Road(s) (unless Landowner requests in writing that the access road is to remain);
9. Operation/maintenance yard/staging area unless otherwise agreed to by the Landowner; and
10. Debris and litter generated by Deconstruction and Deconstruction crews.

B. The Facility Owner shall, at its expense, complete Deconstruction of a Commercial Wind Energy Facility within eighteen (18) months after the end of the Useful Life of the Facility.

C. During the County permit process, the Facility Owner shall file with the County, a Deconstruction Plan. A second Deconstruction Plan shall be filed with the County on or before the end of the tenth year of the Commercial Operation Date.

D. The Facility Owner shall provide the County with Financial Assurance to cover the estimated costs of Deconstruction of the Commercial Wind Energy Facility. Provision of this Financial Assurance shall be phased in over the first 11 years of the Project's operation as follows:

1. On or before the first anniversary of the Commercial Operation Date, the Facility Owner shall provide the County with Financial Assurance to cover ten (10) percent of the estimated costs of Deconstruction of the Facility as determined in the Deconstruction Plan provided during the county permit process.

2. On or before the sixth anniversary of the Commercial Operation Date, the Facility Owner shall provide the County with Financial Assurance to cover fifty (50) percent of the estimated costs of Deconstruction of the Facility as determined in the Deconstruction Plan provided during the county permit process.

3. On or before the eleventh anniversary of the Commercial Operation Date, the Facility Owner shall provide the County with Financial Assurance to cover one hundred (100) percent of the estimated costs of Deconstruction of the Facility as determined in the Deconstruction Plan provided during the tenth year of the Commercial Operation Date.

The Financial Assurance shall not release the surety from liability until the Financial Assurance is replaced. The salvage value of the Facility may only be used to reduce the estimated costs of Deconstruction in the Deconstruction Plan if the County agrees that all interests in the salvage value are subordinate or have been subordinated to that of the County if Abandonment occurs.

E. The County may – but is not required to – reevaluate the estimated costs of Deconstruction of any Commercial Wind Energy Facility after the tenth anniversary, and every five years thereafter, of the Commercial Operation Date which reevaluation must be performed by an independent third party Professional Engineer licensed in the State of Illinois. The County shall provide the Facility Owner with a copy of any reevaluation report. Based on any reevaluation, the County may require changes in the level of Financial Assurance used to calculate the phased coverages described in Section 21 D. required from the Facility Owner. The Facility Owner shall be responsible for the cost of any reevaluation by a third party Professional Engineer.

F. Upon Abandonment, the County may take all appropriate actions for Deconstruction, including drawing upon the Financial Assurance. In the event the County declines to take any action for Deconstruction, the Landowners may draw upon the Financial Assurance.

Concurrence of the Parties to this AIMA

The Illinois Department of Agriculture and Virden Wind Energy, LLC concur that this AIMA is the complete AIMA governing the mitigation of agricultural impacts that may result from the construction of the wind farm project in Montgomery County within the State of Illinois.

The effective date of this AIMA commences on the date of execution.

STATE OF ILLINOIS
DEPARTMENT OF AGRICULTURE

Jerry Costello II

By Jerry Costello II, Director 4

Clay Nordsiek

By ~~Jess Feagans, General Counsel~~
Clay Nordsiek, Deputy General Counsel

801 E. Sangamon Avenue, 62702
State Fairgrounds, POB 19281
Springfield IL 62794-9281

2/9, 2023 24

VIRDEN WIND ENERGY, **LLC**
a Delaware **limited liability company**

Daniel E. DuBois

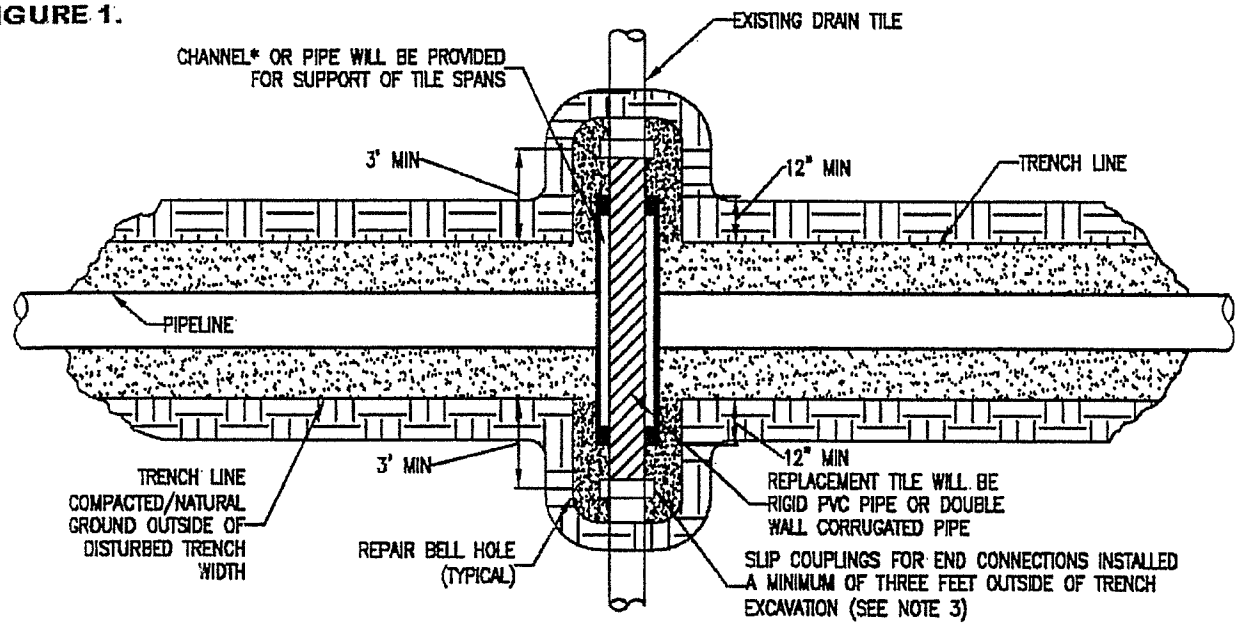
By Daniel DuBois, Managing Director

1002 SE Monterey Commons Boulevard
Suite 300
Stuart, Florida 34996

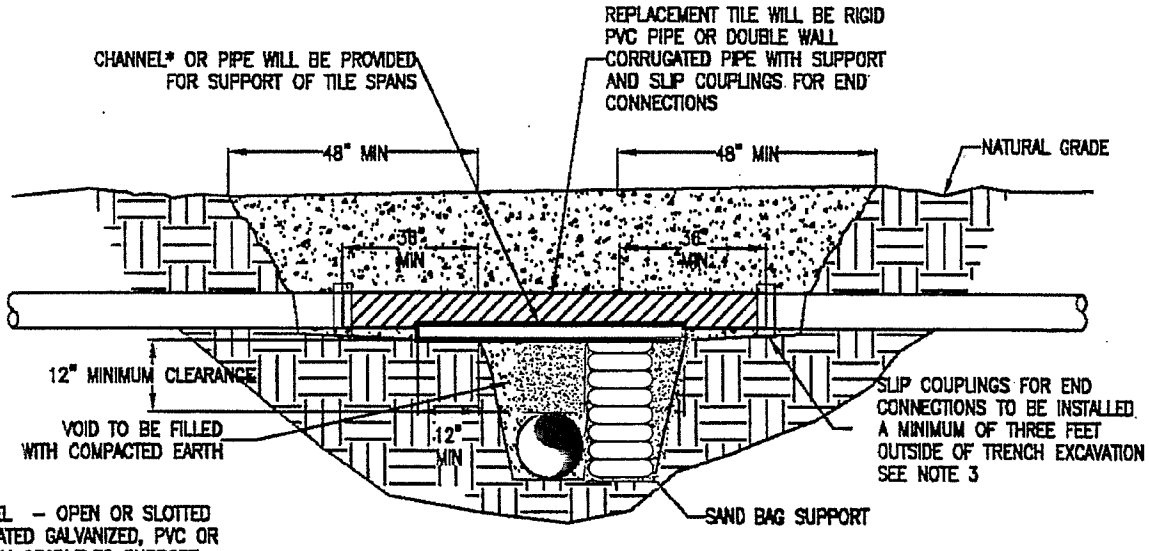
January 10, 2024, 2023

Wind Farm AIMA template - 81818

FIGURE 1.



PLAN
N.T.S.



*CHANNEL – OPEN OR SLOTTED CORRUGATED GALVANIZED, PVC OR ALUMINUM CRADLE TO SUPPORT DRAIN TILE.

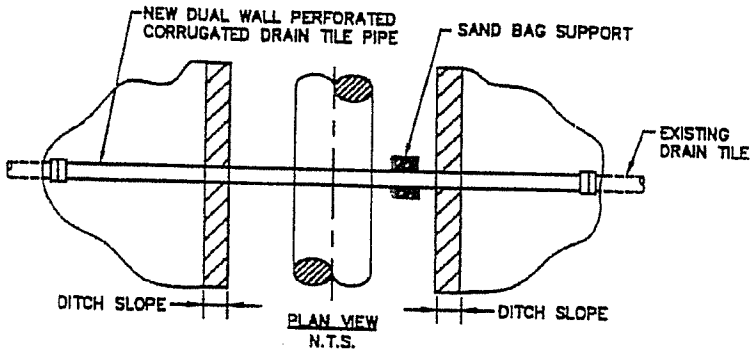
CROSS SECTION
N.T.S.

NOTE:

1. IMMEDIATELY REPAIR TILE IF WATER IS FLOWING THROUGH TILE AT TIME OF TRENCHING. IF NO WATER IS FLOWING AND TEMPORARY REPAIR IS DELAYED, OR NOT MADE BY THE END OF THE WORK DAY, A SCREEN OR APPROPRIATE 'NIGHT CAP' SHALL BE PLACED ON OPEN ENDS OF TILE TO PREVENT ENTRAPMENT OF ANIMALS ETC.
2. CHANNEL OR PIPE (OPEN OR SLOTTED) MADE OF CORRUGATED GALVANIZED PIPE, PVC OR ALUMINUM WILL BE USED FOR SUPPORT OF DRAIN TILE SPANS.
3. INDUSTRY STANDARDS SHALL BE FOLLOWED TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES.

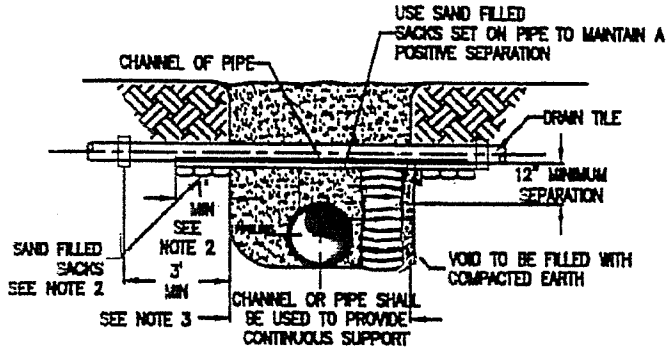
TEMPORARY DRAIN TILE REPAIR

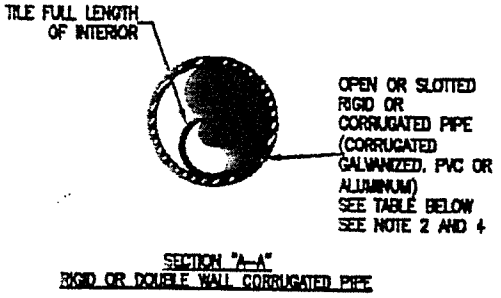
FIGURE 2.



PLAN VIEW
N.T.S.

PLAN VIEW





SECTION "A-A"
RIGID OR DOUBLE WALL CORRUGATED PIPE

END VIEWS

MINIMUM SUPPORT TABLE			
TILE SIZE	CHANNEL SIZE	PIPE SIZE	
3"	4" @ 5.4 #/ft	4"	STD. WT.
4"-5"	5" @ 6.7 #/ft	6"	STD. WT.
8"-9"	7" @ 9.8 #/ft	9"-10"	STD. WT.
10"	10" @ 15.3 #/ft	12"	STD. WT.

NOTE:

1. TILE REPAIR AND REPLACEMENT SHALL MAINTAIN ORIGINAL ALIGNMENT GRADIENT AND WATER FLOW TO THE GREATEST EXTENT POSSIBLE. IF THE TILE NEEDS TO BE RELOCATED, THE INSTALLATION ANGLE MAY VARY DUE TO SITE SPECIFIC CONDITIONS AND LANDOWNER RECOMMENDATIONS.

2. 1'-0" MINIMUM LENGTH OF CHANNEL OR RIGID PIPE (OPEN OR SLOTTED CORRUGATED GALVANIZED, PVC OR ALUMINUM CRADLE) SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. SHIM WITH SAND BAGS TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES).

3. DRAIN TILES WILL BE PERMANENTLY CONNECTED TO EXISTING DRAIN TILES A MINIMUM OF THREE FEET OUTSIDE OF EXCAVATED TRENCH LINE USING INDUSTRY STANDARDS TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES INCLUDING SLIP COUPLINGS.

4. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF THE RIGID PIPE.

5. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY COMPANY REPRESENTATIVES AND LANDOWNER IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY COMPANY REPRESENTATIVES AND FURNISHED TO CONTRACTOR FOR SPANS IN EXCESS OF 20', TILE GREATER THEN 10" DIAMETER, AND FOR "HEADER" SYSTEMS.

6. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.

7. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE LATERALLY INTO THE EXISTING TILE TO FULL WIDTH OF THE RIGHTS OF WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.

PERMANENT DRAIN TILE REPAIR

Appendix A.

Guidelines for Conducting Proper and Successful Decompaction

1. Decompaction is required when all three conditions apply.
   A. the area has been trafficked or traversed by vehicles or construction equipment, and
   B. the soil penetrometer readings are 300 psi or greater, and
   C. The soil strength (psi) in the right-of-way area is greater than that of the non-trafficked area.

2. An Environmental and/or Agricultural Inspector (AI), with experience and training in the proper identification of compacted soil and operation methods of deep decompaction tools is required to observe the daily operation of the ripper/subsoiler to ensure the conditions are appropriate for decompaction efforts and that the proper equipment is utilized and that equipment is set-up and operated correctly.

3. To achieve the most effective shatter of the compacted soil the following guidelines have been established:
   A. Conduct ripping when the soil is dry. Follow the "Soil Plasticity Test Procedures" detailed in Appendix B to determine if soil conditions are adequately dry to conduct decompaction efforts.
   B. Deep ripping shall be conducted using a ripper or subsoiling tool with a shank length of no less than 18 inches and a shank spacing of approximately the same measurement as the shank length.
   C. Use a ripper with a knife length of no less than 2 inches more than the desired depth of decompaction.
   D. To best promote revegetation and restore crop production, a total depth of 30 or more inches of soil (topsoil plus subsoil) is required.
   E. The minimum depths of decompaction stated above in 3.D. are required where possible. A safe distance from sub-surface structures (tile drains, pipelines, buried utilities, bedrock, etc.) must be maintained at all times. Where such structures exist, a lesser depth of decompaction will be required to prevent damage to equipment and the structures as well as to maintain a safe work environment. The allowable decompaction depth in these instances will be determined on a site by site basis.
   F. When the knives are in the soil to the desired depth, the tongue of the ripper should be parallel to the surface of the ground.
   G. Select a tractor that has enough horsepower to pull the ripper at a speed of 1.5 to 2 mph and whose footprint is of equal or lesser width than the ripper. Tracked equipment is preferred and typically required to achieve this criteria.
   H. The ripper shanks should not create ruts, channels, or mixing of the sub-soil with topsoil. A speed of 1.5 to 2 mph is recommended to minimize the risk of rutting and soil mixing. The ideal operating speed can vary with soil characteristics, tractor and ripping tool used. An excessive travel speed will often increase mixing of soil horizons.
   I. When the equipment is set up and operated correctly, the ripper should create a wave across the surface of the ground as it lifts and drops the soil.

J. Make one ripping pass through the compacted area. Using a penetrometer, the AI will measure the PSI between the ripped knife tracks to determine if the single ripping pass was successful. Additional passes should only be used where needed as they may reduce the effectiveness of the ripping by recompacting the soil shattered in the previous pass.

K. If the first pass does not successfully decompact the soil, additional passes will be needed. Should multiple passes of the ripper be needed to achieve decompaction between the knives tracks of the ripping tool, the subsequent passes should be positioned so the knife tracks from the previous pass are split by the second pass. If three or more passes have been made and sufficient decompaction has not yet been achieved the AI may choose to halt further decompaction efforts in that area until conditions improve or better methods are determined.

L. Following ripping, all stone and rock three or more inches in size which has been lifted to the surface shall be collected and removed from agricultural areas.

M. After ripping has been conducted, do not allow unnecessary traffic on the ripped area.

N. In agricultural lands and croplands that will not be replanted to vegetation by the Company, recommend to landowners to plant a cover crop (cereal rye, clover, alfalfa, tillage radish, turnips, etc.) following decompaction. Reduced compaction created by the ripper pass will not remain over time without subsequent root penetration. Root penetration into the shattered soil is necessary to establish permanent stabilized channels to conduct air and water into the soil profile. Two good sources for landowner cover crop education are http://www.mccc.msu.edu/CCinfo/cropbycrop.html and http://mcccdev.anr.msu.edu/. For local expertise, consult with your county's Soil and Water Conservation District /USDA Natural Resource Conservation Service (NRCS) office for cover crop selection and compliance with NRCS planting deadlines.

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Appendix B.

Soil Plasticity Test Procedures

The Agricultural Inspector will test the consistency of the surface soil to a depth of approximately 4 to 8 inches using the Field Plasticity Test procedure developed from the *Annual Book of ASTM Standards, Plastic Limit of Soils* (ASTM D-4318).

1. Pull a soil plug from the area to be tilled, moved, or trafficked to a depth of 4-8 inches.

2. Roll a portion of the sample between the palms of the hands to form a wire with a diameter of one-eighth inch.

3. The soil consistency is:

   A. Tillable (able to be worked) if the soil wire breaks into segments not exceeding 3/8 of an inch in length.

   B. Plastic (not tillable) if the segments are longer than 3/8 of an inch before breaking.

4. This Procedure is to be used to aid in determining when soil conditions are dry enough for construction activities to proceed.

5. Once the soil consistency has been determined to be of adequate dryness, the plasticity test is not required again until the next precipitation event.

121614

Wind Power GeoPlanner™

AM and FM Radio Report

Virden Wind

Prepared on Behalf of
UKA North America, LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

Comsearch analyzed AM and FM radio broadcast stations whose service could potentially be affected by the proposed Virden Wind Project in Montgomery County, Illinois.

2. Summary of Results

AM Radio Analysis

Comsearch found three database records[1] for AM stations within approximately 30 kilometers of the project, as shown in Table 1 and Figure 1. The closest station, WIHM, which broadcasts out of Taylorville, Illinois, is located to the east project area of interest (AOI), 26.72 km from the nearest turbine location.

ID	Call Sign	Status[2]	Frequency (kHz)	Transmit ERP[3] (kW)	Operation Time	Latitude (NAD 83)	Longitude (NAD 83)	Required Separation Distance[4] (km)	Distance to Nearest Turbine (km)
1	WIHM	LIC	1410	1.0	Daytime	39.543933	-89.275089	2.13	26.83
2	WIHM	LIC	1410	0.063	Nighttime	39.543933	-89.275089	2.13	26.83
3	WSMI	LIC	1540	1.0	Daytime	39.172547	-89.570644	0.19	26.94

Table 1: AM Radio Stations within 30 Kilometers of Project Area

[1] Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data presented in this report is derived from the AM/FM station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

[2] LIC = Licensed and operational station; APP = Application for construction permit; CP=Construction permit granted; CP MOD = Modification of construction permit.

[3] ERP = Transmit Effective Radiated Power.

[4] The required separation distance is based on the lesser of 10 wavelengths or 3 kilometers for directional antennas and 1 wavelength for non-directional antennas.

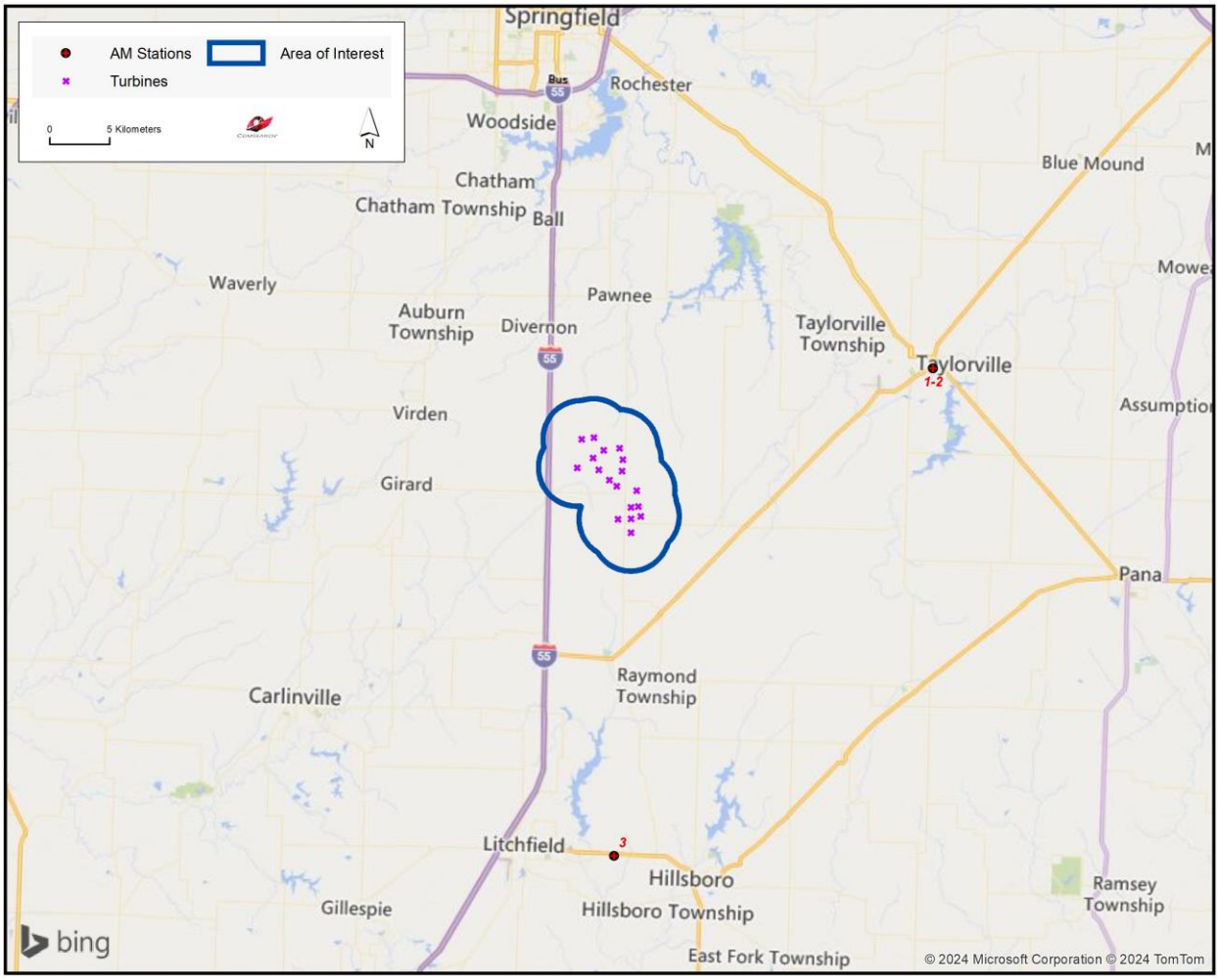

Figure 1: AM Radio Stations within 30 Kilometers of Project Area

FM Radio Analysis

Comsearch determined that there were twenty-four database records for FM stations within a 30-kilometer radius of the Virden Wind Project, as shown in Table 2 and Figure 2. Twenty of these stations are currently licensed and operating, eight of which are translator stations, two are auxiliary (backup) stations and one is a low power station that operates with limited range. The closest station is WXAJ, which is licensed in Hillsboro, Illinois, to the south of the project area, 7.37 km from the nearest proposed turbine location.

ID	Call Sign	Service[5]	Status[6]	Frequency (MHz)	Transmit ERP[7] (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to Nearest Turbine (km)
1	WXAJ	LIC	FM	99.7	50.0	39.353389	-89.531472	7.37
2	W295BQ	LIC	FX	106.9	0.25	39.255889	-89.613417	18.20
3	WSMI-FM	LIC	FM	106.1	50.0	39.255861	-89.613417	18.20
4	WMAY-FM	LIC	FM	92.7	11.5	39.643917	-89.514250	19.15
5	WSCT	LIC	FM	90.5	3.8	39.643944	-89.514250	19.15
6	WLLM-FM	LIC	FM	90.1	5.0	39.349500	-89.804528	20.46
7	WIBI	LIC	FM	91.1	50.0	39.349500	-89.804528	20.46
8	WLLM-FM	CP	FM	90.1	25.0	39.348639	-89.804722	20.53
9	WBWJ	CP	FM	88.3	1.1	39.671528	-89.542222	21.30
10	WMKR	LIC	FM	94.3	5.6	39.452278	-89.286194	23.29
11	WMKR	LIC	FS	94.3	1.0	39.452278	-89.286194	23.29
12	W241CF	LIC	FX	96.1	0.25	39.452278	-89.286194	23.29
13	W243DN	LIC	FX	96.5	0.25	39.452278	-89.286194	23.29
14	WRAN	LIC	FM	97.3	4.6	39.452278	-89.286194	23.29
15	W281BO	LIC	FX	104.1	0.22	39.452278	-89.286194	23.29
16	WCVS-FM	LIC	FM	96.7	6.0	39.633944	-89.814000	23.99
17	WLFZ	LIC	FM	101.9	50.0	39.710861	-89.645083	25.32
18	W296CT	CP	FX	107.1	0.17	39.543889	-89.274722	26.85
19	W296CT	LIC	FX	107.1	0.027	39.543889	-89.274722	26.85
20	WSMI-FM	LIC	FS	106.1	39.0	39.172528	-89.570639	26.94
21	W202CJ	LIC	FX	88.3	0.027	39.734167	-89.638333	27.81
22	WNNS	LIC	FM	98.7	50.0	39.699778	-89.782056	28.03
23	W273DR	LIC	FX	102.5	0.25	39.699778	-89.782056	28.03
24	-	APP	FL	101.3	0.022	39.160556	-89.493056	28.90

Table 2: FM Radio Stations within 30 km

[5] FM = FM broadcast station; FX = FM translator station; FS = FM auxiliary (backup) station; FB = FM booster station.

[6] LIC = Licensed and operational station; APP = Application for construction permit; CP=Construction permit granted; CP MOD = Modification of construction permit.

[7] ERP = Transmit Effective Radiated Power.

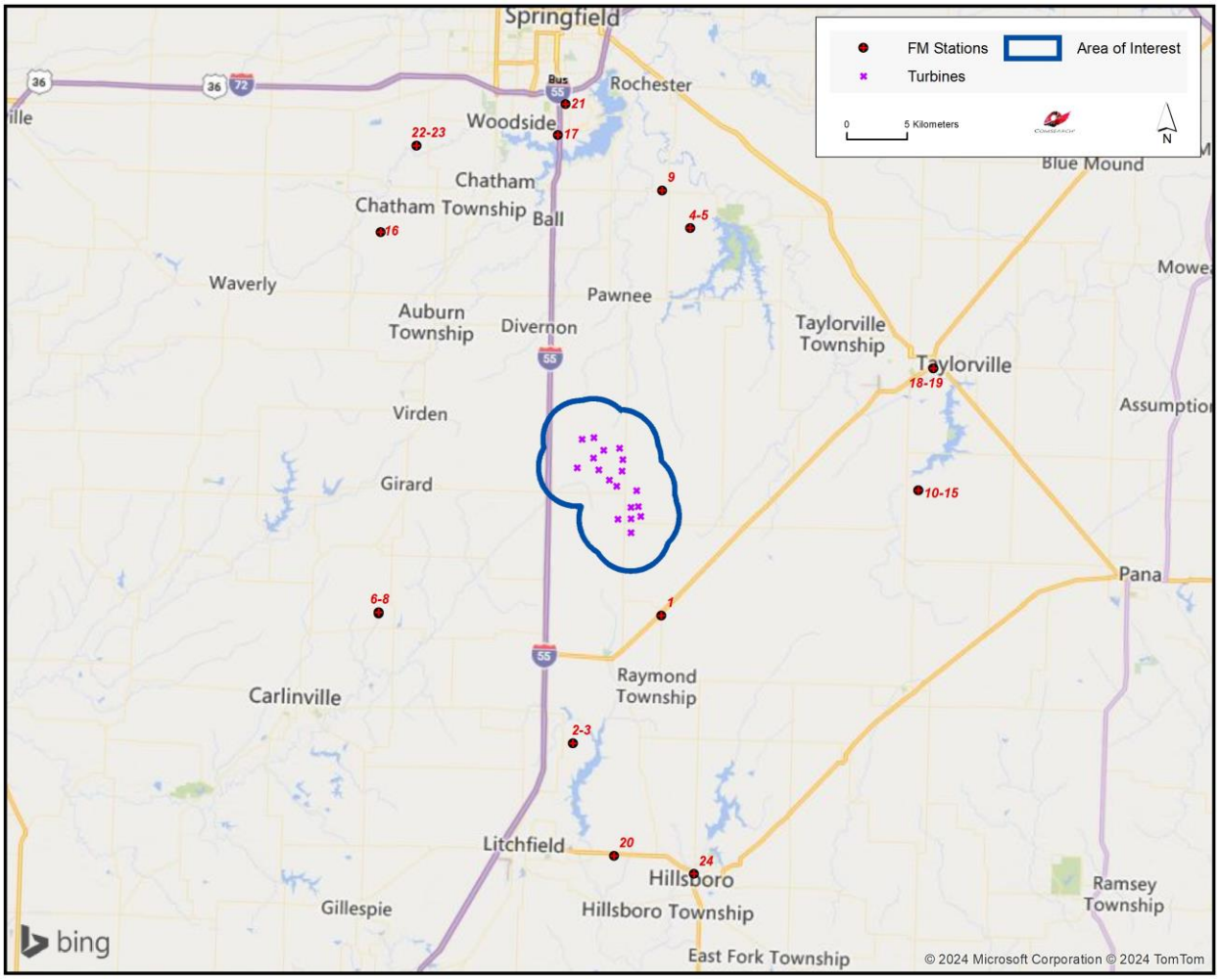

Figure 2: FM Radio Stations within 30 km

3. Impact Assessment

The exclusion distance for AM broadcast stations varies as a function of the antenna type and broadcast frequency. For directional antennas, the exclusion distance is calculated by taking the lesser of 10 wavelengths or 3 kilometers. For non-directional antennas, the exclusion distance is simply equal to 1 wavelength. Potential problems with AM broadcast coverage are only anticipated when AM broadcast stations are located within their respective exclusion distance limit from wind turbine towers. The closest AM station (WIHM) is located 26.83 km from the nearest turbine location. As there were no stations found within 3 kilometers of the project, which is the maximum possible exclusion distance based on a directional AM antenna broadcasting at 1000 KHz or less, the project should not impact the coverage of local AM stations.

The coverage of FM stations is generally not sensitive to interference due to wind turbines, especially when large objects (e.g., wind turbines) are located in the far field region of the radiating antenna to avoid the risk of distorting its radiation pattern. Station WXAJ would be the nearest FM station to any given turbine at 7.37 km away. At this distance there should be adequate separation to avoid radiation pattern distortion.

4. Recommendations

Since no impact on the licensed and operational AM or FM broadcast stations was identified in our analysis, no recommendations or mitigation techniques are required for this project.

5. Contact

For questions or information regarding the AM and FM Radio Report, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	David.Meyer@CommScope.com
Web site:	www.comsearch.com

Wind Power GeoPlanner™

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Land Mobile & Emergency Services Report

Virden Wind

Prepared on Behalf of
UKA North America LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

An assessment of the emergency services in the Virden Wind project area was performed by Comsearch to identify potential impact from the planned turbines. We evaluated the registered frequencies for the following types of first responder entities: police, fire, emergency medical services, emergency management, hospitals, public works, transportation and other state, county, and municipal agencies. We also identified all industrial and business land mobile radio (LMR) systems and commercial E911 operators within the proposed wind energy facility boundaries. This information is useful in the planning stages of the wind energy facility because the data can be used in support of facility communications needs and to evaluate any potential impact on the emergency services provided in that region. An overview of the project area, which is located in Montgomery County, Illinois, appears below in Figure 1.

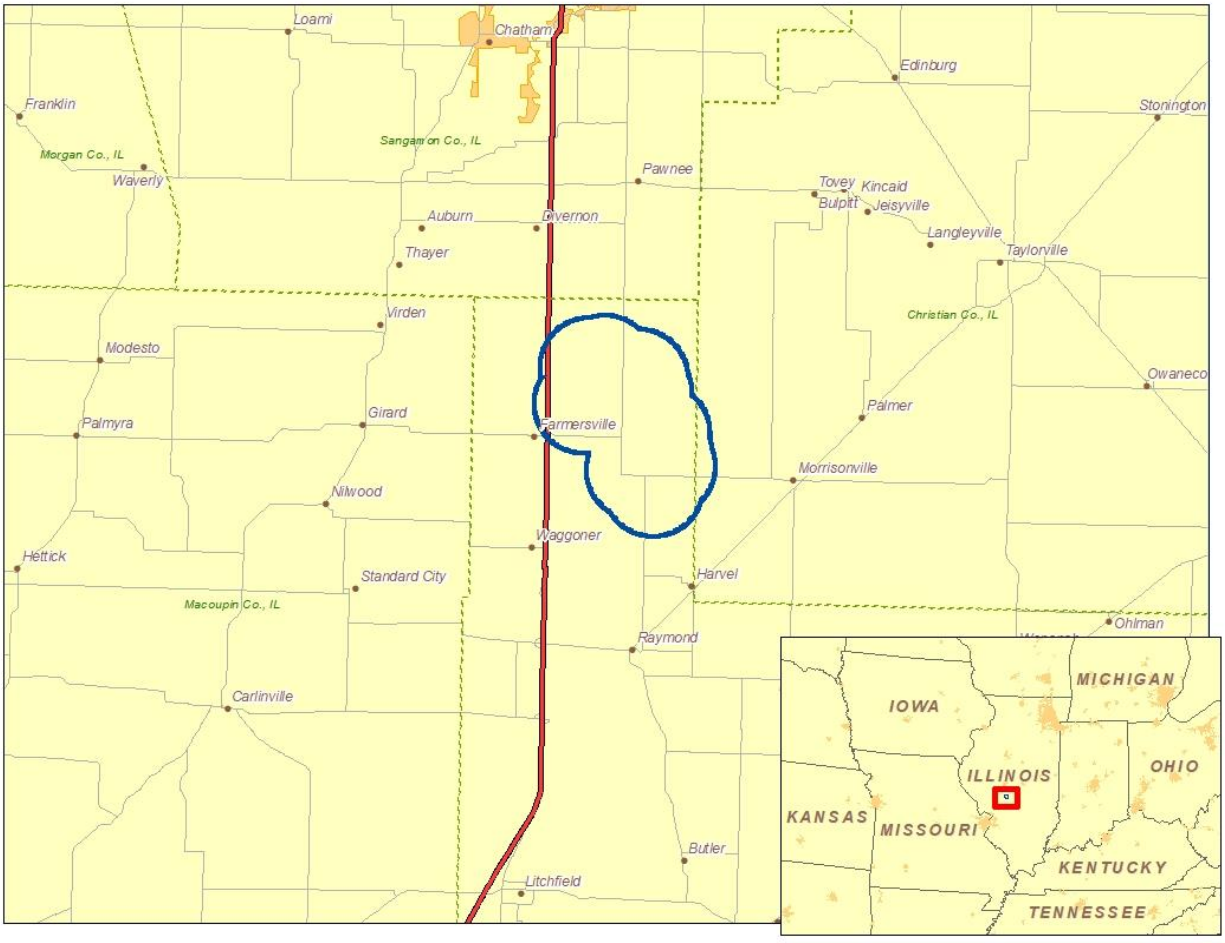

Figure 1: Area of Interest (AOI)

2. Summary of Results

Our land mobile and emergency services incumbent data[1] was derived from the FCC's Universal Licensing System (ULS) and the FCC's Public Safety & Homeland Security bureau. We identified both site-based licenses as well as regional area-wide licenses designated for public safety use.

Site-Based Licenses

The site-based licenses were imported into GIS software and geographically mapped relative to the wind energy project area of interest as defined by the customer. Each site on the map was given an ID number and associated with site information in a data table. A depiction of the fixed-site licenses in the project area appears in Figure 2.

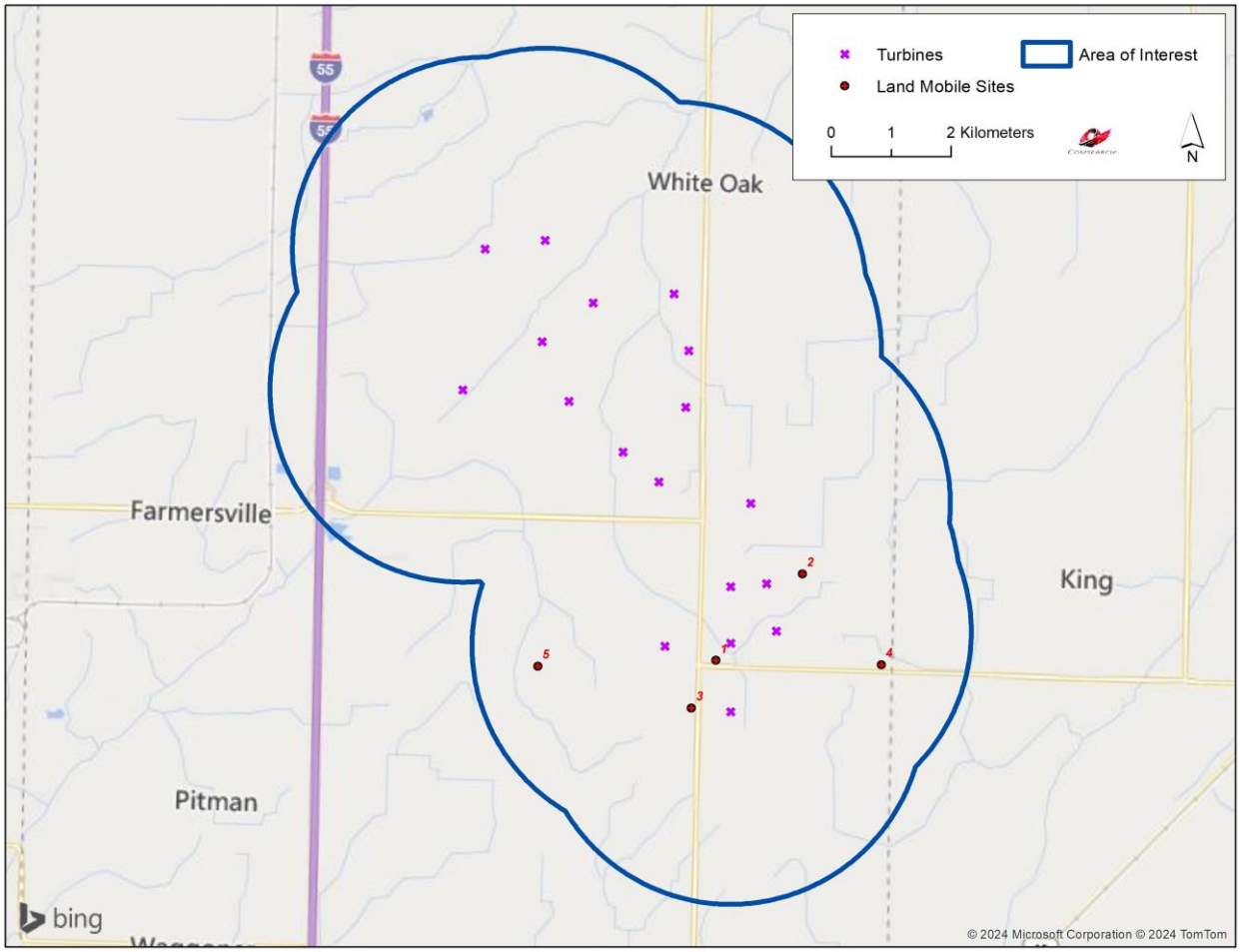

Figure 2: Land Mobile & Emergency Service Sites in Area of Interest

[1] Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data presented in this report is derived from the land mobile station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf

Figure 2 identifies five site-based licenses in the Virden Wind project area of interest. Specific information about these sites is provided in Table 1.

ID	Call Sign	Frequency Band (MHz)	Licensee	Antenna Height AGL (m)	Latitude (NAD83)	Longitude (NAD83)	Distance to Nearest Turbine (km)
1	WQZA813	150-174	BLACK DIAMOND FARMS	38.7	39.422778	-89.566389	0.38
2	WQQH335	450-470	HI TECH FARMS INC	59.0	39.436167	-89.550083	0.62
3	WRDE264	450-470	LEONARD, DAVID	41.1	39.415472	-89.570833	0.66
4	WNNI745	150-174	FUNDERBURK, LYNN	27.0	39.422833	-89.534250	1.84
5	WQON237	450-470	WEITEKAMP, LYNN	18.0	39.421111	-89.600833	2.15

Table 1: Land Mobile & Emergency Service Sites in Area of Interest

Mobile Licenses

In addition to the fixed-site licenses above, 505 mobile licenses defined by center point and radius were found to intersect the Virden Wind project area. Appendix A contains a tabular summary of these stations.

Area-Wide Licenses

The regional area-wide licenses were compiled from FCC data sources and identified for each county intersected by the wind energy project area. The Virden Wind project is located in Montgomery County, Illinois, part of Public Safety Region #13, which contains all the counties in Illinois, excluding the greater Chicago metropolitan area. The regional public safety operations are overseen by the entity listed below.

William J. Carter
Chairperson, Public Safety Region #13
Illinois Department of Public Health
122 South Michigan Avenue, 7th Floor
Chicago, IL 60603
phone: 312-814-5208
email: billy.carter@illinois.gov

The chairperson for Region #30 serves as the representative for all public safety entities in the area and is responsible for coordinating current and future public safety use in the wireless spectrum. In the bands licensed by the FCC for area-wide first responders, which include 220 MHz, 700 MHz, 800 MHz and 4.9 GHz, as well as the traditional Part 90 public safety pool of

frequencies, fifty-two licenses were found for the State of Illinois and one for the County of Montgomery (see Table 2). These area-wide licenses are designated for mobile use only.

ID	Licensee	Area of Operation	Frequency Band (MHz)
1	ADVANCED MEDICAL TRANSPORT OF CENTRAL ILLINOIS	Statewide: IL	150-174
2	ALEXIS NORTH HENDERSON AMBULANCE SERVICE	Statewide: IL	150-174
3	AMERICAN MEDICAL RESPONSE INC	Statewide: IL	150-174, 450-470
4	American National Red Cross	Statewide: IL	25-50
5	Beecher Fire Protection District	Statewide: IL	150-174
6	Buncombe Fire Department	Statewide: IL	150-174
7	BUNKER HILL, CITY OF	Statewide: IL	150-174
8	CARLINVILLE, CITY OF	Statewide: IL	150-174
9	CAVE EASTERN FIRE PROTECTION DISTRICT	Statewide: IL	150-174
10	CHARLESTON, CITY OF	Statewide: IL	150-174
11	City of Chicago Heights Police Department	Statewide: IL	4940-4990
12	CLAY, COUNTY OF	Statewide: IL	150-174
13	Deaconess regional Healthcare Services Illinois, Inc	Statewide: IL	150-174
14	DOWNERS GROVE, VILLAGE OF	Statewide: IL	150-174, 450-470
15	EVERGREEN PARK, VILLAGE OF	Statewide: IL	150-174
16	Farina, Village of	Statewide: IL	150-174
17	GALESBURG HOSPITALS AMBULANCE SERVICE	Statewide: IL	150-174
18	GALVA, CITY OF	Statewide: IL	150-174
19	GLENDALE HEIGHTS, VILLAGE OF	Statewide: IL	150-174
20	Illinois Law Enforcement Alarm System	Statewide: IL	0-10
21	ILLINOIS LAW ENFORCEMENT ALARM SYSTEM (ILEAS)	Statewide: IL	25-50, 150-174, 450-470, 800/900
22	Illinois State Toll Highway Authority	Statewide: IL	0-10, 450-470, 800/900, 4940-4990
23	Illinois, State of	Statewide: IL	0-10, 25-50, 150-174, 406-413, 421-430, 450-470, 769-775/799-805, 800/900, 2450-2500

ID	Licensee	Area of Operation	Frequency Band (MHz)
24	Illinois, State of Department of Transportation	Statewide: IL	0-10, 25-50, 150-174
25	JERSEY, COUNTY OF SHERIFF DEPARTMENT	Statewide: IL	150-174
26	JOHNSON COUNTY 9 1 1 ETSB	Statewide: IL	150-174
27	Lakeside EMS, LLC	Statewide: IL	150-174
28	Maine Township Emergency Management Agency	Statewide: IL	25-50, 150-174
29	MEDICONE MEDICAL RESPONSE	Statewide: IL	150-174
30	METAMORA, CITY OF	Statewide: IL	150-174
31	MIDLOTHIAN, VILLAGE OF	Statewide: IL	150-174
32	MONTGOMERY, COUNTY OF	Countywide: MONTGOMERY, IL	25-50, 150-174
33	MORGAN COUNTY ESDA	Statewide: IL	150-174
34	MOUNT ZION FIRE PROTECTION DISTRICT	Statewide: IL	150-174
35	MURPHYSBORO, CITY OF	Statewide: IL	150-174
36	MUTUAL AID BOX ALARM SYSTEM - IL	Statewide: IL	25-50, 150-174, 450-470
37	NATIONAL SKI PATROL SYSTEM INC	Statewide: IL	150-174
38	ONEIDA WATAGA FIRE PROTECTION DISTRICT	Statewide: IL	150-174
39	ORION FIRE PROTECTION DISTRICT	Statewide: IL	150-174
40	PARATECH AMBULANCE SERVICE INC	Statewide: IL	150-174
41	PATOKA FIRE PROTECTION DIST IL	Statewide: IL	150-174
42	RuralMed, LLC	Statewide: IL	150-174
43	Search And Rescue Mutual Aid (SARMA)	Statewide: IL	150-174
44	SOUTH HOLLAND, VILLAGE OF	Statewide: IL	150-174
45	Stickney, Village of	Statewide: IL	150-174
46	Superior Air Ground Ambulance Inc.	Statewide: IL	150-174
47	TUSCARORA FIRE PROTECTION DISTRICT	Statewide: IL	150-174
48	United Life Care Ambulance Service Inc	Statewide: IL	150-174

ID	Licensee	Area of Operation	Frequency Band (MHz)
49	United Medical Response, LLC	Statewide: IL	150-174
50	Village of University Park	Statewide: IL	150-174
51	WAYNE COUNTY AMBULANCE SERVICE	Statewide: IL	150-174
52	WEST CITY, VILLAGE OF	Statewide: IL	150-174
53	WILLIAMSFIELD FIRE PROTECTION DIST	Statewide: IL	150-174

Table 2: Regional Licenses

E911 Operators

Wireless operators are granted area-wide licenses from the FCC to deploy their cellular networks, which often include handsets with E911 capabilities. Since mobile phone market boundaries differ from service to service, we disaggregated the carriers' licensed areas down to the county level. We have identified the type of service for each carrier in Montgomery County, Illinois, in Table 3.

Mobile Phone Carrier	Service[2]
AT&T	700 MHz, AWS, Cellular, PCS, WCS
DISH Network	700 MHz, AWS
T-Mobile	AWS, PCS
US Cellular	700 MHz
Verizon	700 MHz, AWS, Cellular, PCS

Table 3: Mobile Phone Carriers in Area of Interest with E911 Service

[2] AWS: Advanced Wireless Service at 1.7/2.1 GHz
CELL: Cellular Service at 800 MHz
PCS: Personal Communication Service at 1.9 GHz
WCS: Wireless Communications Service at 2.3 GHz
700 MHz: Lower 700 MHz Service

3. Impact Assessment

The first responder, industrial/business land mobile sites, area-wide public safety, and commercial E-911 communications as described in this report are typically unaffected by the presence of wind turbines, and we do not anticipate any significant harmful effect to these services in the Virden Wind project area. Although each of these services operates in different frequency ranges and provides different types of service including voice, video and data applications, there is commonality among these different networks with regard to the impact of wind turbines on their service. Each of these networks is designed to operate reliably in a non-line-of-sight (NLOS) environment. Many land mobile systems are designed with multiple base transmitter stations covering a large geographic area with overlap between adjacent transmitter sites in order to provide handoff between cells. Therefore, any signal blockage caused by the wind turbines does not materially degrade the reception because the end user is likely receiving signals from multiple transmitter locations. Additionally, the frequencies of operation for these services have characteristics that allow the signal to propagate through wind turbines. As a result, very little, if any, change in their coverage should occur when the wind turbines are installed.

When planning the wind energy turbine locations in the area of interest, a conservative approach would dictate not locating any turbines within 77.5 meters of land mobile fixed-base stations to avoid any possible impact to the communications services provided by these stations. This distance is based on FCC interference emissions from electrical devices in the land mobile frequency bands. As long as the turbines are located more than 77.5 meters from the land mobile stations, they will meet the setback distance criteria for FCC interference emissions in the land mobile bands.

4. Recommendations

In the event that a public safety entity believes its coverage has been compromised by the presence of the wind energy facility, it has many options to improve its signal coverage to the area through optimization of a nearby base station or even adding a repeater site. Utility towers, meteorological towers or even the turbine towers within the wind project area can serve as the platform for a base station or repeater site.

5. Contact

For questions or information regarding the Land Mobile & Emergency Services Report, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	David.Meyer@CommScope.com
Web site:	www.comsearch.com

Appendix A

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
1	WPES764	450-470	AG PLUS DEVELOPMENT INC	80.0	39.980889	-89.972611
2	WQIF745	150-174	Air Evac EMS, Inc.	40.0	39.734167	-89.638333
3	WQWE755	450-470	AMEREN	32.0	39.259778	-89.440000
4	WNQJ842	800/900	Ameren Services Company	402.0	38.669194	-92.208528
5	WPUR555	800/900	Ameren Services Company	113.0	38.629722	-90.011111
6	KXH350	450-470	American Medical Response	113.0	38.616722	-90.298444
7	WQLV439	450-470	Andy Wurm Tire & Wheel Co Inc	320.0	38.740667	-90.304083
8	WNWC598	450-470	Archer Daniels Midland Company	48.0	39.763667	-89.245917
9	WPDK982	450-470	ARCHER DANIELS MIDLAND COMPANY	72.0	39.865861	-88.897028
10	WQGN620	150-174	Archer Daniels Midland Company	40.0	39.746417	-89.758028
11	WQUV733	150-174	BAB INC	40.0	39.591722	-89.727611
12	WRDD579	450-470	BABY TALK INC.	80.0	39.839361	-88.965250
13	WRYR451	150-174	BALL CHATHAM SCHOOL DISTRICT	40.0	39.675528	-89.656889
14	WQPZ733	150-174	BALL TOWNSHIP ROAD COMMISSION	24.0	39.622889	-89.647944
15	WNSI619	450-470	Beaty, DIANA	64.0	39.742556	-89.501194
16	WPMU958	150-174	Beck Bus Transportation Corp.	40.0	39.547556	-89.325083
17	WQZZ486	450-470	BEELER FARMS INC.	32.0	39.302222	-89.598611
18	WPGV418	150-174	BENLD, CITY OF	80.0	39.095611	-89.804806
19	WPFS544	150-174	BERNER, CARL A	40.0	39.439222	-89.178972
20	WQWH242	150-174	BERT J. BARLOW FARMS	48.0	39.578194	-89.590083
21	WRUL245	150-174	BERTOLINO, MARK	40.0	39.225056	-89.318972
22	WNSO534	450-470	BIG BOY STEEL ERECTORS	121.0	38.473111	-90.336500

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
23	WQFB702	25-50, 150-174, 450-470, 470-512, 800/900	B-K ELECTRIC INC	300.0	39.713278	-90.722639
24	WQZA813	150-174	BLACK DIAMOND FARMS	40.0	39.422778	-89.566389
25	WQDZ985	150-174	BLAKLEY HEATING, COOLING AND PLUMBING	40.0	39.548333	-89.287500
26	WSN404	25-50	BLEIGH CONSTRUCTION COMPANY	169.0	39.930889	-90.332056
27	KSS776	150-174	BNSF Railway Co.	40.0	39.484750	-89.776222
28	WYK624	150-174	BNSF RAILWAY CO.	40.0	39.044333	-89.613389
29	WRXB856	150-174	BOEHM FARMS	32.0	39.325611	-89.916222
30	WQQN324	150-174	Bois D'Arc Township	40.0	39.444222	-89.659222
31	WPNY502	150-174	BOND MADISON WATER COMPANY	40.0	39.830056	-89.664000
32	WQWW834	150-174	BOSTON, DANIEL D	40.0	39.641722	-89.573694
33	WRPP273	450-470	BRANDT AGRONOMIC SERVICES, LLC	32.0	39.573167	-89.878611
34	KB91826	450-470	BRINK'S INCORPORATED	121.0	38.629222	-90.206222
35	KD28606	450-470	BRINK'S INCORPORATED	121.0	39.850028	-88.950083
36	KD28610	450-470	BRINK'S INCORPORATED	121.0	39.799500	-89.647611
37	WNCC309	450-470	BROCKELSBY FARMS	56.0	39.510667	-89.477889
38	WNCC309	450-470	BROCKELSBY FARMS	32.0	39.655417	-89.368056
39	WPXU285	450-470	BROWN, BRIAN	32.0	39.179444	-89.493611
40	WRXW764	450-470	BRUCE, MATTHEW S	32.0	39.281111	-89.845833
41	WQCQ275	450-470	BRUNK FARMS	32.0	39.670056	-89.606833
42	WQPA829	450-470	BRUNTJEN, KIRBY	32.0	39.339722	-89.493056
43	WQNW844	150-174	BUERK, GEORGE	40.0	39.451111	-89.222222
44	WRNP406	800/900	BUFFETT, HOWARD	64.0	39.476167	-89.194333
45	WRNP406	800/900	BUFFETT, HOWARD	64.0	39.376028	-89.012889

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
46	WQTZ775	150-174	BURTLE FARMS	40.0	39.613389	-89.620750
47	KNIH249	150-174, 450-470	CAMPBELL, RUSSELL T	56.0	39.173667	-89.650639
48	KZJ518	450-470	CAPITAL AREA CAREER CENTER	32.0	39.717917	-89.626944
49	WQAY890	150-174	CARLINVILLE AREA HOSPITAL	32.0	39.299583	-89.883250
50	WRU920	150-174	CARLINVILLE COMM UNIT SCHOOL DIST 1	40.0	39.287000	-89.888444
51	WPCE569	450-470	CARSON, VIRGIL J	64.0	39.097833	-88.991167
52	WQUK531	450-470	CARTER, SAM	32.0	39.434167	-89.478333
53	WRFL514	450-470	CCI REDI MIX	32.0	39.559722	-89.308528
54	WQM545	450-470	CENTRAL ILLINOIS STEEL CO	32.0	39.338111	-89.865667
55	WQLW759	150-174	CHATHAM AMBULANCE SERVICE	40.0	39.676111	-89.704556
56	WPWF848	150-174	CHATHAM FIRE PROTECTION DISTRICT	24.0	39.691333	-89.690917
57	WQHP565	150-174	CHATHAM FIRE PROTECTION DISTRICT	32.0	39.672750	-89.705278
58	WRHS832	150-174	CHATHAM TOWNSHIP ROAD & BRIDGE	20.0	39.643806	-89.760000
59	WPKC965	150-174	CHATHAM, CITY OF	40.0	39.677778	-89.692056
60	WPBB579	150-174	CHATHAM, VILLAGE OF	40.0	39.674500	-89.703167
61	WQQU323	450-470	CHERRY HILLS CHURCH	32.0	39.721806	-89.688361
62	WNPJ350	450-470	CHRISTIAN COUNTY MENTAL HEALTH ASSN	72.0	39.552833	-89.306472
63	WQOS935	150-174	Christian County, IL ETSB	40.0	39.517222	-89.227222
64	WQOS935	150-174	Christian County, IL ETSB	40.0	39.638861	-89.191528
65	WQOS938	150-174	Christian County, IL ETSB	40.0	39.419583	-89.453333
66	WQOS938	150-174	Christian County, IL ETSB	40.0	39.613111	-89.350361
67	WQOS938	150-174	Christian County, IL ETSB	40.0	39.409056	-89.083361
68	KTA998	150-174	CHRISTIAN, COUNTY OF	24.0	39.559306	-89.306333
69	WNJI379	150-174	CHRISTIAN, COUNTY OF	56.0	39.547278	-89.293417

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
70	WRMP210	800/900	CHRISTIAN, COUNTY OF	32.0	39.510667	-89.477889
71	WRUC605	150-174	CHS OF LOWDER INC.	24.0	39.552083	-89.850028
72	KNIB610	450-470	City of Saint Elmo	80.0	39.027833	-88.847556
73	WPYR672	150-174	CITY OF SPRINGFIELD	40.0	39.795861	-89.656194
74	WQTE472	150-174	COLE, FARLEY	40.0	39.500611	-89.755083
75	WQFE421	150-174	COSS, CHRIS L	40.0	39.441667	-89.650111
76	WQFE421	150-174	COSS, CHRIS L	40.0	39.318278	-89.575528
77	WQFE421	150-174	COSS, CHRIS L	40.0	39.113472	-89.575472
78	WQFE421	150-174	COSS, CHRIS L	40.0	39.030000	-89.526667
79	WQFE421	150-174	COSS, CHRIS L	40.0	39.091194	-89.386444
80	WQFE421	150-174	COSS, CHRIS L	40.0	39.302778	-89.280028
81	WRAG843	450-470	COSS, CHRIS L	32.0	39.302861	-89.280222
82	WRPE221	450-470	Coss, Chris L	32.0	39.302861	-89.280222
83	WRXI221	150-174	COSS, CHRIS L	40.0	39.255722	-89.353444
84	WQZF821	450-470	CRAIG ANTENNA SERVICE	13.0	39.477500	-89.771389
85	WNQS515	800/900	Craig Antenna Service, Inc	113.0	39.240333	-89.907611
86	WNQS515	800/900	Craig Antenna Service, Inc	113.0	39.477556	-89.771472
87	WNWJ542	800/900	Craig Antenna Service, Inc	113.0	39.609778	-90.231778
88	WPRS474	800/900	Craig Antenna Service, Inc	113.0	39.420889	-90.817361
89	WPRS475	800/900	Craig Antenna Service, Inc	113.0	39.136722	-90.631778
90	WPRS475	800/900	Craig Antenna Service, Inc	113.0	39.381667	-90.166111
91	WPRS476	800/900	Craig Antenna Service, Inc	113.0	39.606722	-90.836806
92	WNBP267	450-470	CRAIG, LARRY	80.0	39.851417	-89.099528
93	WPEJ774	450-470	CRAIG, LARRY	121.0	39.306694	-88.932583
94	WPET830	450-470	CRAIG, LARRY	80.0	39.306611	-88.932667

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
95	WPGK253	450-470	CRAIG, LARRY	121.0	39.306611	-88.932667
96	WRAT260	450-470	CRAIG, LARRY	32.0	39.240278	-89.907500
97	WPGR470	450-470	CRAIG, LARRY W	112.0	39.306694	-88.932583
98	WPTA577	800/900	Craig, Larry W	113.0	39.306667	-88.932500
99	WPUB488	800/900	Craig, Larry W	113.0	39.851667	-89.099444
100	WPUC732	800/900	Craig, Larry W	113.0	39.511944	-89.250556
101	WQVH868	450-470	CRAIG, LARRY W	32.0	39.418167	-89.452417
102	WNPD640	450-470	CRAIG, LARRY W:CRAIG, CANDICE D DBA CRAIG ANTENNA SERVICE	72.0	39.851417	-89.099528
103	WQAK419	150-174	Curran Gardner Public Water District	35.0	39.781222	-89.800944
104	KNAE578	450-470	DAMBACHER & PUCCETTI FARMS INC	32.0	39.510611	-89.477861
105	WPME587	450-470	DATATRONICS INC	113.0	38.888944	-90.147333
106	WPHV937	150-174	DECATUR, CITY OF	72.0	39.871139	-88.940639
107	WQUW512	150-174	DECLERCK FARMS INC.	40.0	39.607500	-89.180833
108	WPMV648	450-470	DETECTION SECURITY COMPANY INC	120.0	39.478083	-88.389778
109	WRUU206	450-470	DEWERFF, TIM	32.0	39.305000	-89.307500
110	WNKW607	150-174	DIVERNON FIRE PROTECTION DISTRICT	16.0	39.565611	-89.650083
111	KVB302	150-174	DIVERNON, VILLAGE OF	16.0	39.565611	-89.650083
112	WNLA337	150-174	DIVERNON, VILLAGE OF	16.0	39.565611	-89.658972
113	WQIT800	150-174	DUNNS AMBULANCE SERVICE, INC.	40.0	39.289389	-89.881667
114	WQIT800	150-174	DUNNS AMBULANCE SERVICE, INC.	40.0	39.289694	-89.881306
115	WQIT800	150-174	DUNNS AMBULANCE SERVICE, INC.	40.0	39.549500	-89.292222
116	WNIK665	150-174	EBERT, WILLIAM D	40.0	39.555611	-89.290639
117	WQAX928	150-174	EDINBURG COMMUNITY UNIT SCHOOL DISTRICT #4	24.0	39.661167	-89.389528
118	KNEM440	150-174	EDINBURG FIRE PROTECTION DISTRICT	24.0	39.660056	-89.388417

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119	KNEM440	150-174	EDINBURG FIRE PROTECTION DISTRICT	40.0	39.660056	-89.388417
120	WQVG506	150-174	EE INC.	40.0	39.822000	-89.481000
121	WQVG506	150-174	EE INC.	40.0	39.795000	-89.458000
122	WQVG506	150-174	EE INC.	40.0	39.831667	-89.405000
123	WPHW841	150-174	EFFINGHAM EQUITY	48.0	39.398111	-89.064250
124	WPNY754	800/900	EFFINGHAM, COUNTY OF	113.0	39.125028	-88.516444
125	WQFC677	800/900	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	113.0	38.747833	-90.114000
126	WQFM737	800/900	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	113.0	38.644444	-89.999444
127	WQFM737	800/900	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	113.0	38.671667	-89.750278
128	WQGW688	800/900	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	113.0	38.630278	-89.195000
129	WQYJ368	450-470	ERNEST PICKETT INDUSTRIAL CO OP	32.0	39.510667	-89.477889
130	WQUU881	450-470	ERVIN HEBERT & PAMELA HEBERT	32.0	39.400083	-89.262028
131	WQHE839	150-174	FARMERS ELEVATOR COMPANY OF LOWDER	40.0	39.551444	-89.847333
132	WNIN308	450-470	FARMERS GRAIN CO OF CENTRAL IL	64.0	39.963917	-89.159250
133	WNRI679	450-470	FAYCO TRANSPORTATION SERVICE	80.0	39.306694	-88.932583
134	WRFM532	450-470	FAYETTE SEPTIC SERVICE	64.0	39.071111	-89.244722
135	KB85186	150-174	FAYETTE, COUNTY OF	64.0	38.959778	-89.099778
136	WNFR662	25-50	FAYETTE, COUNTY OF	122.0	38.959778	-89.099778
137	WPIG932	450-470	FAYETTE, COUNTY OF	97.0	39.004778	-89.139222
138	KB78213	450-470	FCA US LLC	120.7	38.629222	-90.206222
139	WPUA969	450-470	FEDEX GROUND	121.0	38.636111	-90.244167
140	WPEQ563	450-470	FERGUSON FLORISSANT R 2 SCHOOL DISTRICT	113.0	38.754222	-90.313722
141	WQRJ388	150-174	FESSER INC	40.0	39.481167	-89.525083
142	WPII789	150-174	FIRST STUDENT INC	32.0	39.797000	-89.606222
143	WPIT369	800/900	First Student Inc	113.0	38.650611	-90.334833

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144	WPQK986	150-174	First Student Inc	40.0	39.797000	-89.606222
145	WNAW444	450-470	FRANKLIN COMMUNITY SCHOOL DISTRICT 1	56.0	39.619500	-90.048167
146	WNNI745	150-174	FUNDERBURK, LYNN	40.0	39.422833	-89.534250
147	WQIF999	450-470	GEORGE ALARM COMPANY, INC.	80.0	39.790278	-89.643833
148	WRVQ331	450-470	GERLACH, KEN	32.0	39.406667	-89.680556
149	KCS543	150-174	GILLESPIE, CITY OF	40.0	39.124167	-89.813889
150	WRCI743	150-174	GILLESPIE-BENLD AREA AMBULANCE SERVICE, INC.	40.0	39.136194	-89.823389
151	WQMP831	150-174	GIRARD POLICE DEPARTMENT	40.0	39.451333	-89.777306
152	WRAF870	150-174	Girl Scouts of Central Illinois	25.0	39.707972	-89.668028
153	WNZS833	450-470	GLOBAL TECHNICAL SYSTEMS INC	80.0	39.614500	-90.043167
154	WQVR239	450-470	GLOBAL TECHNICAL SYSTEMS, INC	32.0	39.312222	-89.876389
155	WNZF598	450-470	GORDEN, SCOTT D	56.0	39.625861	-89.028139
156	WRJB717	450-470	GR COMPANIES	32.0	39.176528	-89.672278
157	WROS768	450-470	GRAIN SYSTEMS INC	32.0	39.527222	-89.323611
158	WPAK797	150-174	GRANTFORK FIRE PROTECTION DIST	48.0	39.829778	-89.666778
159	WQMI710	470-512	GRAY TELEVISION LICENSEE, LLC	270.0	41.528639	-90.573444
160	KSE889	25-50	GROHNE CONCRETE PRODUCTS COMPANY	113.0	39.832528	-88.955083
161	WRPI328	450-470	GROVES FARM	32.0	39.285333	-89.660361
162	WRKL594	450-470	GRUNDY, BRIAN	32.0	39.421111	-89.465000
163	WPPD445	150-174	GUNDERSEN LUTHERAN MEDICAL CENTER	600.0	43.794417	-91.249583
164	WRYY756	450-470	HAMLIN, LESTER	32.0	39.280278	-89.224167
165	WRND963	450-470	HANLEY, BRETT	32.0	39.584444	-89.787778
166	KD40117	25-50, 150-174, 450-470	Hardee's Food Systems, LLC	121.0	38.760611	-89.989833
167	WPHA670	450-470	Hardee's Food Systems, LLC	121.0	38.747833	-90.211500

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168	WQAB736	450-470	Hardee's Food Systems, LLC	121.0	39.115472	-90.324556
169	WNPA851	150-174	HARTKE, MAYNARD W	48.0	39.133389	-89.725083
170	WQKT535	450-470, 470-512, 800/900	Hearst Stations Inc.	482.0	39.006833	-94.503333
171	KNCU558	25-50, 450-470	HELD SALES & SERVICE	32.0	39.326444	-89.554528
172	WNUW672	150-174	HEMBERGER, JERRY L	64.0	39.634500	-89.828722
173	WPSP316	150-174	HERRIN LTD	40.0	39.712833	-89.469806
174	WQQH335	450-470	HI TECH FARMS INC	121.0	39.436167	-89.550083
175	WPJS427	150-174	HILLSBORO AREA AMBULANCE SERVICE INC	40.0	39.152000	-89.480639
176	WPPX824	150-174	HILLSBORO COMMUNITY UNIT SCHOOL DIST 3	40.0	39.157000	-89.493139
177	WPPX824	150-174	HILLSBORO COMMUNITY UNIT SCHOOL DIST 3	32.0	39.151694	-89.486556
178	WQXS705	150-174	HILLSBORO, CITY OF	40.0	39.160861	-89.491444
179	WRWX351	150-174	HILLSBORO, TOWNSHIP OF	40.0	39.131972	-89.485222
180	WRZC697	150-174	HILLSBORO, TOWNSHIP OF	40.0	39.137222	-89.487500
181	WRWG261	450-470	HIMSTEDT, DALE	32.0	39.535833	-89.433333
182	WQXM292	150-174	HOLZWARTH FLYING SERVICE	80.0	39.516667	-89.858333
183	WQRM638	25-50	Hoosier Energy Rural Electric Cooperative, Inc.	240.0	39.093750	-86.914056
184	WQQH844	450-470	IL SUPREME COURT - OFFICE OF MARSHAL	32.0	39.798361	-89.653194
185	KZV948	150-174	ILLINOIS CENTRAL RAILROAD COMPANY	40.0	39.803833	-89.628611
186	WNIF497	150-174	ILLINOIS CENTRAL RAILROAD COMPANY	40.0	39.804222	-89.628444
187	WNMK474	800/900	Illinois Cooperative dba Clear Talk	113.0	39.800278	-89.645556
188	WNQL471	800/900	Illinois Cooperative dba Clear Talk	56.0	39.306111	-88.935556
189	WNRQ863	800/900	Illinois Cooperative dba Clear Talk	113.0	39.800611	-89.645667
190	WNSX924	800/900	Illinois Cooperative dba Clear Talk	113.0	39.113667	-89.718694
191	WPBW403	800/900	Illinois Cooperative dba Clear Talk	113.0	40.149778	-89.371194

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192	WPEN242	800/900	Illinois Cooperative dba Clear Talk	113.0	39.951944	-88.831944
193	WPHA785	800/900	Illinois Cooperative dba Clear Talk	113.0	39.735611	-90.175667
194	WPII376	800/900	Illinois Cooperative dba Clear Talk	112.0	39.490000	-88.349444
195	WPJI402	800/900	Illinois Cooperative dba Clear Talk	113.0	39.952389	-88.832389
196	WPMD711	800/900	Illinois Cooperative dba Clear Talk	113.0	39.990333	-89.512889
197	WPMD713	800/900	Illinois Cooperative dba Clear Talk	113.0	39.666611	-90.341528
198	WPPA258	800/900	Illinois Cooperative dba Clear Talk	113.0	39.255833	-89.613333
199	WPPD854	800/900	Illinois Cooperative dba Clear Talk	113.0	38.942556	-89.103389
200	WPRG705	800/900	Illinois Cooperative dba Clear Talk	113.0	39.387944	-88.289056
201	WPRG709	800/900	Illinois Cooperative dba Clear Talk	113.0	39.800278	-89.645556
202	WPRH222	800/900	Illinois Cooperative dba Clear Talk	113.0	39.247667	-89.631528
203	WPRH229	800/900	Illinois Cooperative dba Clear Talk	113.0	39.666611	-90.341528
204	WPRM207	800/900	Illinois Cooperative dba Clear Talk	113.0	39.952389	-88.832389
205	WPRW835	800/900	Illinois Cooperative dba Clear Talk	113.0	39.566917	-89.196028
206	WPSM629	800/900	Illinois Cooperative dba Clear Talk	113.0	39.490000	-88.349444
207	WPSR499	800/900	Illinois Cooperative dba Clear Talk	113.0	39.800278	-89.645556
208	WPTA328	800/900	Illinois Cooperative dba Clear Talk	113.0	39.952389	-88.832389
209	WPTB208	800/900	Illinois Cooperative dba Clear Talk	113.0	39.952389	-88.832389
210	WQEW611	25-50	Illinois Electric Cooperative	121.0	39.601417	-91.044278
211	WQEW611	25-50	Illinois Electric Cooperative	121.0	39.595028	-90.509278
212	WQME309	800/900	ILLINOIS PUBLIC SAFETY AGENCY NETWORK	64.0	39.306111	-88.935556
213	KSH521	25-50	ILLINOIS ROAD CONTRACTORS INC	121.0	39.724500	-89.965111
214	KB89965	450-470	ILLINOIS, STATE OF	48.0	39.798944	-89.654833
215	KNAY295	150-174	Illinois, State of	121.0	38.788944	-89.991778
216	KNNU245	150-174	ILLINOIS, STATE OF	145.0	39.829222	-89.646222

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217	KXE703	450-470	ILLINOIS, STATE OF	32.0	39.729500	-89.618806
218	WNSW517	450-470	ILLINOIS, STATE OF	32.0	39.517278	-89.227306
219	WNUX989	25-50	ILLINOIS, STATE OF	48.0	39.517278	-89.227306
220	WPMV426	800/900	ILLINOIS, STATE OF	60.0	39.301417	-88.937028
221	WQCE618	800/900	ILLINOIS, STATE OF	32.0	39.517222	-89.227222
222	WQCE619	800/900	ILLINOIS, STATE OF	32.0	39.799417	-89.645278
223	WQCE893	800/900	ILLINOIS, STATE OF	32.0	39.689167	-89.640833
224	WQCK827	800/900	ILLINOIS, STATE OF	32.0	39.799417	-89.645278
225	WQCK972	800/900	ILLINOIS, STATE OF	32.0	39.517222	-89.227222
226	WQIG495	450-470	ILLINOIS, STATE OF	32.0	39.793556	-89.646611
227	KD39304	450-470	Illinois, State of - Dept of Transportation	40.0	39.777833	-89.602056
228	WREJ648	800/900	Iota Spectrum Holdings, LLC	50.0	39.769167	-89.625833
229	WREJ649	800/900	Iota Spectrum Holdings, LLC	50.0	39.769167	-89.625833
230	WQWB286	800/900	Iota Spectrum Partners, LP	50.0	39.769167	-89.625833
231	WREJ265	800/900	Iota Spectrum Partners, LP	50.0	39.769167	-89.625833
232	WREJ266	800/900	Iota Spectrum Partners, LP	50.0	39.769167	-89.625833
233	WRPA335	25-50	J BAUER FARMS, INC	80.0	39.118667	-89.885694
234	WQJK562	450-470	JACK KENNEDY METAL PRODUCTS & BUILDINGS INC	32.0	39.558944	-89.353611
235	WQFU495	800/900	JACKSONVILLE, CITY OF	48.0	39.594806	-89.950028
236	WQSF345	150-174	JANSSEN, STEVE	40.0	39.171944	-89.284167
237	WRFV816	450-470	KELLEY CONSTRUCTION, INC.	32.0	39.144333	-89.505111
238	WQZR586	25-50	KINNEY CONTRACTORS,INC.	80.0	39.292278	-89.640639
239	WRDB755	150-174	KNODLE, LTD	40.0	39.115278	-89.258056
240	WRUL468	150-174	LAKE AREA DISPOSAL	32.0	39.775972	-89.624083
241	WRXC399	150-174	LAKE AREA DISPOSAL	40.0	39.777278	-89.620389

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242	WPFX795	450-470	LAKE WILLIAMSON CHRISTIAN CENTER	32.0	39.252278	-89.834250
243	WRKP312	450-470	LANHAM INC.	32.0	39.676111	-89.416667
244	WPGG718	450-470	LCP-BV KCI HOTEL TRS, LLC	121.0	38.742556	-90.362611
245	WRDE264	450-470	LEONARD, DAVID	32.0	39.415472	-89.570833
246	WQCX944	450-470	LEWIS & CLARK COMMUNITY COLLEGE	32.0	39.259556	-89.902472
247	WQZI495	150-174	LIFESTAR AMBULANCE SERVICE	40.0	39.805500	-89.652778
248	WRDC956	150-174	LIFESTAR AMBULANCE SERVICE	40.0	39.805500	-89.652778
249	KAG286	150-174, 450-470	LIFESTAR AMBULANCE SERVICE INC	145.0	38.538111	-89.129806
250	KWR327	150-174	LITCHFIELD COMMUNITY UNIT SCHOOL DISTRICT 12	32.0	39.184778	-89.648694
251	KCN968	150-174, 450-470	LITCHFIELD, CITY OF	56.0	39.172278	-89.672306
252	KCN968	150-174	LITCHFIELD, CITY OF	40.0	39.177833	-89.650639
253	WPEQ270	150-174	LITCHFIELD, CITY OF	56.0	39.172278	-89.672306
254	WRJQ344	150-174	Litchfield, City of	40.0	39.189889	-89.662139
255	WRJQ344	150-174	Litchfield, City of	40.0	39.175806	-89.653972
256	WRJQ344	150-174	Litchfield, City of	40.0	39.073556	-89.623778
257	WRJQ344	150-174	Litchfield, City of	40.0	39.198139	-89.614583
258	WQNC605	150-174	LITCHFIELD, CITY OF FIRE DEPARTMENT	32.0	39.195889	-89.618139
259	WRKI263	150-174	LOAMI FIRE PROTECTION DISTRICT	40.0	39.674833	-89.847000
260	WNWZ925	150-174	LONGMEYER FARMS	121.0	39.267556	-90.201500
261	WQNT455	450-470	M & M SERVICE COMPANY	32.0	39.206972	-89.403917
262	WQFG754	150-174	MABAS DIVISION 48	40.0	39.779417	-89.609944
263	WPFS699	150-174, 450-470	MACOUPIN, COUNTY OF	40.0	39.312222	-89.876389
264	WPXT232	150-174	MACOUPIN, COUNTY OF	40.0	39.312222	-89.876389
265	WPZR684	150-174	MACOUPIN, COUNTY OF	40.0	39.312222	-89.876389
266	WQJV865	150-174	MACOUPIN, COUNTY OF	40.0	39.312222	-89.876389

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267	WRYS702	450-470	MACS FIRE & SAFETY INC	80.0	39.173611	-89.650556
268	WNJX684	450-470	MADISON COMMUNICATIONS INC	56.0	39.027000	-89.793417
269	WZZ927	800/900	MADISON COUNTY METRO EAST TRANSIT DISTRI	113.0	38.766444	-90.003444
270	WQVW622	800/900	Madison County Metro East Transit District	113.0	38.949083	-90.196528
271	KCX387	150-174	MADISON, COUNTY OF	161.0	38.811167	-89.958444
272	KSB221	25-50, 150-174	MADISON, COUNTY OF	161.0	38.811167	-89.958444
273	WPHZ794	450-470	MATERIAL SERVICE CORPORATION	80.0	39.333389	-89.291750
274	WREK278	800/900	MEB 2021 Irrevocable Trust Agreement dated October 15, 2021	50.0	39.769167	-89.625833
275	WQIU700	150-174	MEDICS FIRST INC.	40.0	39.798611	-89.655000
276	WQLB293	150-174	MEDICS FIRST, INC.	25.0	39.477500	-89.771389
277	WQLB293	150-174	MEDICS FIRST, INC.	40.0	39.805056	-89.645944
278	WRKC724	150-174	MEGGINSON MIDWEST INCORPORATED	16.0	39.523917	-89.581028
279	WQTN966	150-174	Megginson, John	32.0	39.618028	-89.814167
280	WQUK996	450-470	MEINERS, TERRY	32.0	39.327222	-89.362778
281	WQZN561	450-470	MEMORIAL HEALTH SYSTEMS	32.0	39.785028	-89.714583
282	WQZN561	450-470	MEMORIAL HEALTH SYSTEMS	32.0	39.556028	-89.293417
283	WQB723	150-174	MENARD, COUNTY OF	80.0	40.023944	-89.844000
284	WPQA441	450-470	MID ILLINOIS CONCRETE INC	32.0	39.157500	-89.482500
285	WPYY628	450-470	MILLER COMMUNICATIONS, INC.	40.2	39.452278	-89.286194
286	WPYY718	450-470	MILLER COMMUNICATIONS, INC.	32.0	39.552000	-89.285361
287	WQUP554	150-174	MJ FARMS INC.	32.0	39.478556	-89.959028
288	WQWJ586	450-470	MJ KELLNER FOOD SERVICE	32.0	39.749611	-89.758528
289	KCZ366	450-470	MJM ELECTRIC COOPERATIVE	32.0	39.263333	-89.896944
290	KCZ366	450-470	MJM ELECTRIC COOPERATIVE	32.0	39.292556	-89.270111
291	WRMC646	150-174	Montgomery County 911	40.0	39.162139	-89.494028

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
292	WQEM374	150-174	MONTGOMERY COUNTY ETSB 911	32.0	39.162250	-89.493972
293	WPIG428	150-174	MONTGOMERY, COUNTY OF	64.4	39.169778	-89.489250
294	WQER787	150-174	MORGAN COUNTY ETSB	40.0	39.621028	-90.048111
295	WQFN726	150-174	MORGAN COUNTY ETSB	40.0	39.592444	-89.952917
296	WPGZ446	450-470	MORRISONVILLE FARMERS CO OP	32.0	39.417556	-89.455361
297	WQDE366	150-174	MORRISONVILLE POLICE DEPARTMENT	16.0	39.420056	-89.466250
298	WQEU325	150-174	MORRISONVILLE-PALMER FIRE PROTECTION DISTRICT	32.0	39.420000	-89.456667
299	WRDT652	150-174	MOUNT AUBURN FIRE PROTECTION DISTRICT	40.0	39.762250	-89.266806
300	KNNM523	150-174	MOUNT OLIVE COMMUNITY UNIT SCHOOL DISTRICT	40.0	39.072278	-89.735083
301	WRAH807	150-174	MOUNT OLIVE COMMUNITY UNIT SCHOOL DISTRICT	40.0	39.071278	-89.737917
302	WPEM829	150-174	MT. OLIVE, CITY OF	40.0	39.066111	-89.728528
303	WPEM829	150-174	MT. OLIVE, CITY OF	40.0	39.073611	-89.726667
304	BLP00711	800/900	MULTIMEDIA KSDK, LLC	161.0	38.626444	-90.196778
305	WQTU349	450-470	NATION FARMS	32.0	39.510667	-89.477889
306	WPHN481	150-174	Niemeyer, Kirk	90.0	39.018389	-88.825333
307	WRNP990	450-470	Nokomis Quarry Company	32.0	39.346722	-89.289250
308	WNYW856	150-174	NOKOMIS, CITY OF	56.0	39.300333	-89.286472
309	KNFX267	150-174	Norfolk Southern Railway Company	40.0	39.742417	-89.306333
310	KNFX275	150-174	Norfolk Southern Railway Company	40.0	39.378611	-89.364528
311	KNFX279	150-174	Norfolk Southern Railway Company	40.0	39.131667	-89.622222
312	KZZ985	150-174	Norfolk Southern Railway Company	40.0	39.788500	-89.642667
313	KZZ985	150-174	Norfolk Southern Railway Company	40.0	39.791000	-89.642667
314	WPGK420	150-174	Norfolk Southern Railway Company	40.0	39.800056	-89.645944
315	WQBA720	150-174	Norfolk Southern Railway Company	16.0	39.348889	-89.538889
316	WQBA720	150-174	Norfolk Southern Railway Company	16.0	39.386694	-89.493306

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
317	WQBA720	150-174	Norfolk Southern Railway Company	16.0	39.392417	-89.486444
318	WQBA720	150-174	Norfolk Southern Railway Company	16.0	39.490167	-89.368278
319	WQBA720	150-174	Norfolk Southern Railway Company	16.0	39.498611	-89.358056
320	WQNJ625	150-174	Norfolk Southern Railway Company	8.0	39.334167	-89.556389
321	WQOG332	150-174	Norfolk Southern Railway Company	8.0	39.386389	-89.493611
322	WRCM638	150-174	NORFOLK SOUTHERN RAILWAY COMPANY	40.0	39.560444	-89.273972
323	WRCM638	150-174	NORFOLK SOUTHERN RAILWAY COMPANY	40.0	39.652722	-89.177139
324	WREI504	450-470	NORRIS, TRENT	32.0	39.488333	-89.354722
325	WQMC232	150-174	NORTH MAC COMMUNITY UNIT SCHOOL DISTRICT #34	25.0	39.500611	-89.766750
326	WQMC232	150-174	NORTH MAC COMMUNITY UNIT SCHOOL DISTRICT #34	40.0	39.500611	-89.766750
327	WPMD636	450-470	NORTHWESTERN AREA AMBULANCE & RESCUE SVC	32.0	39.434500	-89.995944
328	WROX311	150-174	NORTHWESTERN FIRE PROTECTION DISTRICT	32.0	39.440639	-89.963306
329	WPQG502	150-174	NORTON, ROBERT	40.0	39.599222	-89.951222
330	WNBM516	450-470	NUTRIEN AG SOLUTIONS INC	48.0	39.292278	-89.299528
331	WNFX485	450-470	NUTRIEN AG SOLUTIONS INC	48.0	39.352833	-90.020944
332	WQVP762	150-174	OAK RIDGE LUMBER, LLC	120.0	39.483222	-90.371500
333	WNJI823	450-470	OKAWVILLE FARMERS ELEVATOR CO	113.0	38.423111	-89.553139
334	KUQ499	150-174	Otter Lake Water Commission	40.0	39.433944	-89.887611
335	WNGJ407	150-174	OWANECO FIRE PROTECTION DISTRICT	121.0	39.482278	-89.193139
336	WQWP649	450-470	PANA LIMESTONE QUARRY	32.0	39.396944	-89.236111
337	WRCH611	150-174	PANHANDLE COMMUNITY UNIT SCHOOL DIST 2	40.0	39.326722	-89.571306
338	WQRD480	150-174	PANHANDLE TOWNSHIPS	15.0	39.379167	-89.650000
339	WQRD480	150-174	PANHANDLE TOWNSHIPS	15.0	39.303889	-89.640833
340	WQRD480	150-174	PANHANDLE TOWNSHIPS	15.0	39.318889	-89.574167
341	WQRD480	150-174	PANHANDLE TOWNSHIPS	15.0	39.353611	-89.535278

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342	WRJT858	450-470	PAWNEE ASSEMBLY OF GOD CHURCH	16.0	39.595111	-89.583389
343	WREL955	150-174	PAWNEE CUSD #11	16.0	39.594028	-89.576556
344	WNHU816	150-174	PAWNEE FIRE PROTECTION DISTRICT	40.0	39.592000	-89.582583
345	KNCN973	150-174	Pawnee Grain Company Incorporated	40.0	39.523500	-89.581556
346	KMF525	450-470	PETCO PETROLEUM CORPORATION	80.0	39.090889	-88.876444
347	WNSF335	800/900	Phillips 66 Communications Inc.	113.0	38.839500	-90.074000
348	WNVG425	450-470	Phillips 66 Communications Inc.	121.0	38.901167	-90.170389
349	WQYI308	800/900	PHILLIPS 66 COMMUNICATIONS INC.	113.0	38.839667	-90.074194
350	WQDF251	150-174, 450-470	PITTSBURGH PIPE & SUPPLY CORPORATION	32.0	39.158333	-89.662778
351	WPGC873	450-470	POLO TRUCKING INC	96.0	39.070333	-89.903167
352	WPRB469	450-470	POPE FARMS INC	32.0	39.318944	-89.574806
353	WQEV221	450-470	PORTILLO'S HOT DOGS LLC	80.0	39.752417	-89.707083
354	WRDP912	150-174	PRAIRIELAND AMBULANCE	32.0	39.497861	-89.768306
355	WQEQ701	150-174	PRATER, DALE	40.0	39.190833	-89.261111
356	KNJB936	150-174	PRATER, ROY	72.0	39.213111	-88.887278
357	WPLT429	450-470	PRO ALARM, LLC	120.0	38.787556	-89.777861
358	WQZW817	450-470	R & S DOWELL FARMS	32.0	39.435278	-89.815000
359	KTY953	150-174	RAYMOND COMMUNITY FIRE PROTECTION DISTRICT	13.0	39.319500	-89.575083
360	WNFE726	150-174	RAYMOND, VILLAGE OF	40.0	39.257833	-89.575639
361	WQWT363	150-174	RED E MIX, LLC	40.0	39.169167	-89.659722
362	WRVX679	450-470	Regional Office of Education #3	40.0	39.180528	-89.668667
363	KNEC555	150-174	Reid, Robert E	80.0	38.885056	-90.080944
364	WRUX657	150-174	Rentschler Farms	80.0	39.823417	-89.495417
365	WRTY582	150-174	RF FARMS	40.0	39.336889	-89.995222
366	WQOZ465	450-470	RIECHMANN BROS LLC	32.0	39.451944	-89.159000

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367	WQRZ750	150-174	RIEMANN FARMS INC	40.0	39.335722	-89.611222
368	KNCK634	150-174	RIVERTON AREA FIRE PROTECTION DISTRICT	40.0	39.846722	-89.543167
369	WREK282	800/900	ROBERT E. OKELEY II REVOCABLE TRUST	50.0	39.769167	-89.625833
370	WQOY709	150-174	ROCHESTER FIRE PROTECTION DISTRICT	40.0	39.748694	-89.519444
371	WRDM861	150-174	Rochester FPD	40.0	39.755528	-89.531389
372	KEC861	150-174	ROULAND TRUCKING	121.0	39.733389	-90.200111
373	WQRZ583	150-174	Rovey Family Farms	4.0	39.472361	-89.679472
374	KB96944	450-470	SAGA COMMUNICATIONS OF ILLINOIS, LLC	80.0	39.801722	-89.643722
375	KC27782	450-470	SAGA COMMUNICATIONS OF ILLINOIS, LLC	80.0	39.801722	-89.643722
376	WPMU226	150-174	SAINT FRANCIS HOSPITAL	40.0	39.175056	-89.641750
377	KTI589	150-174	SAINT JOHNS HOSPITAL OF THE HOSPITAL SISTERS	40.0	39.805056	-89.645944
378	KSC460	25-50, 150-174	SANGAMON, COUNTY OF	40.2	39.799778	-89.643444
379	KSI628	150-174	SANGAMON, COUNTY OF	40.0	39.838361	-89.650278
380	KSI628	150-174	SANGAMON, COUNTY OF	40.0	39.801139	-89.647222
381	KSI628	150-174	SANGAMON, COUNTY OF	40.0	39.718111	-89.638167
382	KSI628	150-174	SANGAMON, COUNTY OF	40.0	39.779417	-89.609944
383	WPCG473	150-174	SANGAMON, COUNTY OF	40.0	39.718111	-89.638167
384	WRNM204	450-470	SCHWEIZER FARMS INC.	32.0	39.328611	-89.402500
385	WRFC382	150-174	SCOTT LANDREY FARMS	32.0	39.490250	-89.750194
386	WQBB433	150-174	Search And Rescue Mutual Aid (SARMA)	40.0	39.292833	-89.876722
387	WRMF506	800/900	SEQUOIA HOLDINGS, LLC	80.0	39.806556	-88.968583
388	WQQA513	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.573333	-89.878333
389	WQQA513	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.566944	-89.641389
390	WQQA513	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.451944	-89.159167
391	WQQA521	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.315278	-89.875278

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392	WQQA521	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.323056	-89.567222
393	WQQA524	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.443611	-89.776667
394	WQTV990	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.170833	-89.660556
395	WQVJ277	450-470	SLOAN IMPLEMENT COMPANY	32.0	39.609833	-89.343333
396	WREK807	800/900	SOMERS, CANDACE	50.0	39.769167	-89.625833
397	WQUM968	150-174	SOUTH FORK SCHOOL DISTRICT 14	32.0	39.589750	-89.414583
398	WRFC777	450-470	SOUTHERN PIKE PUMPING, LLC	113.0	39.443472	-90.763250
399	WPHW803	150-174	SOUTHWESTERN COMMUNITY UNIT SCHOOL DISTRICT 9	80.0	39.122556	-90.144556
400	WQUR555	150-174	SPEISER FARM INC.	24.0	39.245000	-89.374722
401	WQWS645	150-174	SPINNER, GERRY	40.0	39.135694	-89.403889
402	KSF638	150-174, 450-470	SPRINGFIELD, CITY OF	72.0	39.777000	-89.641778
403	KZZ787	450-470	SPRINGFIELD, CITY OF	32.0	39.800611	-89.645667
404	WNRC743	450-470	SPRINGFIELD, CITY OF	72.0	39.777000	-89.641778
405	WPES905	800/900	SPRINGFIELD, CITY OF	113.0	39.800611	-89.645667
406	WQKW733	800/900	SPRINGFIELD, CITY OF	32.0	39.799417	-89.645278
407	KNNU332	450-470	ST JOHNS HOSPITAL	32.0	39.757306	-89.710917
408	WPGW537	150-174	ST ROSE ELEMENTARY SCHOOL DISTRICT NO 14-15	121.0	38.684500	-89.554806
409	WQAW308	150-174	ST. FRANCIS HOSPITAL	40.0	39.179750	-89.640361
410	WPEH410	150-174	STAUNTON, CITY OF	48.0	39.016722	-89.783417
411	WPJP671	450-470	STEIN INC	121.0	38.704222	-90.125111
412	WPDX295	450-470	STEPHENS, DANNY R DBA BAR S INC	121.0	39.612556	-89.341750
413	WREK921	450-470	STRAWN INC.	32.0	39.663889	-89.590556
414	WNBG832	450-470	SUNRISE AG SERVICES INC	80.0	39.915889	-90.206500
415	WRPE331	450-470	SUNSHINE BEHAVIORAL HEALTH DBA LINCOLN RECOVERY	32.0	39.281528	-89.646611

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416	WRYX540	450-470	SUSLEE, JASON	32.0	39.270556	-89.295889
417	WQTU491	150-174	T & W FARMS LLC	32.0	39.478194	-89.982639
418	KSG554	150-174	Talley Broadcasting Corporation	80.0	39.172833	-89.570639
419	WQWZ467	800/900	Tate & Lyle Ingredients Americas LLC	113.0	39.841139	-88.924528
420	WQQH763	450-470	Taylorville Memorial Hospital	32.0	39.543111	-89.286194
421	KVJ478	150-174	TAYLORVILLE, CITY OF	32.0	39.547556	-89.292583
422	WQDI539	150-174	TAYLORVILLE, CITY OF	32.0	39.547278	-89.298694
423	WQMI805	150-174	Texas Eastern Communications, LLC	80.0	38.827611	-90.081000
424	WQMI805	150-174	Texas Eastern Communications, LLC	80.0	38.784889	-89.066500
425	WQMI805	150-174	Texas Eastern Communications, LLC	80.0	39.460111	-89.024000
426	WNJX926	800/900	THE BOEING COMPANY	113.0	38.775611	-90.389833
427	WNJX926	800/900	THE BOEING COMPANY	113.0	38.750556	-90.346972
428	WRCR459	800/900	THE BOEING COMPANY	113.0	38.756556	-90.348722
429	KNGS417	150-174	The Curators of the University of Missouri	241.0	38.938361	-92.328250
430	WREK276	800/900	THE DAVID R. BETHUNE AND SYLVIA B. BETHUNE FAMILY TRUST DATED APRIL 21, 1997	50.0	39.769167	-89.625833
431	WQNG808	450-470	The Mennel Milling Company of Illinois	40.0	39.072056	-89.723861
432	WREJ639	800/900	THE THEODORA L. RINK, SPECIAL ACCOUNT, REVOCABLE LIVING TRUST	50.0	39.769167	-89.625833
433	WPGU772	150-174	TOTAL GRAIN MARKETING LLC	80.0	39.020056	-88.833389
434	WPHE866	450-470	TOWER PROPERTIES COMPANY	121.0	38.647556	-90.337056
435	WNCL901	150-174	UNION PACIFIC RAILROAD COMPANY	30.0	39.137222	-89.487500
436	WNAK635	150-174	UNIT 10 SCHOOLS	40.0	39.588361	-89.743139
437	WNAK635	150-174	UNIT 10 SCHOOLS	8.0	39.565083	-89.652528
438	WQA556	800/900	UNITED COMMUNICATIONS CO	56.0	38.991167	-89.790639
439	WPUC514	450-470	UNIVERSITY OF ILLINOIS AT SPRINGFIELD	32.0	39.729639	-89.612722

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440	KB82881	216-220	UNIVERSITY OF MEMPHIS	640.0	36.000056	-86.000000
441	WPOZ759	150-174	Village of Chatham	40.0	39.675056	-89.708722
442	WQTP231	150-174	Village of Farmersville Illinois	32.0	39.441667	-89.650278
443	KQS784	150-174	VIRDEN FIRE PROTECTION DISTRICT	24.0	39.503389	-89.768417
444	KQS784	150-174	VIRDEN FIRE PROTECTION DISTRICT	48.0	39.500889	-89.767028
445	WNPD702	150-174	VIRDEN, CITY OF	16.0	39.499500	-89.768694
446	WPQB848	150-174	VIRDEN, CITY OF	20.0	39.500889	-89.767028
447	KGT690	150-174	Vistra Corporate Services Company	18.0	39.591389	-89.499722
448	KGT690	150-174	Vistra Corporate Services Company	18.0	39.591667	-89.499167
449	KGT690	150-174	Vistra Corporate Services Company	32.0	39.592556	-89.496750
450	KGT690	150-174	Vistra Corporate Services Company	18.0	39.590556	-89.496667
451	WQLG603	150-174	VOSE, MITCHELL E	100.0	39.679722	-90.348333
452	WQSL438	450-470	WALDECK, MARVIN	32.0	39.422778	-89.622222
453	WPFS310	150-174	WALTER, DANNY E	48.0	39.443389	-89.398417
454	BLP00730	150-174, 470-512	WAND(TV) PARTNERSHIP	80.0	39.824472	-88.967556
455	WNBZ633	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.949083	-90.196528
456	WNBZ633	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.547556	-89.917611
457	WNBZ633	800/900	WARNER COMMUNICATIONS CORP.	113.0	39.035222	-89.696306
458	WNBZ633	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.656167	-89.680917
459	WNIE897	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.650583	-90.335389
460	WPEU206	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.674389	-90.406778
461	WPEU206	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.650611	-90.334833
462	WPFH670	800/900	WARNER COMMUNICATIONS CORP.	121.0	38.683111	-90.000667
463	WPFH674	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.423361	-89.552083
464	WPGV945	450-470	WARNER COMMUNICATIONS CORP.	121.0	38.759222	-90.638444

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465	WPIG846	450-470	WARNER COMMUNICATIONS CORP.	121.0	38.709778	-90.003722
466	WPIM678	800/900	WARNER COMMUNICATIONS CORP.	113.0	39.232556	-89.520083
467	WPLS624	450-470	WARNER COMMUNICATIONS CORP.	80.0	39.012833	-89.780083
468	WQAW674	800/900	WARNER COMMUNICATIONS CORP.	113.0	39.097556	-90.365944
469	WQYV280	800/900	WARNER COMMUNICATIONS CORP.	80.0	38.949083	-90.196528
470	WQYV280	800/900	WARNER COMMUNICATIONS CORP.	113.0	38.766444	-90.003444
471	WREP713	800/900	WARNER COMMUNICATIONS CORP.	113.0	39.035222	-89.696306
472	WSS659	450-470	Warner Communications Corporation	121.0	38.647556	-90.337056
473	WNBZ963	25-50	WEIDNER, GERALD W	56.0	39.078667	-89.950944
474	WQON237	450-470	WEITEKAMP, LYNN	32.0	39.421111	-89.600833
475	WPSG455	150-174	WEMPEN FARMS LTD	32.0	39.329778	-89.608139
476	WQVN253	150-174	WHALEN TRUCKING INC	40.0	39.589500	-89.951778
477	KFE380	450-470	Whiteside, Ron	80.0	38.895333	-89.408417
478	WNGV585	450-470	WHITESIDE, RON	80.0	38.951444	-89.569528
479	WPES869	450-470	Whiteside, Ron	121.0	38.895333	-89.408417
480	WPFG529	450-470	Whiteside, Ron	104.0	39.160889	-89.491472
481	WPIC224	450-470	Whiteside, Ron	80.0	38.951444	-89.569528
482	WPIC225	450-470	Whiteside, Ron	80.0	38.895333	-89.408417
483	WPIC226	450-470	Whiteside, Ron	80.0	39.160889	-89.491472
484	WPKA615	450-470	Whiteside, Ron	80.0	38.951444	-89.569528
485	WPKA617	450-470	Whiteside, Ron	80.0	38.895333	-89.408417
486	WPKA626	450-470	Whiteside, Ron	80.0	38.951444	-89.569528
487	WQED496	450-470	WHITESIDE, RON	32.0	39.184778	-89.658417
488	BLP01105	150-174	WICS Licensee, LLC	64.0	39.794500	-89.616500
489	WRQA208	450-470	WIELAND ROLLED PRODUCTS NORTH AMERICA LLC	80.0	38.868333	-90.118333

ID	Call Sign	Frequency Band (MHz)	Licensee	Mobile Area Radius (km)	Latitude (NAD83)	Longitude (NAD83)
490	WPYX493	450-470	WIESE PLANNING & ENGINEERING, INC.	121.0	38.775194	-90.513389
491	WNAA702	150-174	WILLIAMS, JAMES F	402.0	38.450028	-92.983528
492	KNIB891	450-470	WILLIAMSVILLE COMMUNITY UNIT SCHOOL	72.0	39.781722	-89.575083
493	WPUR258	800/900	WirelessUSA Partners LLC	113.0	38.647500	-90.336944
494	WPUR258	800/900	WirelessUSA Partners LLC	100.0	38.630000	-90.190556
495	WPUR258	800/900	WirelessUSA Partners LLC	113.0	38.630000	-90.190556
496	WPUR258	800/900	WirelessUSA Partners LLC	113.0	38.592139	-90.033972
497	WPZV914	800/900	WirelessUSA Partners LLC	112.0	39.800278	-89.645556
498	WQYR805	800/900	WIRELESSUSA PARTNERS, LLC	113.0	39.800278	-89.645556
499	WRAI688	800/900	WIRELESSUSA PARTNERS, LLC	113.0	38.592139	-90.033972
500	KD23229	450-470	Wirelessusa, Inc	121.0	38.647556	-90.337056
501	WQON809	150-174	WOOD FAMILY PARTNERSHIP	40.0	39.326250	-89.567083
502	WPEX809	150-174	WOODSIDE, TOWNSHIP OF	40.0	39.768111	-89.656222
503	WNYV287	450-470	YOUNG, DEON	80.0	39.184500	-89.374528
504	WNGC296	800/900	Young, Joseph	113.0	39.827222	-89.595556
505	WNWE208	150-174	YOUNG, RONALD W	40.0	39.156722	-89.880111

Table A: Mobile Licenses Intersecting Project Area

Wind Power GeoPlanner™

Microwave Study

Virden Wind

Prepared on Behalf of
UKA North America, LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services. This report focuses on the potential impact of wind turbines on licensed, proposed and applied non-federal government microwave systems.

2. Project Overview

Project Information

Name: Virden Wind
County: Montgomery
State: Illinois

Number of Turbines: 18
Blade Diameter: 163 meters
Hub Height: 118 meters

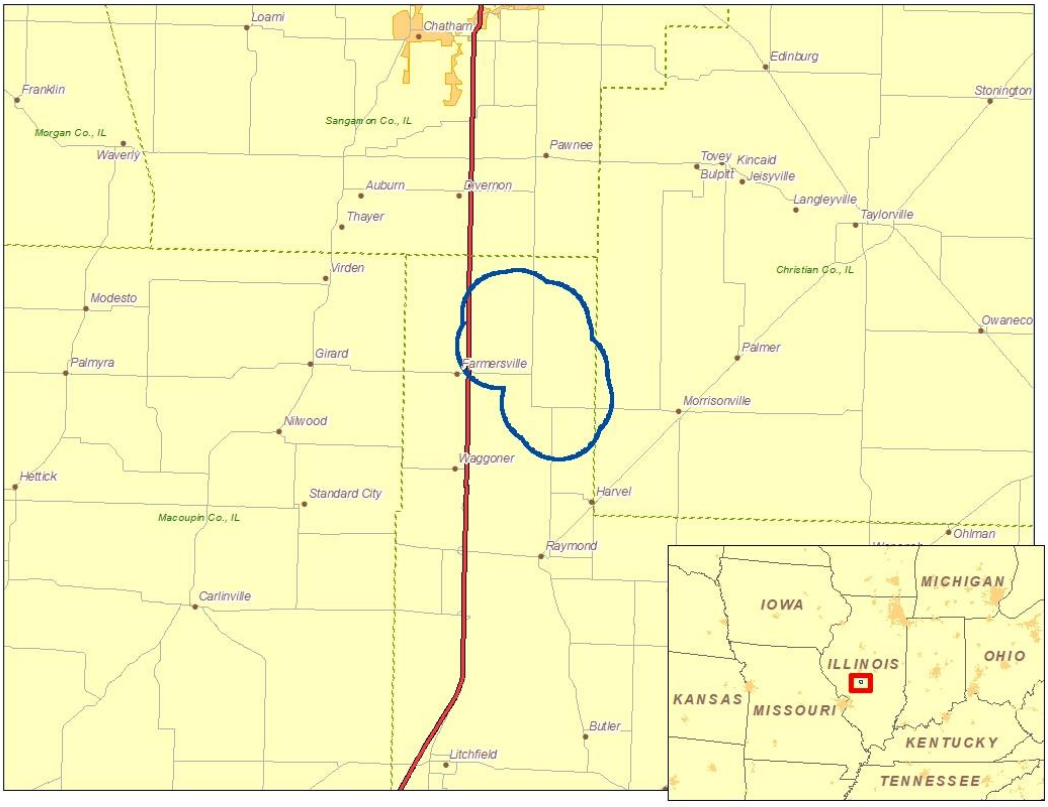


Figure 1: Area of Interest

3. Two-Dimensional Fresnel Zone Analysis

Methodology

Our obstruction analysis was performed using Comsearch's proprietary microwave database, which contains all non-government licensed, proposed and applied paths from 0.9 - 23 GHz[1]. First, we determined all microwave paths that intersect the area of interest[2] and listed them in Table 1. These paths and the area of interest that encompasses the planned turbine locations are shown in Figure 2.

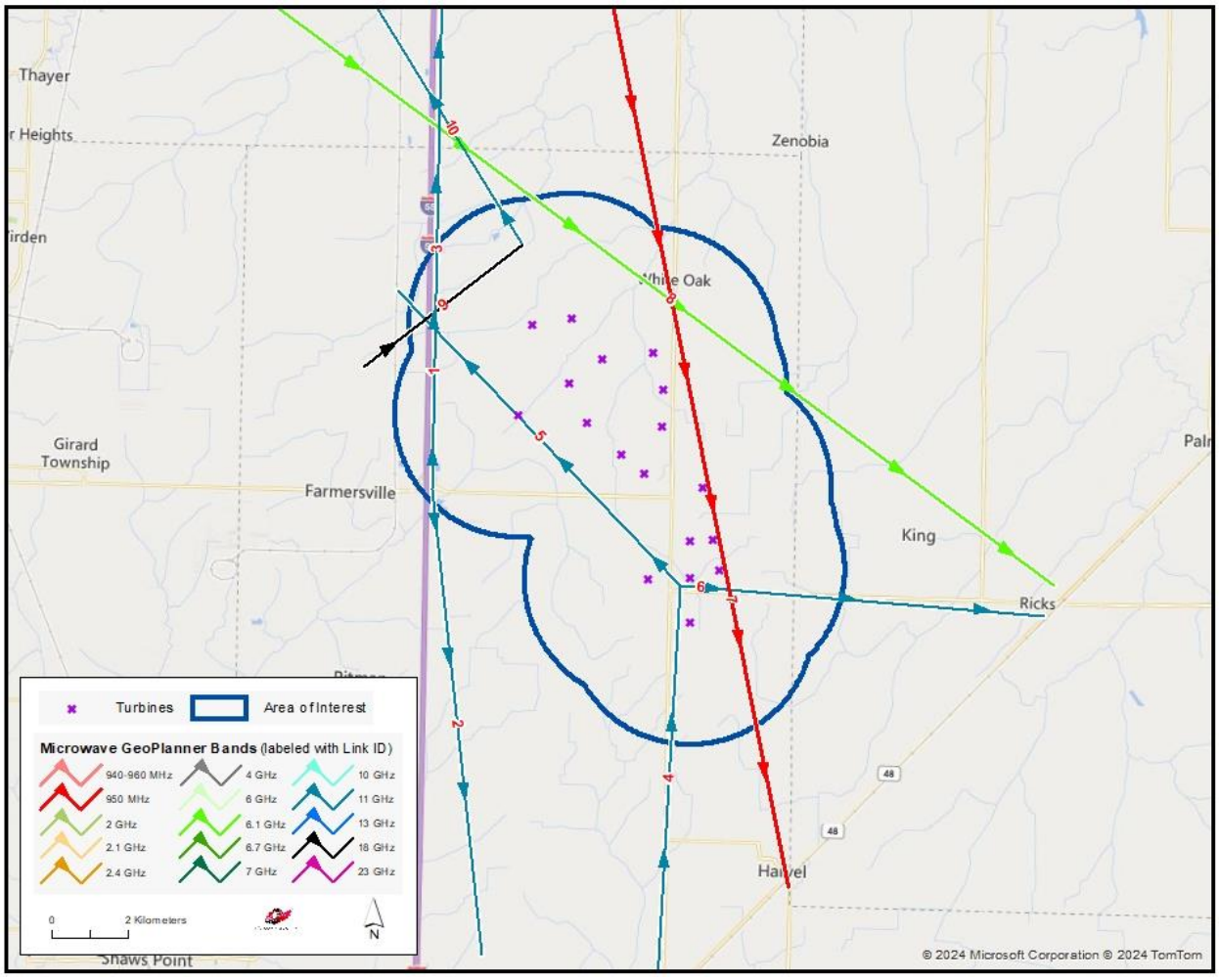


Figure 2: Microwave Paths that Intersect the Area of Interest

[1] Please note that this analysis does not include unlicensed microwave paths or federal government paths that are not registered with the FCC.

[2] We use FCC-licensed coordinates to determine which paths intersect the area of interest. It is possible that as-built coordinates may differ slightly from those on the FCC license.

ID	Status	Callsign 1	Callsign 2	Band	Path Length (km)	Licensee
1	Licensed	WQVR492	WQVR493	11 GHz	18.61	T-Mobile License LLC
2	Licensed	WQVR492	WRUU268	11 GHz	12.17	T-Mobile License LLC
3	Licensed	WQVR492	WQVR493	11 GHz	18.61	T-Mobile License LLC
4	Licensed	WQWX542	WQWX543	11 GHz	11.49	First National Bank of Raymond
5	Licensed	WQWX543	WQXP322	11 GHz	10.64	First National Bank of Raymond
6	Licensed	WQWX543	WQXP318	11 GHz	9.51	First National Bank of Raymond
7	Licensed	WQXD220	RXONLY	950 MHz	46.34	Neuhoff Media Springfield, LLC
8	Licensed	WRWC327	WRWC328	6.1 GHz	30.63	T-Mobile License LLC
9	Licensed	WRXM664	WRXM676	18 GHz	5.20	AMG Technology Investment Group LLC
10	Licensed	WRXM676	WRXM705	11 GHz	13.28	AMG Technology Investment Group LLC

Table 1: Summary of Microwave Paths that Intersect the Area of Interest

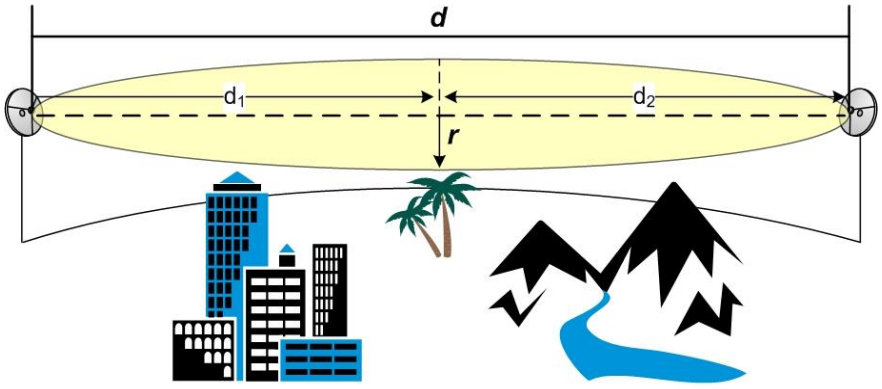
(See enclosed mw_geopl.xlsx for more information and GP_dict_matrix_description.xls for detailed field descriptions)

Verification of Coordinate Accuracy

It is possible that as-built coordinates may differ from those on the FCC license. For this project, four paths cross within close proximity of the proposed turbines and the tower locations for these paths will have a critical impact on the result. Therefore, we verified these locations using aerial photography and they were found to be accurate.

Next, we calculated a Fresnel Zone for each path based on the following formula:

$$r \cong 17.3\sqrt{\frac{n}{F_{GHz}}\left(\frac{d_1 d_2}{d_1 + d_2}\right)}$$



Where,

r	=	Fresnel Zone radius at a specific point in the microwave path, meters
n	=	Fresnel Zone number, 1
F_{GHz}	=	Frequency of microwave system, GHz
d_1	=	Distance from antenna 1 to a specific point in the microwave path, kilometers
d_2	=	Distance from antenna 2 to a specific point in the microwave path, kilometers

In general, this is the area where the planned wind turbines should be avoided, if possible. Likewise, Comsearch recommends that an area directly in front of each microwave antenna should be avoided. This corresponds to the Consultation Zone which measures 1 kilometer along the main beam of the antenna and 24 ft (7.3 meters) wide. A depiction of the Fresnel Zones and Consultation Zones for each microwave path listed can be found in Figures 3 and 4, and is also included in the enclosed shapefiles[3,4].

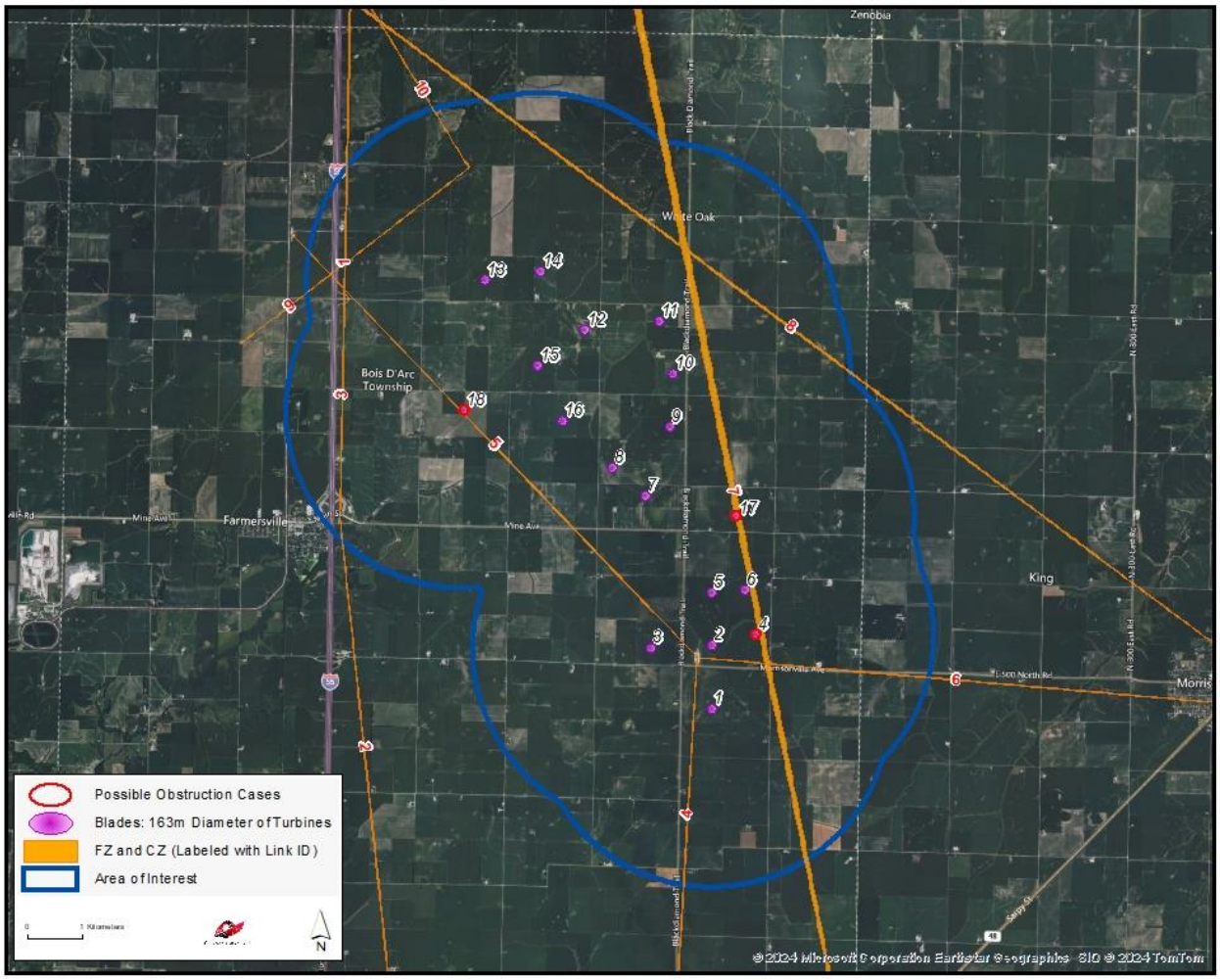


Figure 3: Fresnel Zones and Consultation Zones in the Area of Interest

[3] The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 16 projected coordinate system.

[4] Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

Discussion of Potential Two Dimensional Obstructions

Total Microwave Paths	Paths with Affected Fresnel Zones	Total Turbines	Turbines Intersecting the 2D Fresnel Zones
10	1	18	1

Table 2: Fresnel Zone Analysis Result

For this project, eighteen turbines were considered in the analysis, each with a blade diameter of 163 meters and turbine hub height of 118 meters. Of those turbines, one was found to intersect the Fresnel Zone of one microwave path. Figure 5 contains a detailed depiction of the potential obstruction scenario and Table 3 contains a summary of the affected turbine. A cross sectional analysis was performed in Section 4 to determine the diagonal clearance value for this case.

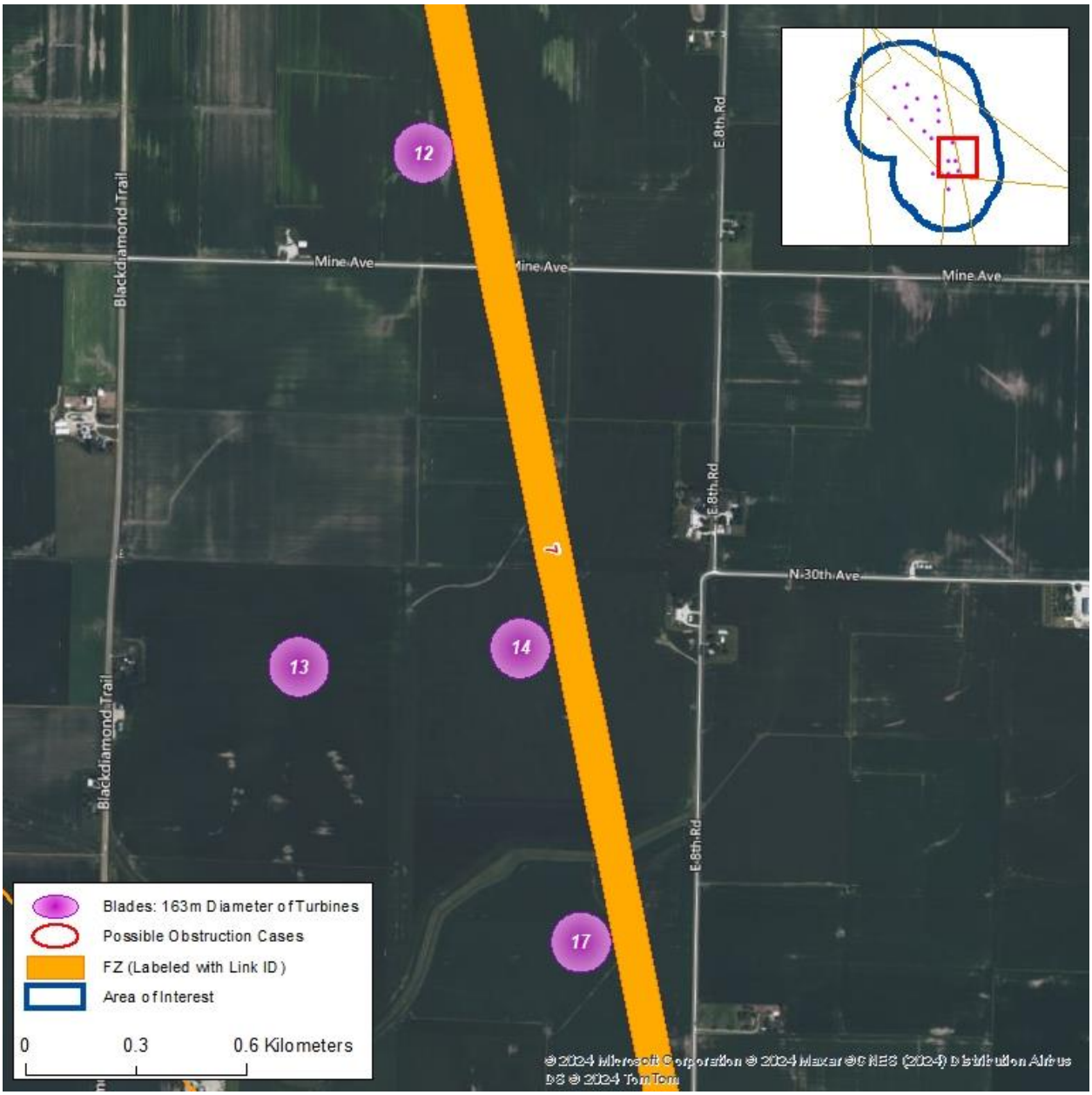


Figure 4: Turbines Close to the Fresnel Zones

Figure 5: Potential Obstruction Case Turbine 7

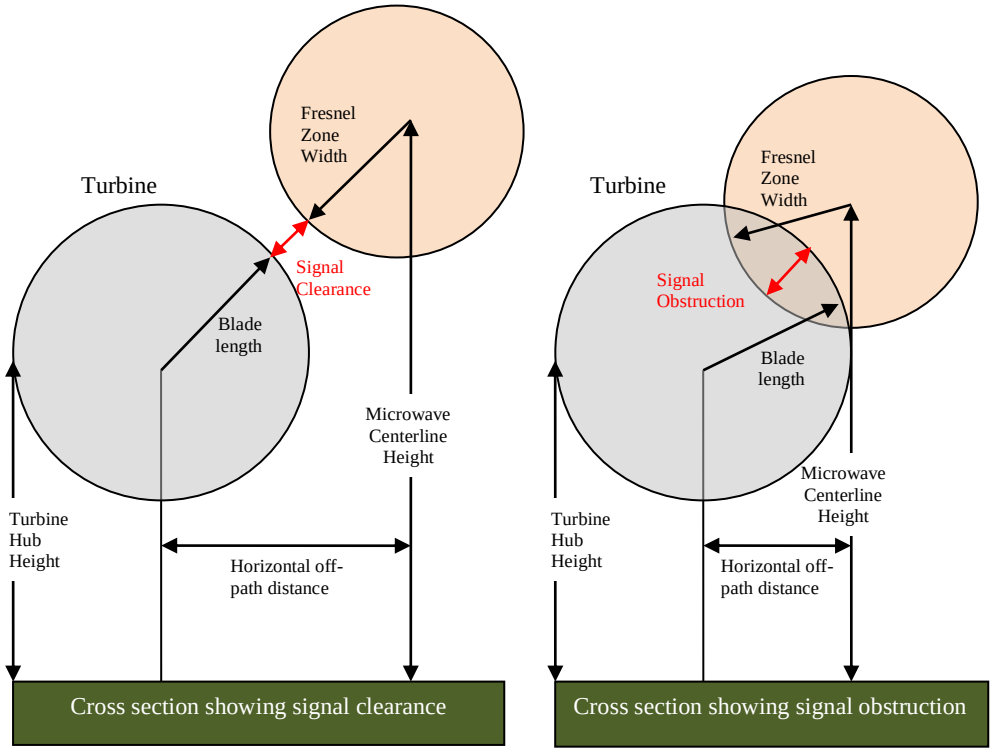
Turbine ID	Latitude (NAD83)	Longitude (NAD83)	Affected Microwave Path ID	Fresnel Zone Radius at Turbine Location (m)	Horizontal off-path Distance (m)	Distance along the path from site 1 (km)	Horizontal Clearance (m)
7	39.462445	-89.616939	5	8.33	53.70	4.50	-36.13

Table 3: Turbines that Intersect Fresnel Zones

4. Cross Sectional Analysis

Our Fresnel Zone analysis in the previous section identified one potential obstruction case that needs to be further examined from a cross sectional perspective. The case that will be analyzed in this section can be found in Table 3.

Our cross sectional analysis calculates the precise height and width of 100% of the first Fresnel Zone at the turbine location based on the antenna heights of the two link endpoints and the earth curvature bulge at the specific turbine location. The horizontal off-path distance was calculated in the previous section and the turbine hub height and blade length were provided by the client. The cross sectional analysis uses these values to calculate the clearance between the blades and the microwave Fresnel Zone as shown in the two diagrams below.



The results of the cross sectional calculations can be seen in Table 4. It shows positive clearance values indicating clearance of the Fresnel Zones.

Microwave Path ID	Fresnel Zone Radius at Turbine Location (m)	Microwave Centerline Height at Turbine Location (m)	Turbine ID	Hub Height (m)	Blade Length (m)	Cross Sectional Clearance (m)
5	8.33	29.73	7	118	81.5	13.49

Table 4: Cross Sectional Analysis Results

5. Conclusion

Our study identified ten microwave paths within the Virden Wind project area. The Fresnel Zones for these microwave paths were calculated and mapped. One turbine was found to intersect the two-dimensional Fresnel Zone of one microwave path and was cleared based on the cross sectional analysis which shows that the blade pass above the Fresnel Zone. Therefore no turbines were found to have potential obstructions with the microwave systems in the area.

6. Contact

For questions or information regarding the Microwave Study, please contact:

Contact person: David Meyer
Title: Senior Manager
Company: Comsearch
Address: 21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone: 703-726-5656
Fax: 703-726-5595
Email: David.Meyer@CommScope.com
Web site: www.comsearch.com

Appendix: Turbine Locations

ID	Latitude	Longitude
1	39.483744	-89.613397
2	39.485351	-89.601831
3	39.476111	-89.592188
4	39.477810	-89.576557
5	39.470040	-89.601842
6	39.469323	-89.573338
7	39.462445	-89.616939
8	39.461155	-89.596281
9	39.460759	-89.573604
10	39.453737	-89.585547
11	39.449391	-89.578414
12	39.446559	-89.560446
13	39.433947	-89.563903
14	39.434550	-89.556955
15	39.424663	-89.576340
16	39.425395	-89.563589
17	39.427420	-89.554782
18	39.415043	-89.563210

Wind Power GeoPlanner™

Mobile Phone Carrier Report

Virden Wind

Prepared on Behalf of
UKA North America, LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

Comsearch has developed and maintains comprehensive technical databases containing information on licensed mobile phone carriers across the US. Mobile phone carriers operate in multiple frequency bands and are often referred to as Advanced Wireless Service (AWS), Personal Communication Service (PCS), 700 MHz Band, Wireless Communications Service (WCS), and Cellular. They hold licenses on an area-wide basis which are typically comprised of several counties.

This report focuses on the potential impact of wind turbines on mobile phone operations in and around the project area.

2. Summary of Results

Methodology

Our mobile phone analysis was performed using Comsearch's proprietary carrier database, which is derived from a variety of sources including the Federal Communications Commission (FCC). Since mobile phone market boundaries differ from service to service, we disaggregated the carriers' licensed areas down to the county level. Then we compiled a list of all mobile phone carriers in the main counties that intersect the area of interest. The area of interest was defined by the client and encompasses the planned turbine locations. A depiction of the wind project area and counties appears below.

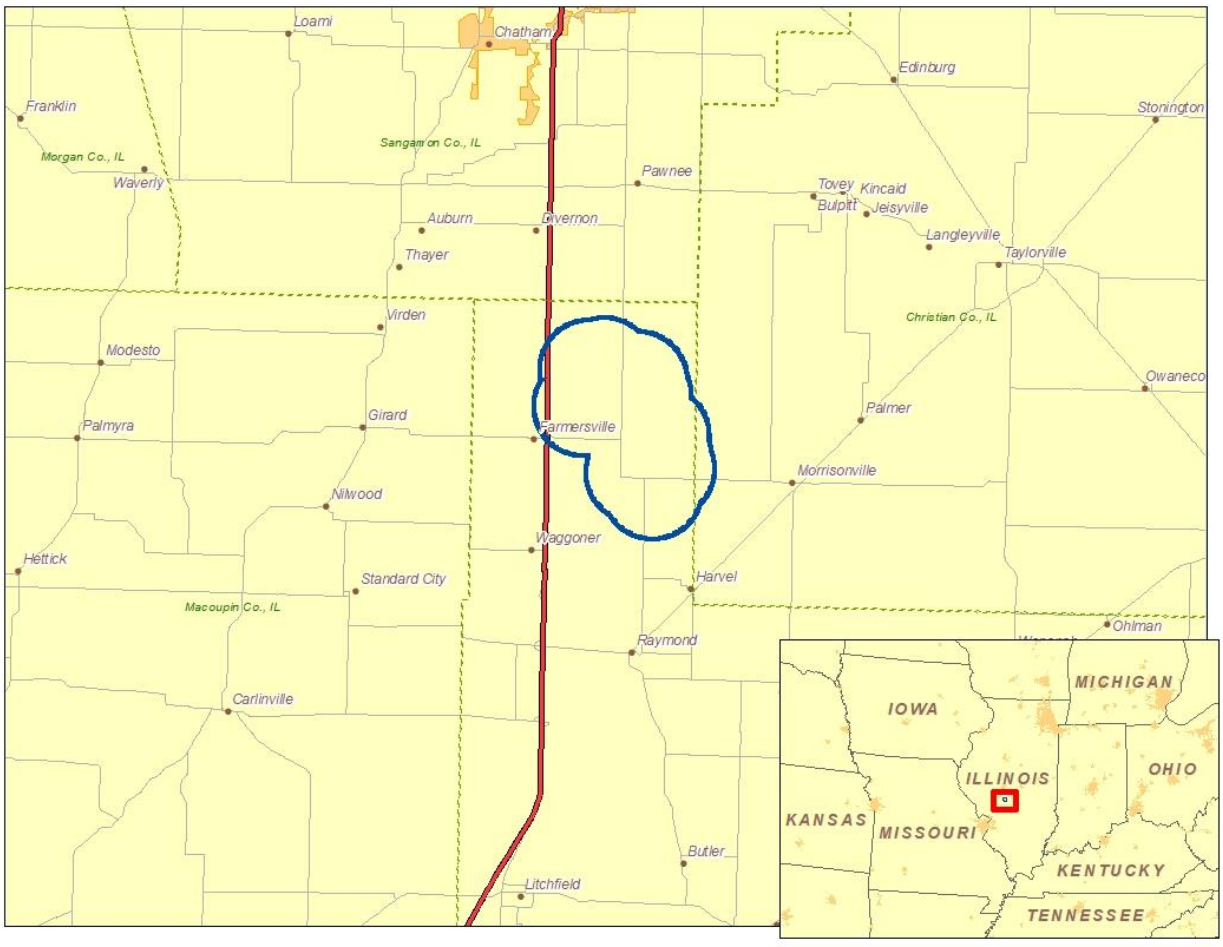


Figure 1: Counties that intersect the Area of Interest

Results
The Virden Wind Project is located in Montgomery County, IL. We have identified the type of service, channel block, market ID and FCC callsign for each carrier in the county of interest. A description of the various service types and geographic market areas is below with a summary table on the following page.

AWS
AWS licensees won their spectrum in an auction that started in August 2006. The licensees are authorized by 734 Cellular Market Areas (CMA) for Block A, 176 Economic Areas (BEA) for Blocks B and C, and 12 Regional Economic Area Groupings (REAG) for Blocks D, E and F. This spectrum at 1.7 and 2.1 GHz was allocated for mobile broadband and advanced wireless services. Partitioning and leases are permitted in the band.

Cellular
Licensees are authorized by Metropolitan and Rural Statistical Areas, also known as CMAs. Unserved areas can be covered by licensees other than the original A or B block licensee. To determine the most realistic coverage, we compiled the Cellular Geographic Service Areas (CGSA) from the 32 dBu contours defined by Part 22.911(a) of the FCC rules. Mobile services are provided at 800 MHz and partitioning and leases are permitted in the band.

PCS
There have been nine auctions for this band, with the last one being held in August 2008. Licensees are authorized by 51 Major Trading Areas (MTA) for Blocks A and B, 493 Basic Trading Areas (BTA) for Blocks C through F, and 176 Economic Areas (EA) for Block G. This band has been heavily partitioned and disaggregated both by counties and by smaller polygons within counties (known as undefined areas or partial counties). The 1.9 GHz PCS carriers provide mobile services and leases are permitted in the band.

700 MHz Band
Originally used for analog television broadcasting, this band consists of an upper and lower band, each having its own set of frequency blocks. There have been three auctions in this band with the last one (Auction 73) being held in 2008 and mobile phone carriers eventually winning licenses for Blocks A, B, and C of the Lower 700 MHz band and Block C of the Upper 700 MHz band. Licensees are authorized by 176 Economic Areas (EA) for Lower Block A, 734 Cellular Market Areas (CMA) for Lower Blocks B and C, and 12 Regional Economic Area Groupings (REAG) for Upper Block C. Partitioning and leases are permitted in the band.

WCS
Mobile services provided in the 2.3 GHz band occupy frequency blocks above and below the spectrum allocated for Satellite Digital Audio Radio Service (SDARS) from 2320 MHz to 2345 MHz. WCS licensees are authorized by 52 Major Economic Areas (MEA) for Blocks A and B and 12 Regional Economic Area Groupings (REAG) for Blocks C and D. Partitioning and leases are permitted in the band.

Service[1]	Mobile Phone Carrier	Channel Block	County	ST	Market ID	Callsign
700 MHz	US Cellular	Lower A	Montgomery	IL	BEA097	WQLE668
700 MHz	AT&T	Lower B	Montgomery	IL	CMA399	WQIZ568
700 MHz	AT&T	Lower C	Montgomery	IL	CMA399	WPWV470
700 MHz	AT&T	Lower D	Montgomery	IL	EAG704	WPZA238
700 MHz	DISH Network	Lower E	Montgomery	IL	BEA097	WQJZ239
700 MHz	Verizon	Upper C	Montgomery	IL	REA003	WQJQ691
AWS	AT&T	A	Montgomery	IL	CMA399	WQKI625
AWS	Verizon	B	Montgomery	IL	BEA097	WQGA983
AWS	AT&T	C	Montgomery	IL	BEA097	WQGT880
AWS	AT&T	D	Montgomery	IL	REA003	WQNH802
AWS	T-Mobile	E	Montgomery	IL	REA003	WQGB376
AWS	Verizon	F	Montgomery	IL	REA003	WQGA717
Cellular	AT&T	A	Montgomery	IL	CMA399	KNKN479
Cellular	Verizon	B	Montgomery	IL	CMA399	KNKN996
PCS	AT&T	A	Montgomery	IL	MTA003	KNLF206
PCS	Verizon	B	Montgomery	IL	MTA003	KNLF207
PCS	T-Mobile	B	Montgomery	IL	MTA003	WQRJ905
PCS	T-Mobile	C	Montgomery	IL	BTA426	WPOK571
PCS	T-Mobile	D	Montgomery	IL	BTA426	KNLH604
PCS	T-Mobile	E	Montgomery	IL	BTA426	KNLG883
PCS	T-Mobile	F	Montgomery	IL	BTA426	KNLG651
PCS	T-Mobile	G	Montgomery	IL	BEA097	WQKT289
WCS	AT&T	A	Montgomery	IL	MEA018	KNLB305
WCS	AT&T	B	Montgomery	IL	MEA018	KNLB279
WCS	AT&T	C	Montgomery	IL	REA003	WPQL712
WCS	AT&T	D	Montgomery	IL	REA003	KNLB325

Table 1: Mobile Phone Carriers in the Area of Interest

[1] AWS: Advanced Wireless Service at 1.7/2.1 GHz
CELL: Cellular Service at 800 MHz
PCS: Personal Communication Service at 1.9 GHz
700 MHz: Commercial Mobile Phone at 700 MHz
WCS: Wireless Communication Service at 2.3 GHz

FCC-Licensed Sites

For competitive and confidentiality reasons, most mobile phone carriers' individual sites are not licensed with the FCC. However, in the cellular band, if a base station extends the existing Cellular Geographic Service Area (CGSA), then it must be recorded with the FCC. We identified two cellular sites near the area of interest. Figure 2 on the next page depicts their locations in relation to the area of interest and Table 2 contains the technical parameters on the FCC license.

Callsign	Licensee	Latitude (NAD83)	Longitude (NAD83)	Distance to the Nearest Tower (km)
KNKN996	Verizon	39.422500	-89.642694	4.96
KNKN479	AT&T	39.472250	-89.664222	4.21

Table 2: FCC-Licensed Mobile Phone Sites

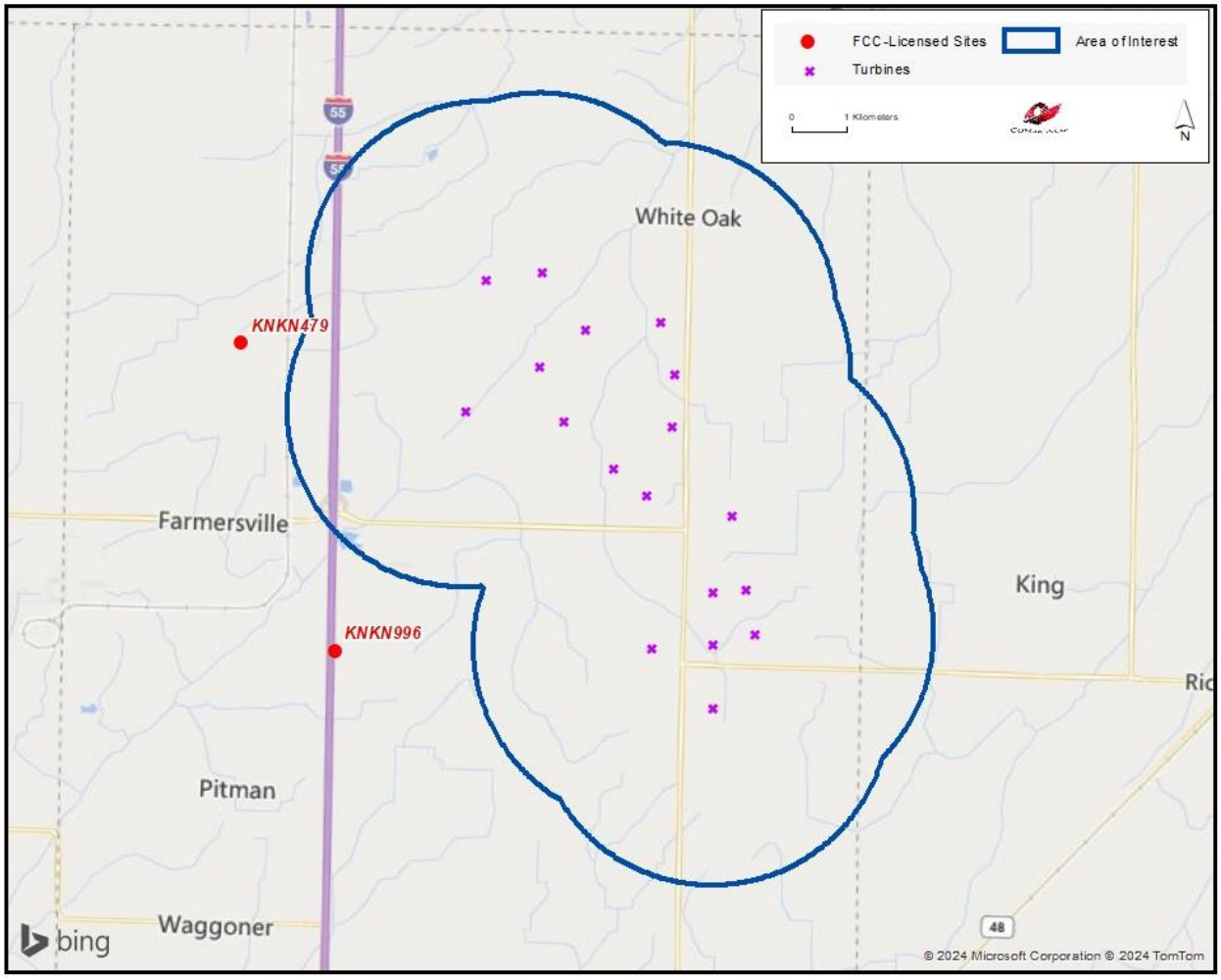


Figure 2: FCC-Licensed Mobile Phone Sites near the Area of Interest

Impact Assessment and Distance Setback Requirements

The cellular mobile phone signal propagation is typically not affected by physical structures because the beam widths of the radiated signal from the base stations and mobile units are very wide and the wavelength of the signal is long enough to wrap around objects such as wind turbine towers and blades. In addition, the cellular network consists of multiple base stations that are designed so that if the connection cannot be made to one base station it will shift to adjacent base stations to make the connection. This enables cellular mobile telephone systems to provide coverage in areas that are congested with physical structures such as downtown urban areas. Areas containing wind turbines have less of a coverage issue than urban areas, so the wind turbines presence does not require any special setback for signal obstruction consideration other than physical clearance of the blades. From an electromagnetic interference standpoint, the emissions from the wind turbines, which are specified by the FCC, should be taken into account to ensure they will not interfere with the base stations or the mobile units. Part 15 of the FCC regulations covers the emissions from unintentional radiating devices, such as wind turbines. The field strength limits for the emissions from unintentional radiators is given in paragraph 15.109 of Part 15 of the FCC rules. The emission limits are stated for a distance of 3 meters or approximately 10 feet and are shown below.

Radiated Emission Limits at 3 Meters

Frequency of Emission (MHz)	Field Strength (microVolts/meter)
30 – 88	100
88 – 216	150
216 – 960	200
> 960	500

From these limits and the receiver sensitivity of the cellular base stations and mobile units we can determine a setback requirement for wind turbines and cellular system. The typical sensitivity of mobile units is -90 dBm ($1X10^{-12}$ Watts) and the typical sensitivity of base stations is -93 dBm ($5X10^{-13}$ Watts). The gain of mobile unit antennas are -10dB or 0.1 and the gain of base station antennas are 17 dB or 50. The effective area (A) of the mobile unit and base station antennas are determined from the following formula.

$$A = G*\lambda^2 / 4*\pi$$

Where,
G = Antenna Gain, number
λ = Wavelength, 0.353 meters
π = 3.14

This gives us an effective area for the mobile unit antenna of $9.9X10^{-4}$ meter^2 and the effective area for the base station antenna of 0.496 meter^2. Using the typical receiver sensitivities of the mobile and base units above, we can determine their power flux density (P_D) from the following formula:

$$P_D = S/A$$

Where S is defined as the sensitivity for Mobile Unit or for the Base Station expressed in Watts

To calculate the electric field strength (E) we use the following formula:

$$E = (P_D * 377)^{½}$$

So for the mobile unit, $P_D = 1.01X10^{-9}$ Watts/meter^2 and E = 617 microVolts/meter. And, for the base station unit, $P_D = 1.008X10^{-12}$ Watts/meter^2 and E= 19.4 microVolts/meter.

These results show that the mobile units' sensitivity expressed as field strength is above the level allowed as an emission for the wind turbines at a distance of 3 meters. Therefore, no setback for the use of a mobile unit is needed beyond 3 meters. Since the base station has field strength sensitivity below the allowed emission level of the wind turbines a setback distance is needed to ensure that the base stations will not be affected. The field strength of the emission is inversely proportional to separation distance in meters. To determine the setback distance to reduce the field strength to 19.4 microVolts/meter the following formula is used.

D = (500 MicroVolts/meter)*(3 meters) / 19.4 MicroVolts/meter

Where,
D = Setback Distance for Base Station to avoid interference, meters

Thus the setback distance for the cellular tower base station from the wind turbines should be 77.3 meters or greater.

Summary

The telephone communications in the mobile phone carrier bands are typically unaffected by the presence of the wind turbines and we do not anticipate any significant harmful effect to mobile phone services in the Virden Wind project area. Mobile phone systems are designed with multiple base transmitter stations covering a specific area. Since mobile telephone signals are designed with overlap between adjacent base transmitter sites in order to provide handoff between cells, any signal blockage caused by the wind turbines does not materially degrade the reception because the end user may be receiving from multiple transmitter locations. For example, if a particular turbine attenuates the signal reception into a mobile phone, the phone may receive an alternate signal from a different transmit location, resulting in no disruption in service. Mobile phone systems that are implemented in urban areas near large structures and buildings often have to combat even more problematic signal attenuation and reflection conditions than rural areas containing a wind energy turbine facility.

For the cellular towers located within the project area, no setback distance is required from an interference standpoint other than physical clearance of the blades. From an electromagnetic

standpoint, a setback distance of 77.3 meters should be used to meet FCC emission requirements.

In the unlikely event that a mobile phone carrier believes their coverage has been compromised by the presence of the wind energy facility, they have many options to improve their signal coverage to the area through optimization of a nearby base transmitter or even adding a new sector or cell site. Utility towers, meteorological towers or even the turbine towers within the wind project area can serve as the platform for a base transmit site or cell enhancer.

3. Contact Us

For questions or information regarding the Mobile Phone Carrier Report, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	David.Meyer@CommScope.com
Web site:	www.comsearch.com

Wind Power GeoPlanner™

Doppler and NEXRAD Weather Radar Study

Virden Wind

Prepared on Behalf of
UKA North America, LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

The purpose of this document is to describe the research, calculations, and analysis performed to assess the impact of the proposed Virden Wind energy project on the operation of Doppler Weather Radar Systems (owned and operated by television stations and commercial interests) and the NEXRAD radars (jointly operated by the National Weather Service (NWS), the Federal Aviation Administration (FAA), and the U.S. Air Force) within the vicinity of the project. This study was performed for UKA North America, LLC.

2. Project Area

The location of the Virden Wind energy project in Montgomery County, Illinois is shown in Figure 1. The proposed turbines will have a maximum hub height of 118 meters and a rotor diameter of 163 meters, giving the structures an overall maximum height of 199.5 meters above ground level. At the time of this study, there are 18 turbines proposed for the Virden Wind project. Table 1 lists these turbines and their coordinates within the project area. A detailed view is provided in Figure 2.

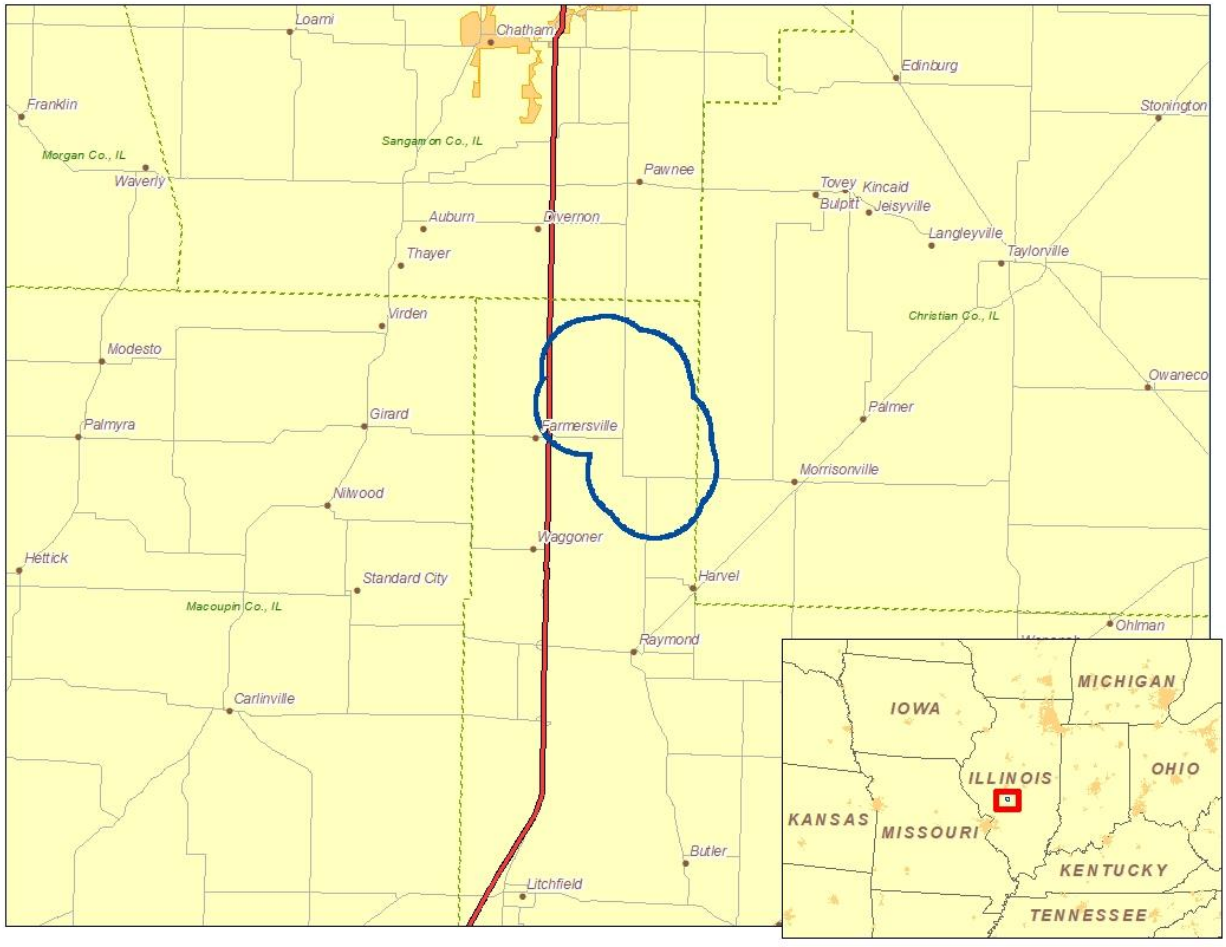


Figure 1: Location of Virden Wind in the State of Illinois

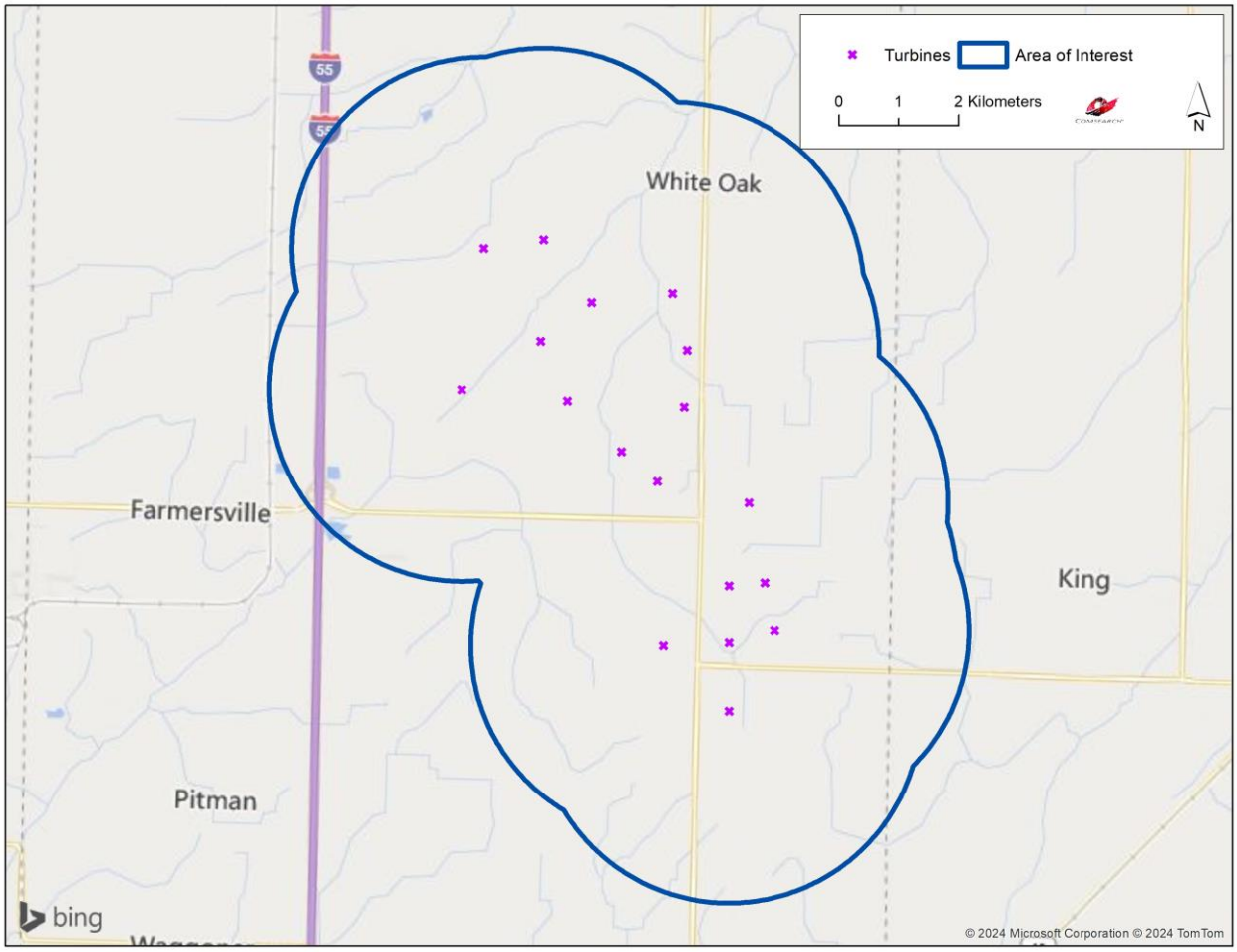


Figure 2: Location of Turbines within Virden Wind Project Area

Turbine ID	Latitude (NAD83)	Longitude (NAD83)	Ground Elevation (m)	Maximum Blade Height Above Mean Sea Level (m)
1	39.48374425	-89.61339741	194.04	393.54
2	39.48535056	-89.60183072	192.28	391.78
3	39.47611138	-89.59218758	194.52	394.02
4	39.47781032	-89.57655725	192.03	391.53
5	39.47003989	-89.60184204	193.86	393.36
6	39.46932323	-89.57333815	193.31	392.81
7	39.46244521	-89.61693892	192.44	391.94
8	39.46115542	-89.59628111	194.16	393.66
9	39.46075892	-89.57360363	195.03	394.53
10	39.45373719	-89.58554670	194.71	394.21
11	39.44939120	-89.57841384	196.42	395.92
12	39.44655908	-89.56044590	196.87	396.37
13	39.43394660	-89.56390307	196.49	395.99
14	39.43455010	-89.55695465	196.77	396.27
15	39.42466270	-89.57634015	196.04	395.54
16	39.42539503	-89.56358948	195.76	395.26
17	39.42742026	-89.55478238	196.30	395.80
18	39.41504312	-89.56321005	197.63	397.13

Table 1: Wind Turbine Coordinates

3. Technical Data

Based on a preliminary analysis of the terrain within the vicinity of the project and taking into account the maximum height of the proposed wind turbines, a reasonable search radius for radar systems was established at 250 kilometers from the center of the project area. Tables 2 and 3 contain the technical parameters of the commercial Doppler radar systems located within 250 kilometers of the project, including ownership and geographical data[1]. A depiction of the location of the Doppler radar systems with respect to the wind farm appears in Figure 3. Table 4 and Figure 4 contain the information on the NEXRAD radar systems found with 250 kilometers.

[1] Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

ID	Call Sign	Frequency (MHz)	Ground Elevation (m)	Antenna Height (m)	Output Power (Watts)	Distance to Nearest Turbine (km)
1	WPNU756	5350.0-5460.0	148.0	41.2	200	184.56
2	WPPH816	5350.0-5460.0	168.0	21.0	200	187.60
3	WPQT423	5450.0-5600.0	268.0	25.0	250000	217.69
4	KSQ559	5350.0-5460.0	124.0	48.0	175	234.23
5	WNWW463	5440.0	27.0	20.0	250	236.49
6	WQWD486	9320.0-9370.0	256.0	15.0	1000	237.42
7	WQBV585	5350.0-5460.0	244.8	7.3	175	237.99
8	KSR867	5500.0-5550.0	131.0	32.0	250	244.46
9	WNLR207	9300.0-9500.0	186.0	11.0	6000/7500	248.73

Table 2: Technical Data for Commercial Interest and Television Station Doppler Radar Systems within 250 Kilometers of the Virden Wind

ID	Call Sign	Owner- Operator	Location	Latitude (NAD83)	Longitude (NAD83)
1	WPNU756	Terre Haute TV License Company, LLC	TERRE HAUTE, IN	39.47219444	-87.41105556
2	WPPH816	Nexstar Media Inc.	FARMERSBURG, IN	39.24252778	-87.39141667
3	WPQT423	KRCG Licensee, LLC	FULTON, MO	38.84336111	-92.00408333
4	KSQ559	Gray Television Licensee, LLC	CAPE GIRARDEAU, MO	37.30561111	-89.52230556
5	WNWW463	NPG of Missouri, LLC	COLUMBIA, MO	38.81808333	-92.22130556
6	WQWD486	The Curators of the University of Missouri	COLUMBIA, MO	38.90711111	-92.26763889
7	WQBV585	CURATORS OF THE UNIVERSITY OF MISSOURI	COLUMBIA, MO	38.90488889	-92.27361111
8	KSR867	Nexstar Media Inc.	HENDERSON, KY	37.86533333	-87.56750000
9	WNLR207	Indiana, State of - Purdue University - W Laf	WEST LAFAYETTE, IN	40.41641667	-86.93305556

Table 3: Location and Ownership of Commercial Interest and Television Station Doppler Radar Systems within 250 Kilometers of the Virden Wind Project

ID	WBAN #	Station ID	Station Name	Latitude (NAD83)	Longitude (NAD83)	Elevation (ft)	Tower Height (m)	Distance to Nearest Turbine (km)
1	4833	KILX	Lincoln, IL	40.15055556	-89.33694444	582	30	77.27
2	3982	KLSX	Saint Louis, MO	38.69888889	-90.68277778	608	30	125.21

Table 4: Location and Technical Data for NEXRAD Radar Systems within 250 Kilometers of the Virden Wind Project Area

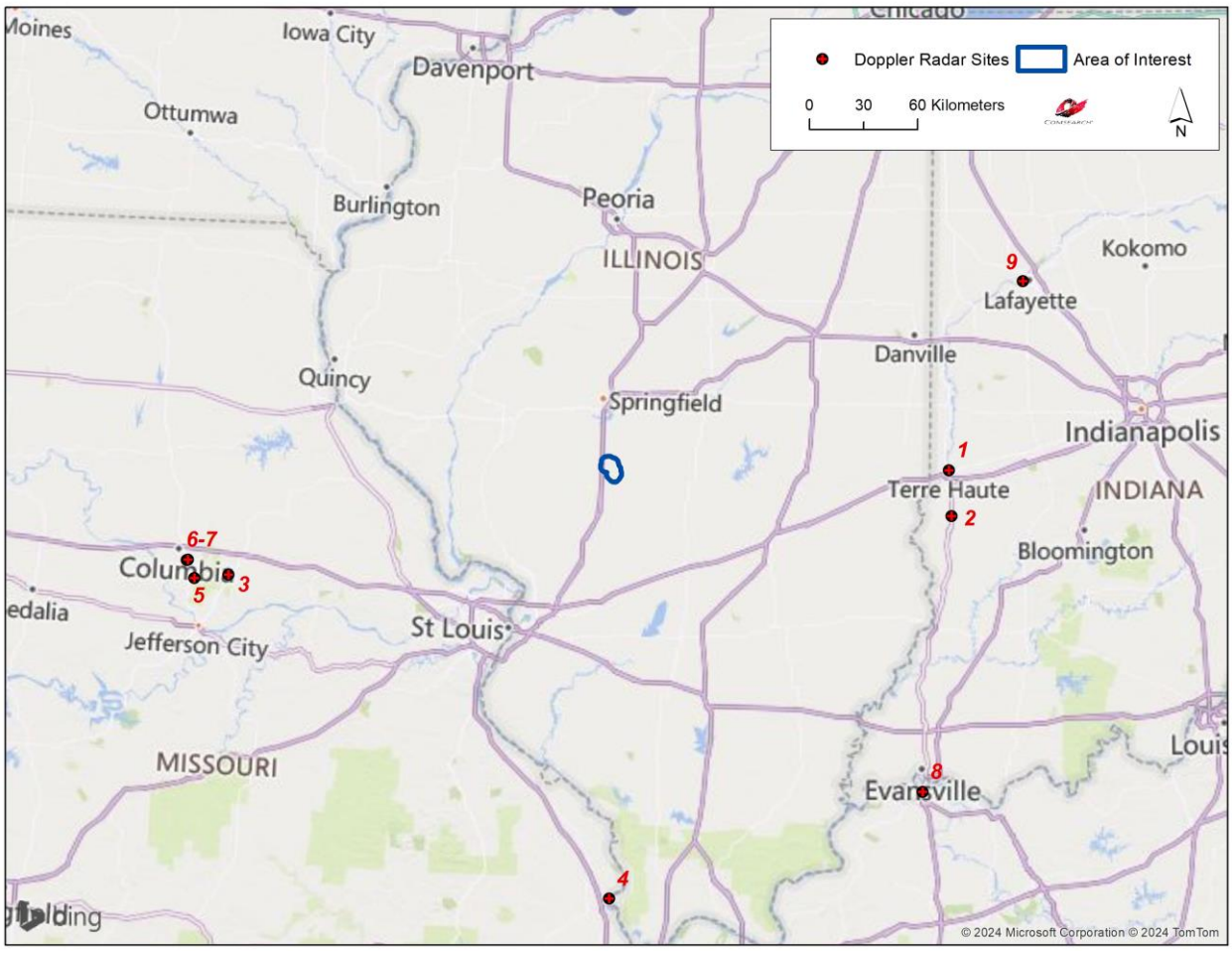


Figure 3: Location of Doppler Radar Systems within 250 Kilometers of the Virden Wind Project Area

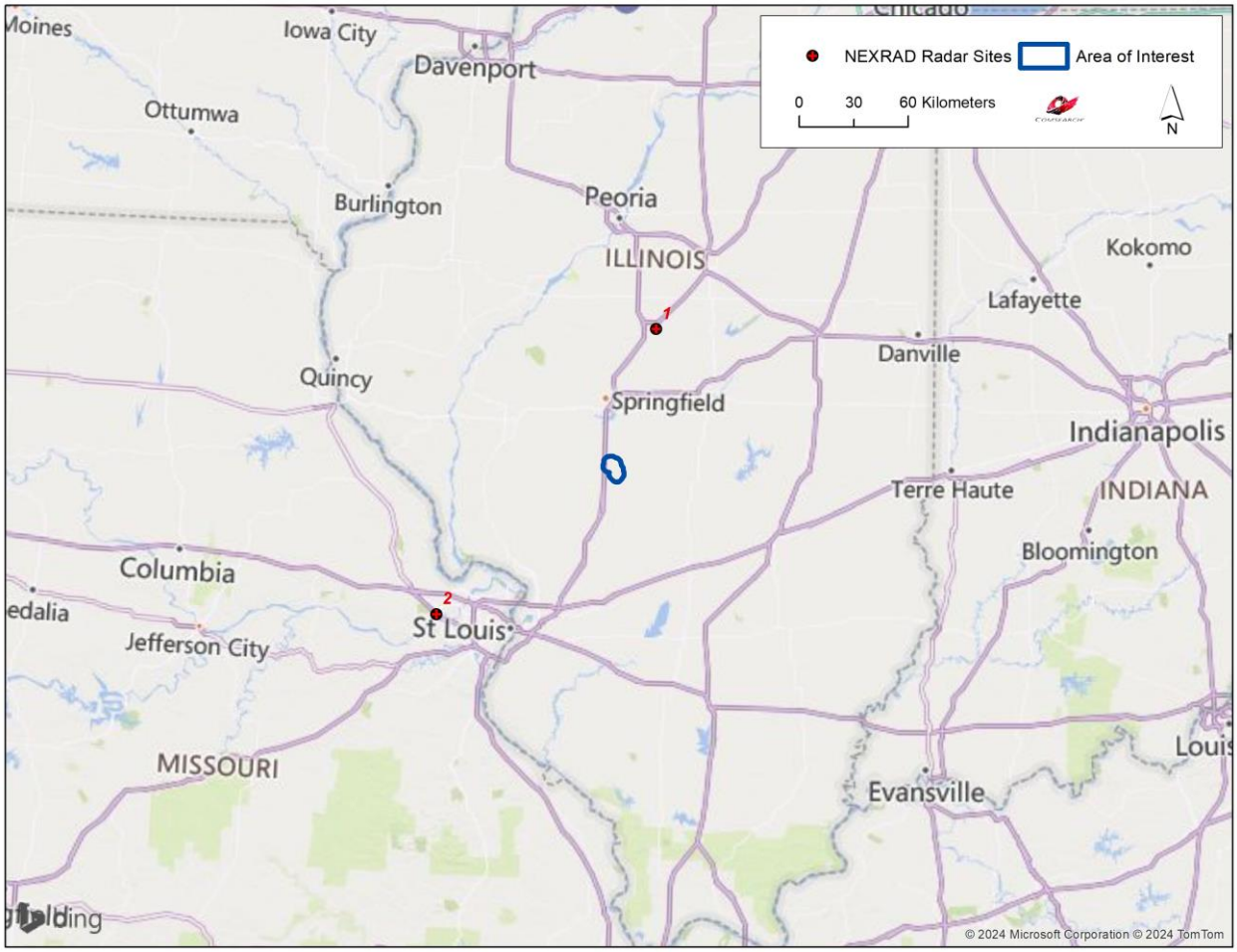


Figure 4: Location of NEXRAD Radar Systems within 250 Kilometers of the Virden Wind Project Area

4. Impact Assessment

The technical approach to determine the potential impact of the turbines on the radar systems in the area is to calculate whether the wind turbines are in line-of-sight (LOS) of the radar systems. The wind turbines of the Virden Wind have the potential to block radar coverage and produce false targets if the turbines are in line-of-sight of the radar systems' transmitted signals.

To verify the presence or absence of LOS conditions between the Virden Wind energy project and the radar systems identified in Section 3, LOS coverage plots were generated for each of the radar systems. These plots identify the geographical regions that have LOS to a given radar by taking into account the height of the radar antenna, the maximum height of the wind turbine blades, the curvature of the earth, and potential refractivity in the atmosphere. The plots may be referenced in the Appendix section of this report.

According to the LOS coverage plots, the effective terrain elevations would block LOS between the antennas of all 11 radars and the wind project area. Therefore, LOS conditions would not exist between the radars and the wind turbines.

5. Conclusions

Based on the analysis described in this report, none of the nine Doppler radar systems nor two NEXRAD radar systems in the vicinity of the Virden Wind project area could be impacted by the project's planned wind turbines.

6. Contact

For questions or information regarding the Doppler Radar Study, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	David.Meyer@CommScope.com
Web site:	www.comsearch.com

Appendix

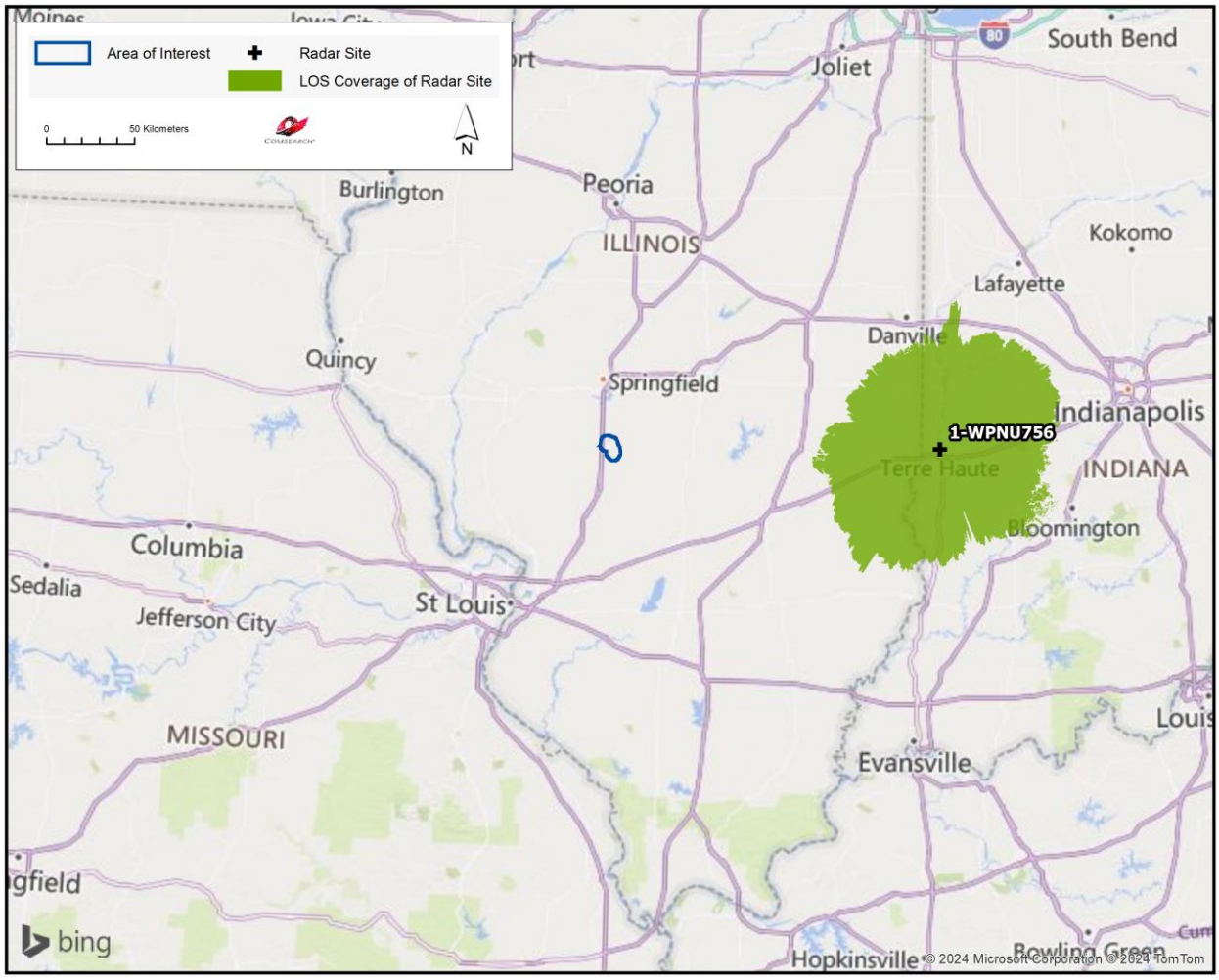


Figure A1-1: Line-of-Sight Coverage of WPNU756 with Respect to Virden Wind

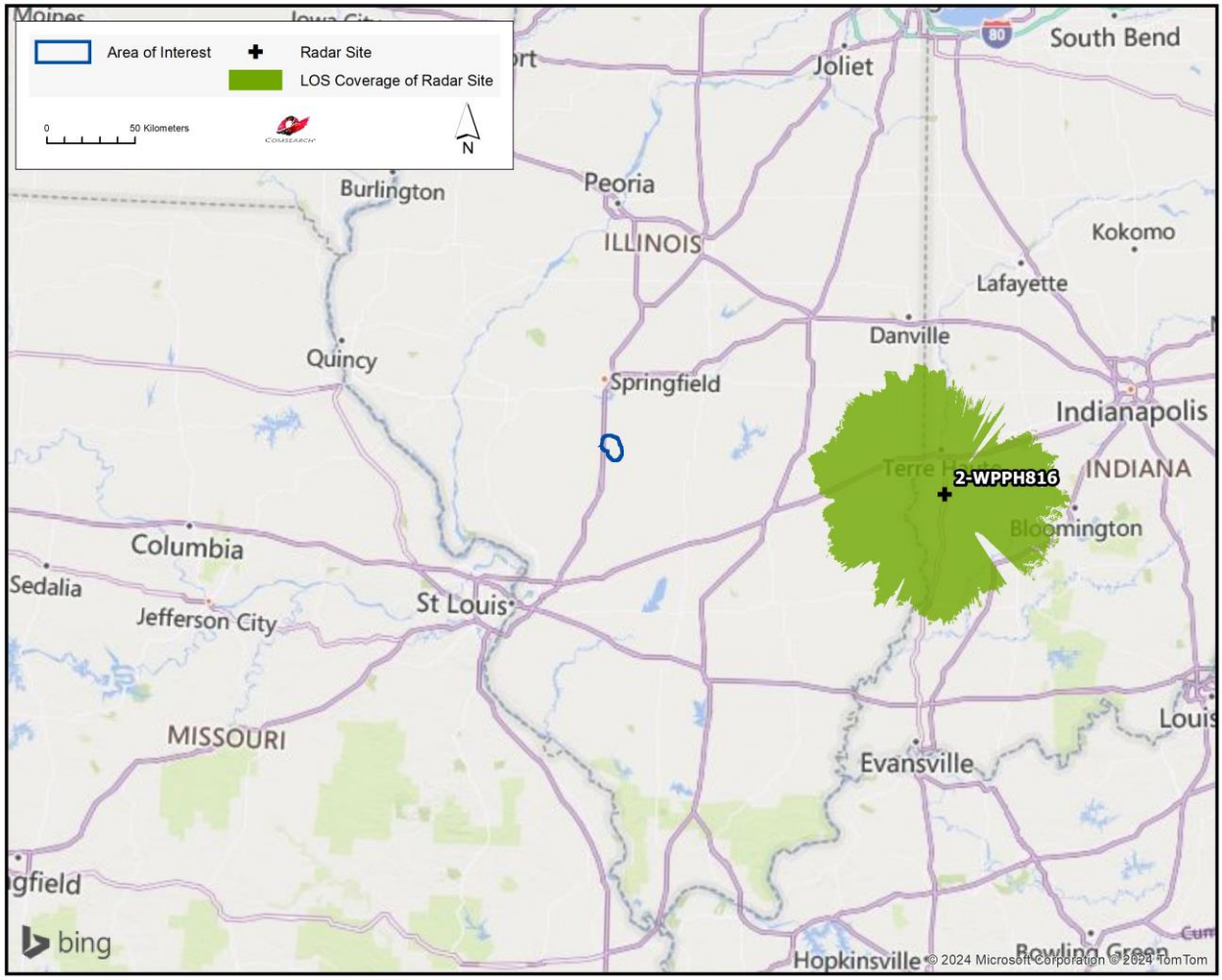


Figure A1-2: Line-of-Sight Coverage of WPPH816 with Respect to Virden Wind

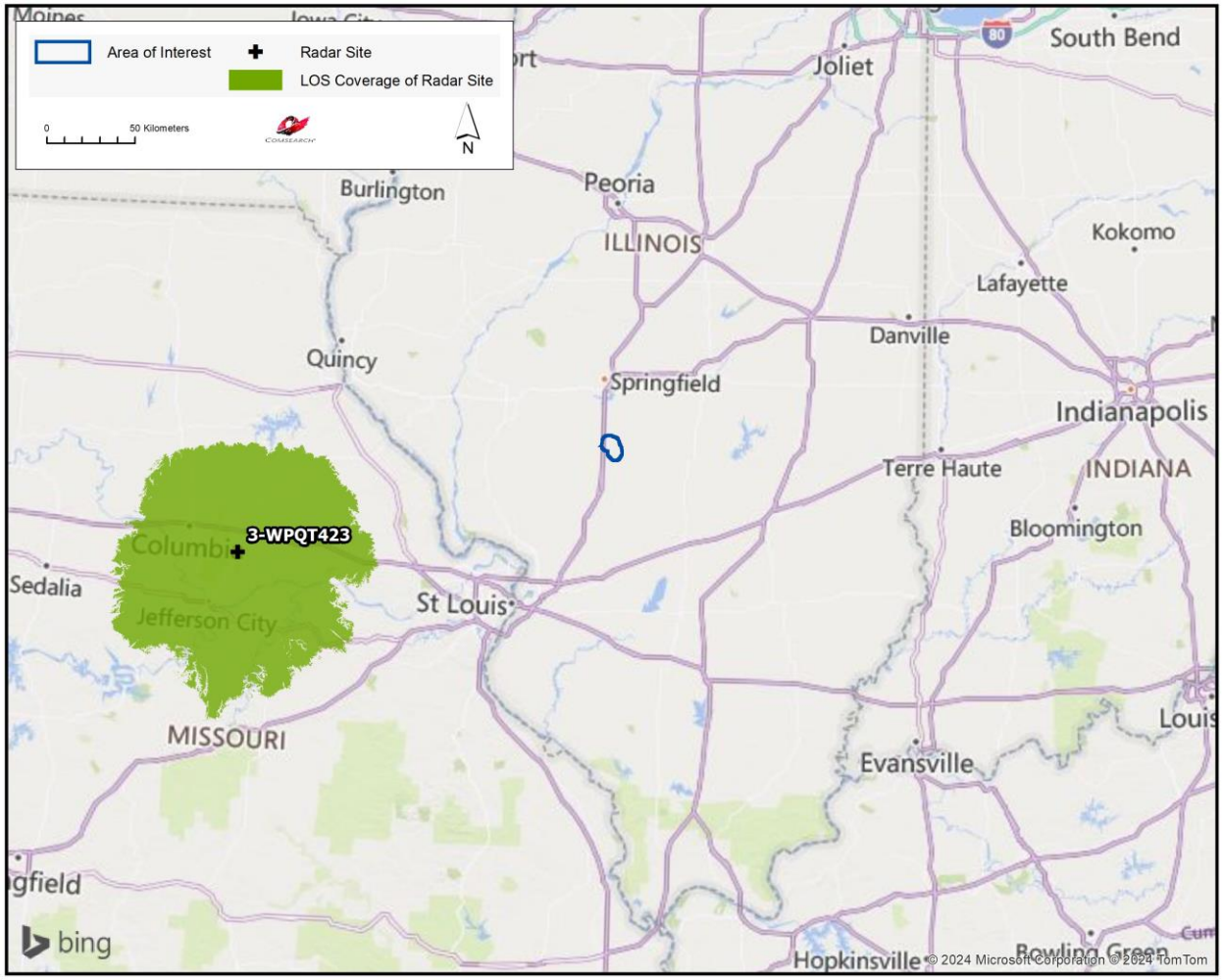


Figure A1-3: Line-of-Sight Coverage of WPQT423 with Respect to Virden Wind

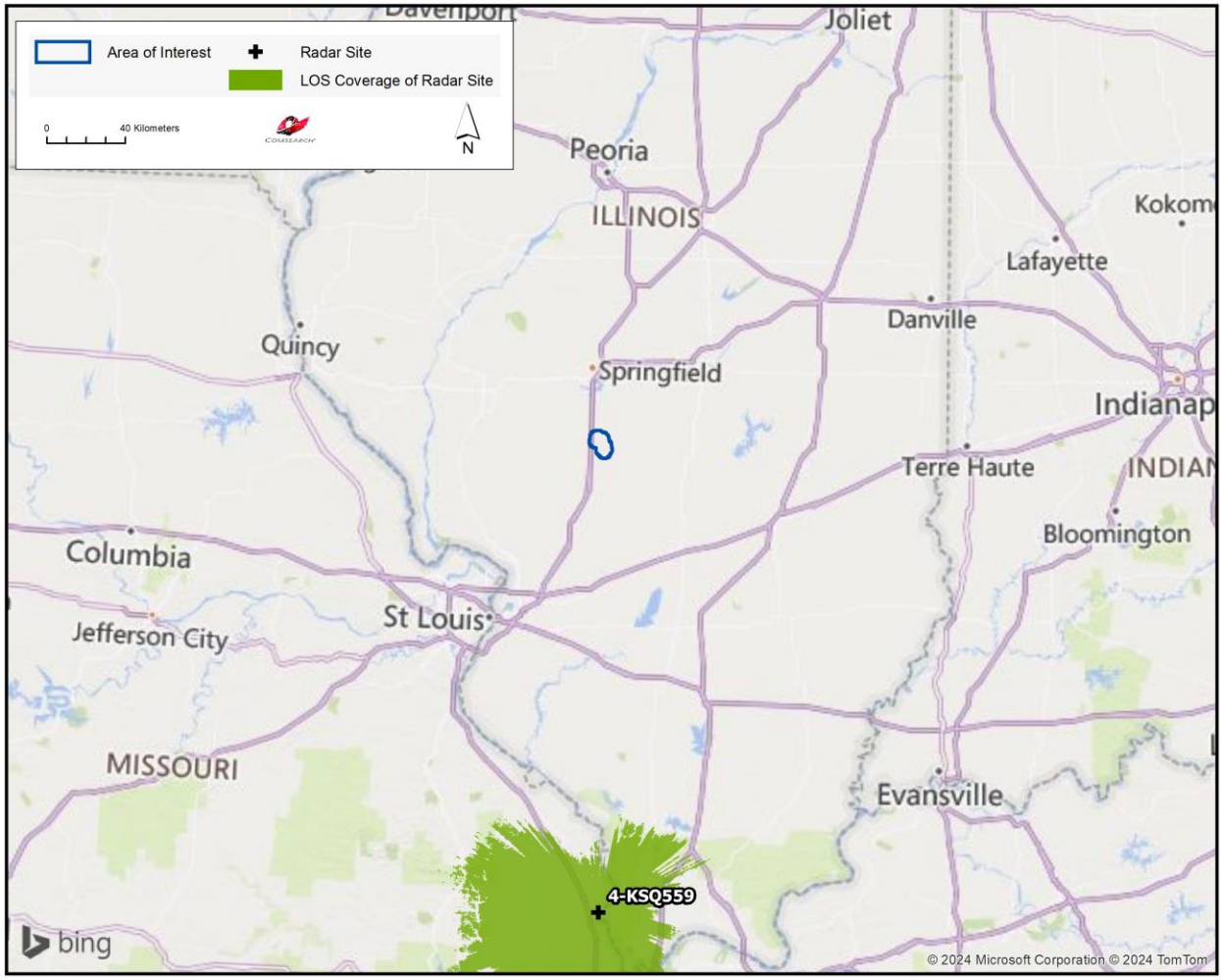


Figure A1-4: Line-of-Sight Coverage of KSQ559 with Respect to Virden Wind

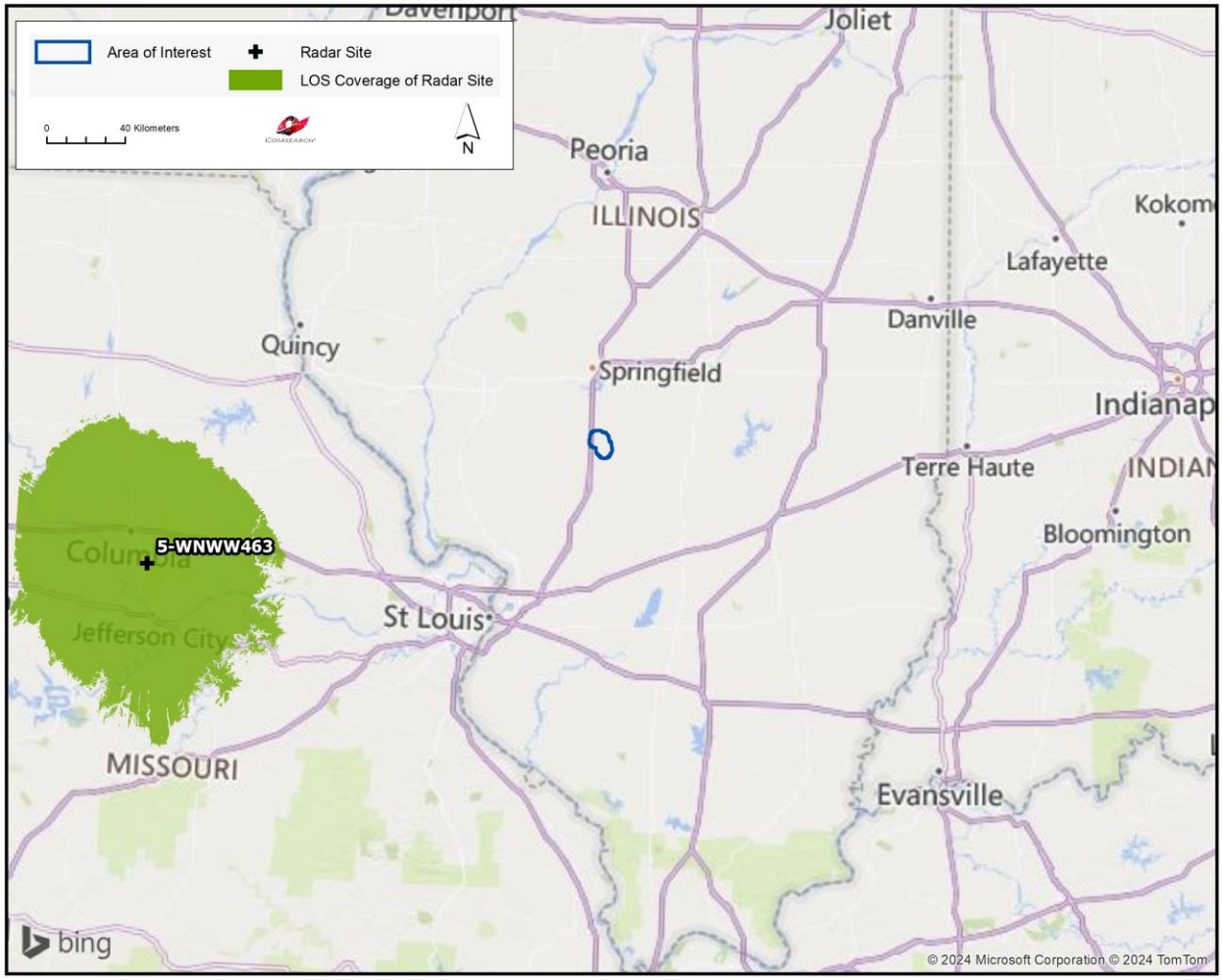


Figure A1-5: Line-of-Sight Coverage of WNWW463 with Respect to Virden Wind

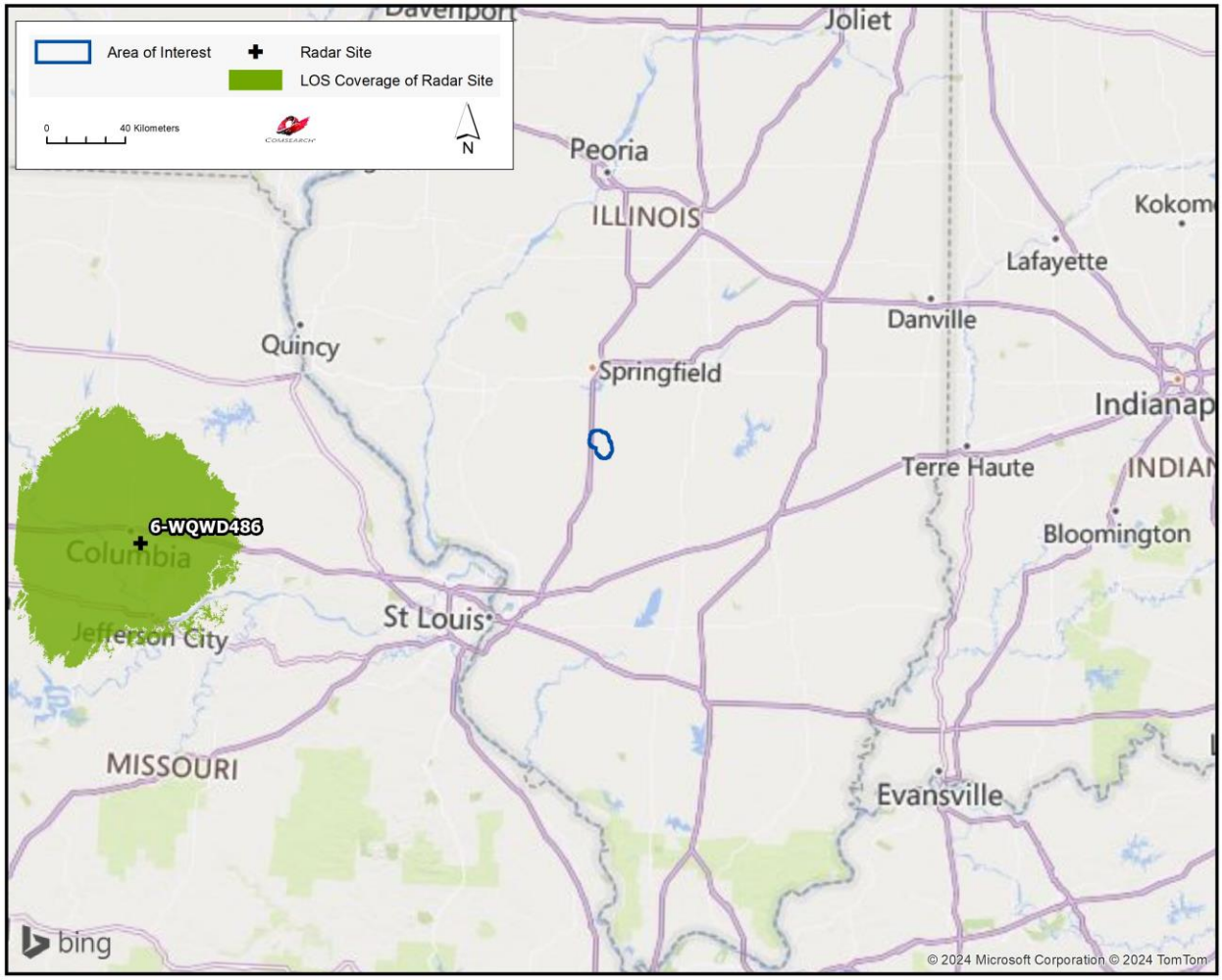


Figure A1-6: Line-of-Sight Coverage of WQWD486 with Respect to Virden Wind

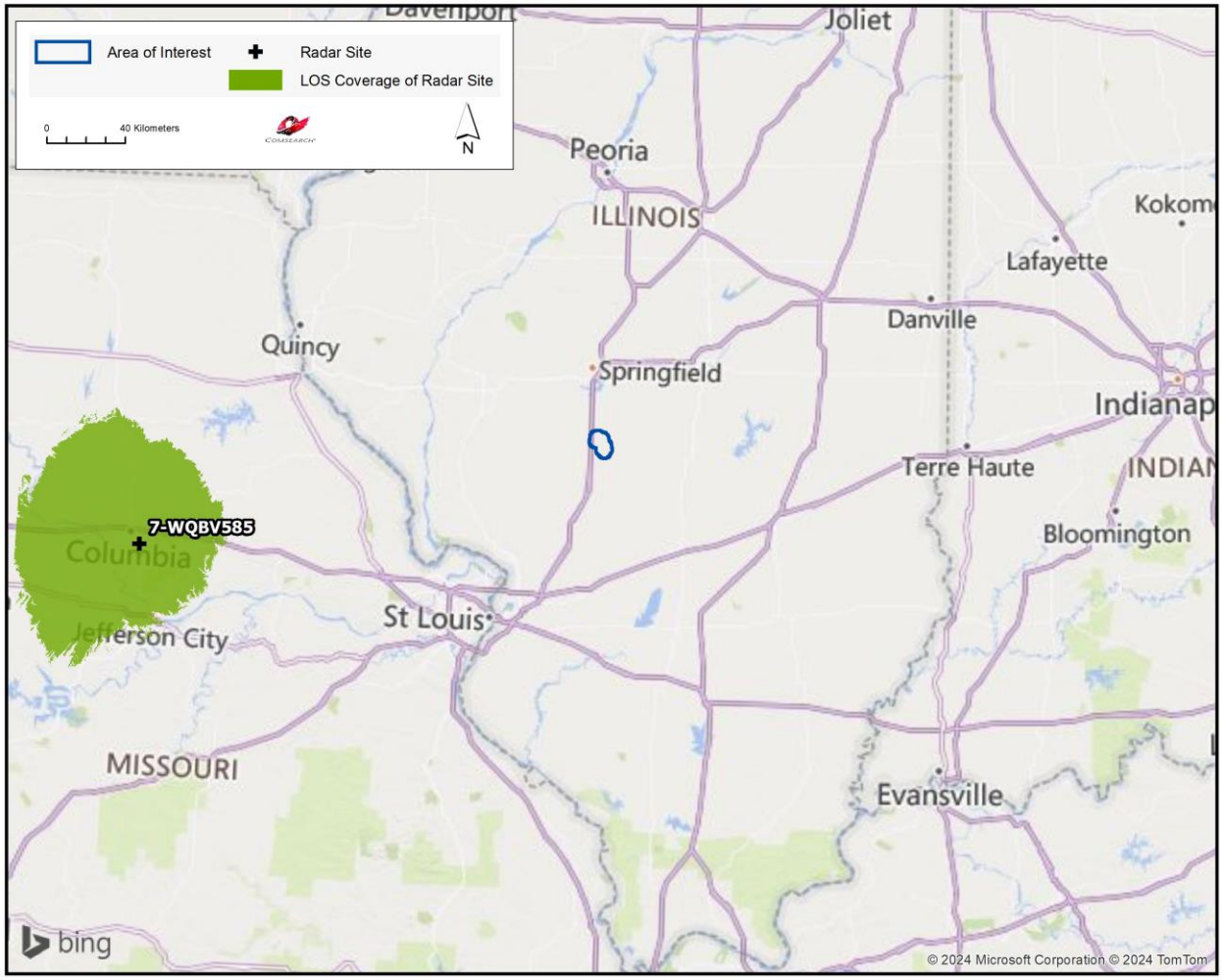


Figure A1-7: Line-of-Sight Coverage of WQBV585 with Respect to Virden Wind

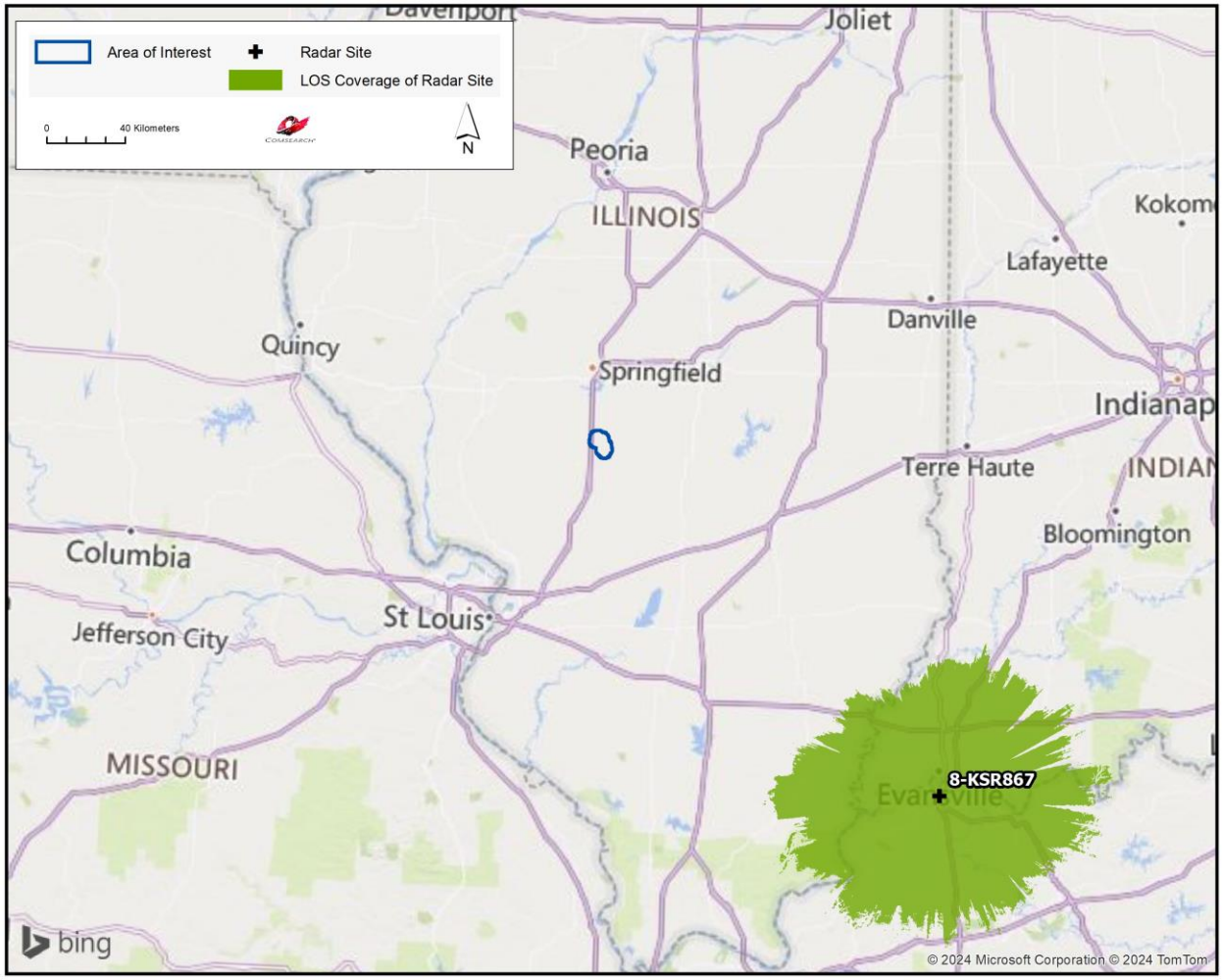


Figure A1-8: Line-of-Sight Coverage of KSR867 with Respect to Virden Wind

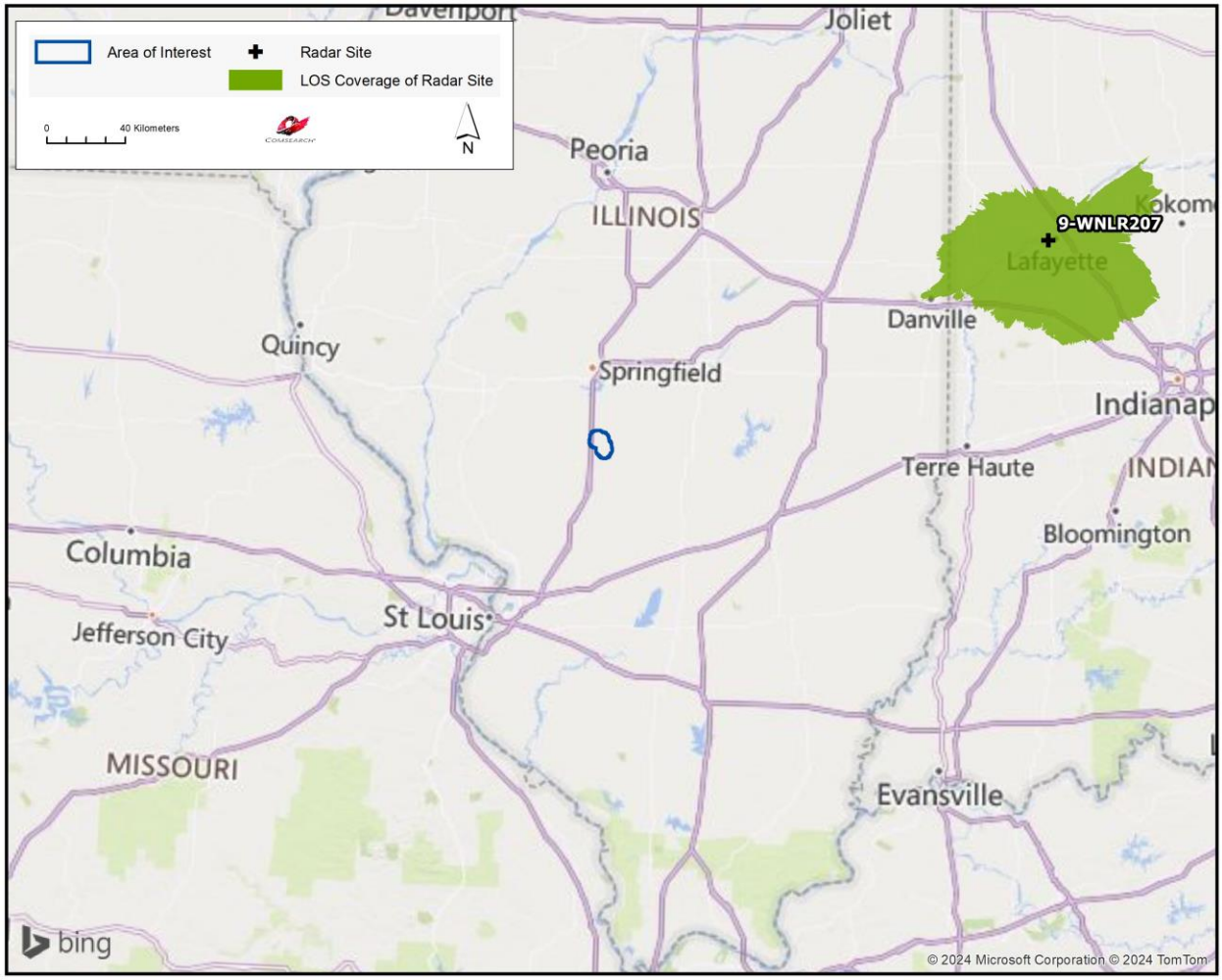


Figure A1-9: Line-of-Sight Coverage of WNLR207 with Respect to Virden Wind

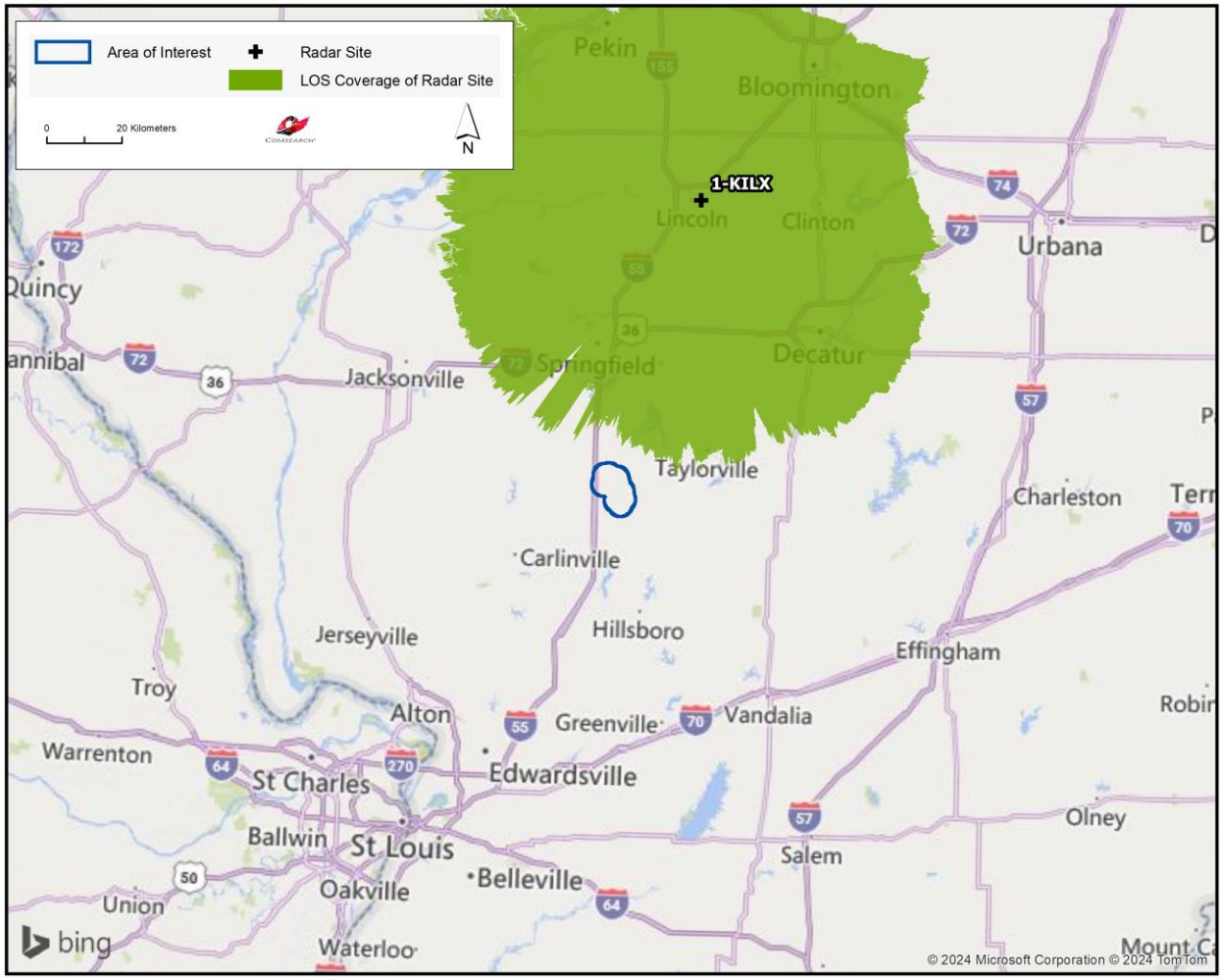


Figure A2-1: Line-of-Sight Coverage of KILX with Respect to Virden Wind

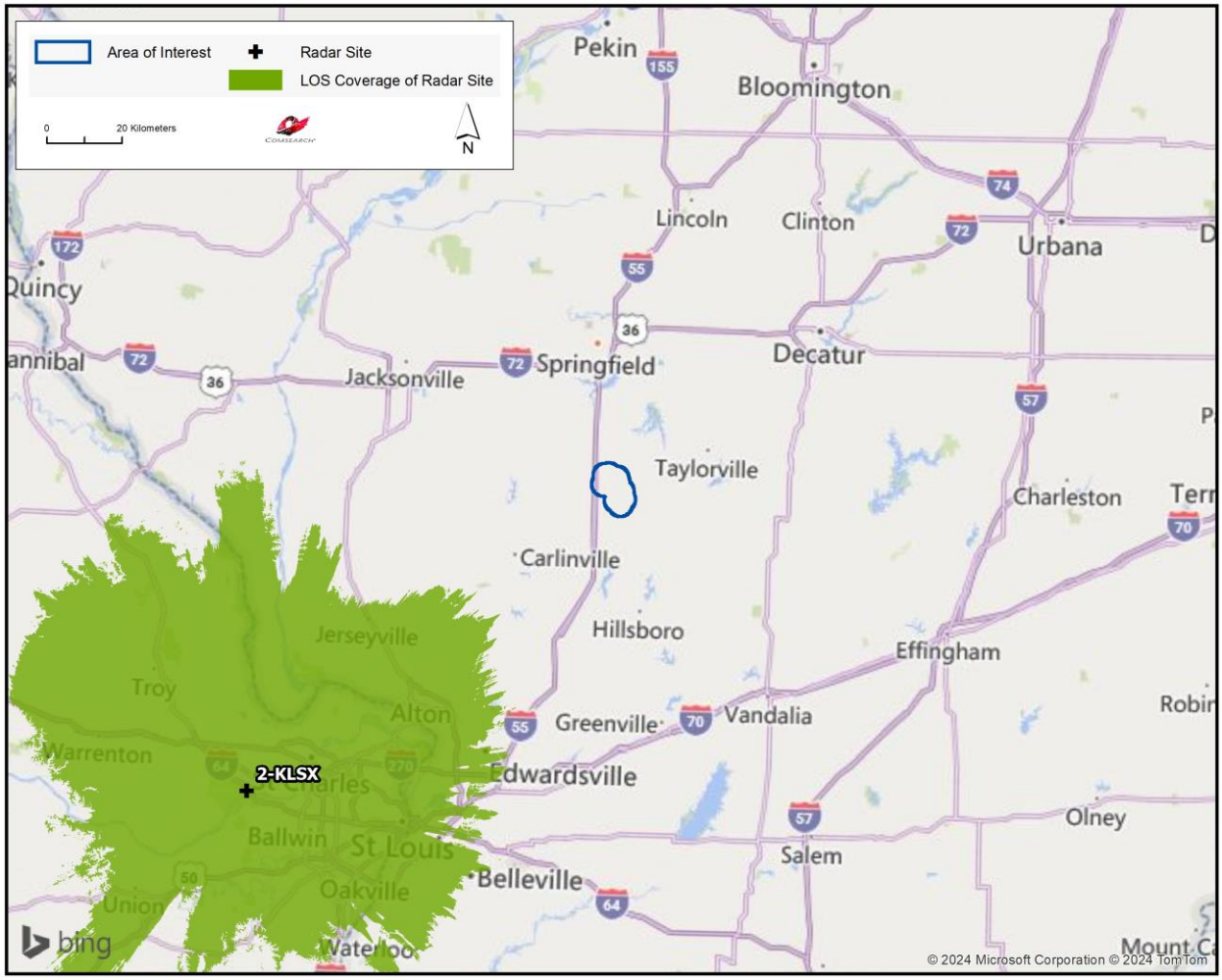


Figure A2-2: Line-of-Sight Coverage of KLSX with Respect to Virden Wind

Wind Power GeoPlanner™

Off-Air TV Analysis

Virden Wind

Prepared on Behalf of
UKA North America LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

Off-air television stations broadcast signals from terrestrially-based facilities directly to television receivers. Comsearch identified those off-air stations whose service could potentially be affected by the proposed Virden Wind project in Montgomery County, Illinois. Comsearch then examined the coverage of the stations and the communities in the area that could potentially have degraded television reception due to the location of the proposed wind turbines.

2. Summary of Results

The proposed wind energy project area and local communities are depicted in Figure 1, below.

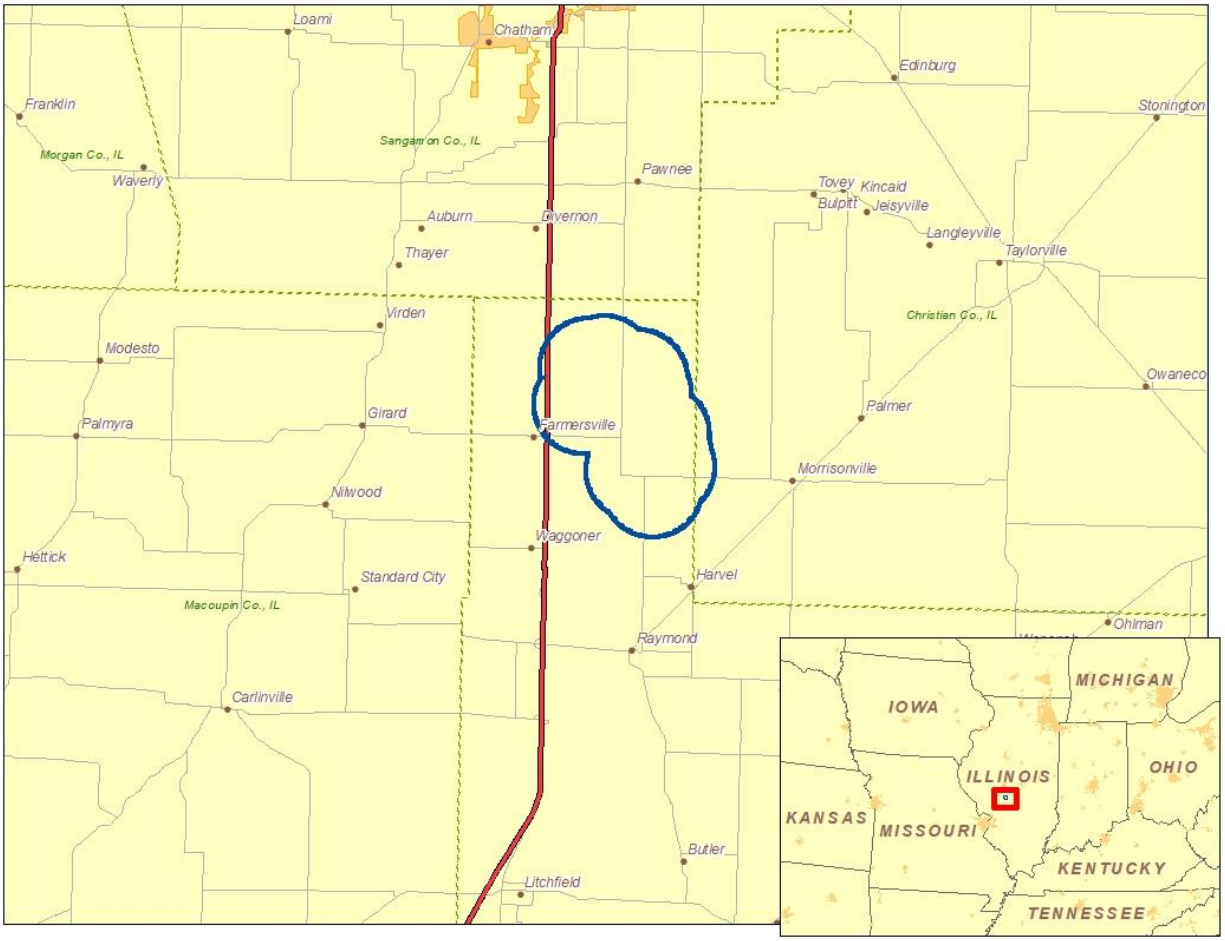


Figure 1: Wind Farm Project Area and Local Communities

To begin the analysis, Comsearch compiled all off-air television stations[1] within 150 kilometers of the proposed turbines. TV stations at a distance of 150 kilometers or less are the most likely to provide off-air coverage to the project area and neighboring communities. These stations are listed in Table 1, on the next page, and a plot depicting their locations is provided in Figure 2. There are a total of 63 database records for stations within approximately 150 kilometers of the proposed turbines. Of these stations, 55 stations are currently licensed and operating, 23 of which are low-power stations or translators. Translator stations are low-power stations that receive signals from distant broadcasters and retransmit the signal to a local audience. These stations serve local audiences and have limited range, which is a function of their transmit power and the height of their transmit antenna.

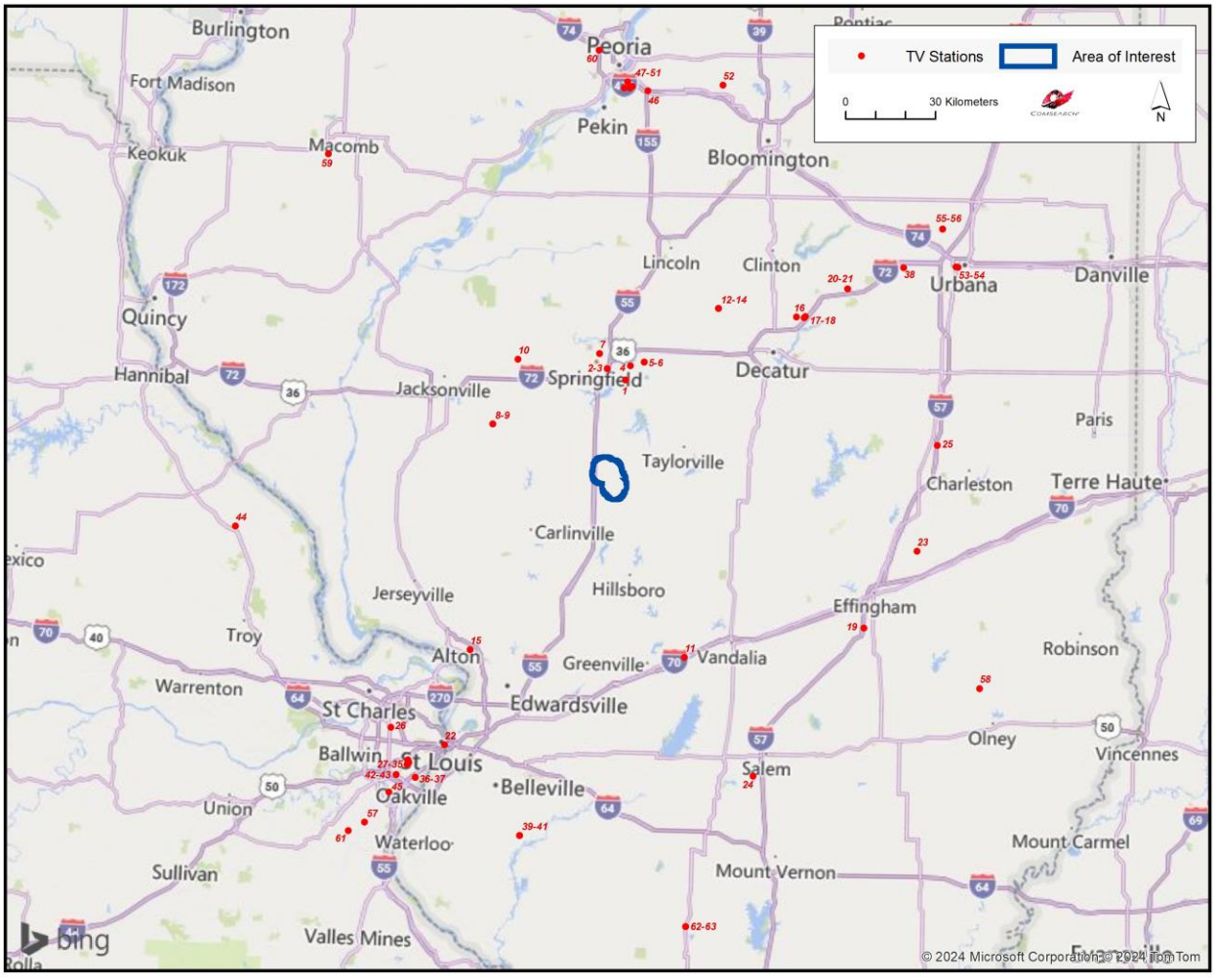


Figure 2: Plot of Off-Air TV Stations within 150 Kilometers of Proposed Turbines

[1] Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data presented in this report is derived from the TV station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

ID	Call Sign	Status	Service[2]	Channel	Transmit ERP[3] (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine (km)
1	W23EW-D	LIC	LPD	23	15.0	39.748417	-89.532639	29.81
2	WEAE-LD	LIC	LPD	21	15.0	39.780889	-89.605056	32.82
3	W31EH-D	LIC	LPD	31	0.1	39.780889	-89.605056	32.82
4	WCIX	LIC	DTV	11	8.5	39.790944	-89.514722	34.75
5	WICS	LIC	DTV	15	300.0	39.804167	-89.461111	37.41
6	WRSP-TV	LIC	DTV	16	310.0	39.804167	-89.461111	37.41
7	W27ES-D	LIC	LPD	27	5.6	39.825556	-89.636667	37.90
8	WSEC	LIC	DTV	18	93.5	39.602667	-90.046194	39.49
9	W29ES-D	LIC	LPT	29	15.0	39.602667	-90.046194	39.49
10	W19EE-D	LIC	LPD	19	0.2	39.800611	-89.955889	45.86
11	WXSL-LD	LIC	LPD	21	15.0	38.915417	-89.274944	60.81
12	WCQA-LD	STA	LPD	12	1.5	39.971056	-89.174361	64.72
13	WCQA-LD	STA	LPD	12	1.5	39.971056	-89.174361	64.72
14	WCQA-LD	LIC	LPD	12	3.0	39.971056	-89.174361	64.72
15	W36EX-D	LIC	DCA	36	15.0	38.920028	-90.105083	72.23
16	WLCF-LD	LIC	LPD	17	15.0	39.950833	-88.868056	80.31
17	WBUI	LIC	DTV	22	325.0	39.948889	-88.836917	82.21
18	WAND	LIC	DTV	20	1000.0	39.952389	-88.832389	82.76
19	WEDK-LD	LIC	LPD	25	0.1	39.015806	-88.580778	95.72
20	WILL-TV	APP	DTV	9	35.0	40.038889	-88.669444	99.62
21	WILL-TV	LIC	DTV	9	30.0	40.038889	-88.669444	99.62
22	KEFN-CD	LIC	DCA	20	15.0	38.630000	-90.190556	102.74
23	W33EK-D	LIC	LPT	33	15.0	39.250361	-88.379611	103.20

[2] Definitions of service and status codes:
ACA - Analog Class A
DCA - Digital Class A
DRT - Digital Replacement Translator
DT - ETL testing
DTS - Distributed Transmission System
DTV - Full Service Television
DTX - Digital TV Auxiliary
LPA - Low Power Analog TV
LPD - Low Power Digital TV
LPT - Digital TV Translator
LPX - Analog TV Translator
TS - Legacy Service for Analog TV Auxiliary
TV - Analog TV legacy

LIC – Licensed and operational station
CP – Construction permit granted
CP MOD – Modification of construction permit
APP – Application for construction permit, not yet operational
STA – Special transmit authorization, usually granted by FCC for temporary operation
AMD - Amendment

[3] ERP = Transmit Effective Radiated Power

ID	Call Sign	Status	Service[2]	Channel	Transmit ERP[3] (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine (km)
24	W29CI-D	LIC	DCA	29	15.0	38.562778	-88.999444	106.49
25	WEIU-TV	LIC	DTV	30	174.0	39.570833	-88.307083	108.49
26	K25NG-D	LIC	DCA	25	15.0	38.677028	-90.399861	109.40
27	KDNL-TV	LIC	DTV	31	1000.0	38.580556	-90.329167	114.00
28	KPTN-LD	LIC	LPD	19	7.0	38.574417	-90.325528	114.37
29	KBGU-LD	LIC	LPD	27	15.0	38.574417	-90.325528	114.37
30	WODK-LD	LIC	LPD	30	15.0	38.574417	-90.325528	114.37
31	KUMO-LD	APP	LPD	32	15.0	38.574417	-90.325528	114.37
32	KUMO-LD	CP	LPD	32	15.0	38.574417	-90.325528	114.37
33	KUMO-LD	LIC	LPD	51	15.0	38.574417	-90.325528	114.37
34	K15KP-D	LIC	LPD	15	15.0	38.568056	-90.331944	115.27
35	KSDK	LIC	DTV	35	838.0	38.568056	-90.331944	115.27
36	KDTL-LD	LIC	LPD	17	15.0	38.529722	-90.299444	117.22
37	KMOV	LIC	DTV	24	1000.0	38.529722	-90.299444	117.22
38	WCIA	LIC	DTV	34	681.0	40.105833	-88.450000	119.05
39	W09DL-D	LIC	LPD	9	3.0	38.364889	-89.889861	120.01
40	WPXS	LIC	DTV	13	160.0	38.364889	-89.889861	120.01
41	WLEH-LD	LIC	LPD	29	15.0	38.364889	-89.889861	120.01
42	KPLR-TV	LIC	DTV	26	1000.0	38.535278	-90.373056	120.32
43	KTVI	LIC	DTV	33	1000.0	38.535278	-90.373056	120.32
44	WVDM-LD	LIC	LPD	21	15.0	39.264972	-91.032889	124.06
45	KETC	LIC	DTV	23	300.0	38.482222	-90.398056	126.39
46	W27EQ-D	LIC	LPD	27	15.0	40.621944	-89.476667	126.68
47	WTVP	LIC	DTV	35	155.0	40.628889	-89.570000	127.03
48	WHOI	LIC	DTV	24	402.0	40.629444	-89.548056	127.14
49	WEEK-TV	LIC	DTV	25	536.0	40.629444	-89.548056	127.14
50	WMBD-TV	LIC	DTV	26	822.0	40.635000	-89.538611	127.79
51	WAOE	LIC	DRT	18	15.0	40.648056	-89.557222	129.18
52	WYZZ-TV	LIC	DTV	28	1000.0	40.645833	-89.179167	133.82
53	WBXC-CD	LIC	DCA	18	15.0	40.111111	-88.243056	134.11
54	W27EL-D	LIC	LPD	27	15.0	40.109361	-88.234889	134.61
55	W07DD-D	STA	LPD	7	0.1	40.224167	-88.298889	137.19
56	W07DD-D	LIC	LPD	7	0.28	40.224167	-88.298889	137.19
57	WRBU	LIC	DTV	28	1000.0	38.388333	-90.487778	139.43
58	WUSI-TV	LIC	DTV	23	110.0	38.838611	-88.129722	139.47
59	WMEC	LIC	DTV	36	100.0	40.398333	-90.731944	139.54
60	WSIO-LD	CP	LPT	19	11.0	40.741153	-89.673717	139.61
61	KNLC	LIC	DTV	14	900.0	38.361111	-90.548611	144.98
62	WSIU-TV	LIC	DTV	8	53.0	38.103056	-89.244444	148.28
63	WSIU-TV	APP	DTV	8	70.0	38.103056	-89.244444	148.28

Table 1: Off-Air TV Stations within 150 Kilometers of Proposed Turbines

3. Impact Assessment

Based on a contour analysis of the licensed stations within 150 kilometers of the Virden Wind project, it was determined that eleven of the full-power digital stations, identified below in Table 2, along with three low-power digital stations, may have their reception disrupted in and around the project. The areas primarily affected would include TV service locations within 10 kilometers of the turbines that have clear line-of-sight (LOS) to a proposed wind turbine but not to the respective station. After the wind turbines are installed, communities and homes in these locations may have degraded reception of these stations. This is due to multipath interference caused by signal scattering as TV signals are reflected by the rotating wind turbine blades and mast.

ID	Call Sign	Status	Service	Channel	Transmit ERP (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to the Closest Turbine (km)
1	W23EW-D	LIC	LPD	23	15.0	39.748417	-89.532639	29.81
2	WEAE-LD	LIC	LPD	21	15.0	39.780889	-89.605056	32.82
4	WCIX	LIC	DTV	11	8.5	39.790944	-89.514722	34.75
5	WICS	LIC	DTV	15	300.0	39.804167	-89.461111	37.41
6	WRSP-TV	LIC	DTV	16	310.0	39.804167	-89.461111	37.41
8	WSEC	LIC	DTV	18	93.5	39.602667	-90.046194	39.49
9	W29ES-D	LIC	LPT	29	15.0	39.602667	-90.046194	39.49
17	WBUI	LIC	DTV	22	325.0	39.948889	-88.836917	82.21
18	WAND	LIC	DTV	20	1000.0	39.952389	-88.832389	82.76
21	WILL-TV	LIC	DTV	9	30.0	40.038889	-88.669444	99.62

Table 2: Licensed Off-Air TV Stations Subject to Degradation

4. Recommendations

While TV signals are reflected by wind turbines, which can cause multipath interference to the TV receiver, modern digital TV receivers have undergone significant improvements to mitigate the effects of signal scattering. When used in combination with a directional antenna, it becomes even less likely that signal scattering from wind farms will cause interference to digital TV reception.

Nevertheless, signal scattering could still impact certain areas currently served by the TV station mentioned above, especially those that would have line-of-sight to at least one wind turbine but not to the station antenna. In the unlikely event that interference is observed in any of the TV service areas, it is recommended that a high-gain directional antenna be used, preferably outdoors, and oriented towards the signal origin in order to mitigate the interference.

Both cable service and direct broadcast satellite service will be unaffected by the presence of the wind turbine facility and may be offered to those residents who can show that their off-air TV reception has been disrupted by the presence of the wind turbines after they are installed.

5. Contact

For questions or information regarding the Off-Air TV Analysis, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	David.Meyer@CommScope.com
Web site:	www.comsearch.com

Wind Power GeoPlanner™

Wireless Internet Services Report

Virden Wind

Prepared on Behalf of
UKA North America, LLC

March 15, 2024

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

Wireless internet providers, often called WISPs (Wireless Internet Service Providers), deliver internet services via radio transmission to business and/or residential subscribers. They compete with wired internet service providers such as the local phone and cable companies. Wireless internet providers can use various frequency bands in both licensed and unlicensed spectrum. Many rural community WISPs operate in the unlicensed spectrum since there is a lower barrier to entry without the costs associated with acquiring licensed spectrum. The most common unlicensed bands for this purpose are the 900 MHz, 2.4 GHz, and 5.8 GHz bands. There is also some activity in the "lite-licensed" 3.65 GHz band.

This report attempts to identify wireless internet providers in proximity to the Virden Wind project and evaluates the potential impact of wind turbines on their operations in and around the project area.

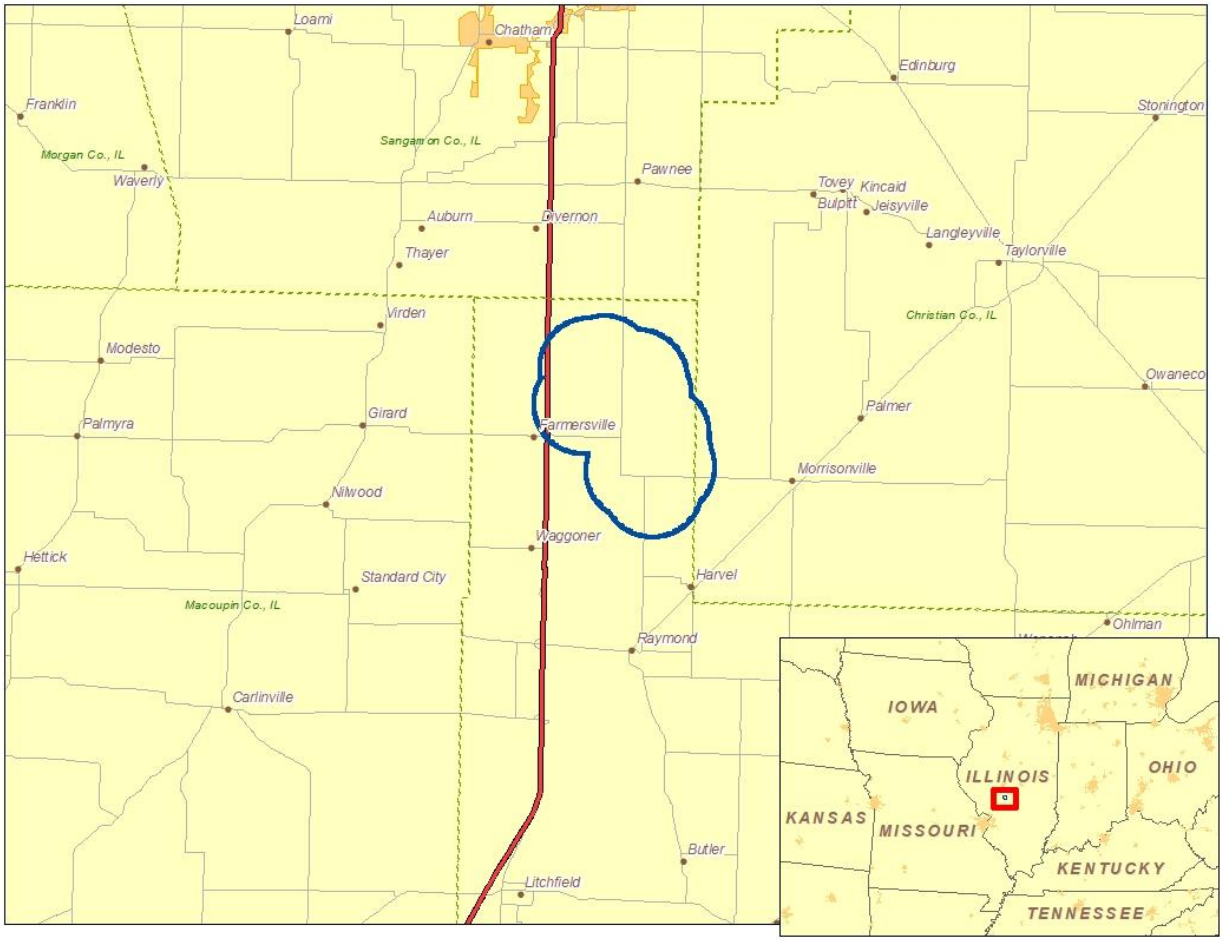


Figure 1: Virden Wind Project Area

2. Summary of Results

Methodology

Most bands used for wireless internet services (primarily the unlicensed bands) have no reliable data source available since according to FCC rules, these systems are not required to license or register their transmitter locations. Therefore, the only band with a reliable data set to evaluate is the 3.65 GHz WBS (Wireless Broadband Systems) band, which by FCC rule requires registration of base and fixed transmitters. Our analysis will include any providers found in this band, but will not necessarily include providers with unlicensed systems. This is due to the lack of available data and the providers' lack of interference protection as a consequence of their unlicensed status.

Results

Our 3.65 GHz band search identified two wireless internet systems within 50 km of the proposed turbines in the Virden Wind Project. Our search results are shown in the map on the next page. The distances listed in Table 1 below correspond to the shortest distance between the proposed turbines and wireless transmitter(s) for each operator.

Call Sign(s)	Licensee	FRN	Number of Licensed Antennas	Distance to Nearest Turbine (km)
WQUQ272	Rhino Communications	0021487566	68	22.8
WQVK773	Onvoy Spectrum, LLC	0024415002	1	29.7

Table 2: Summary of Licensed WISP Operators within 50 km of the Virden Wind Project

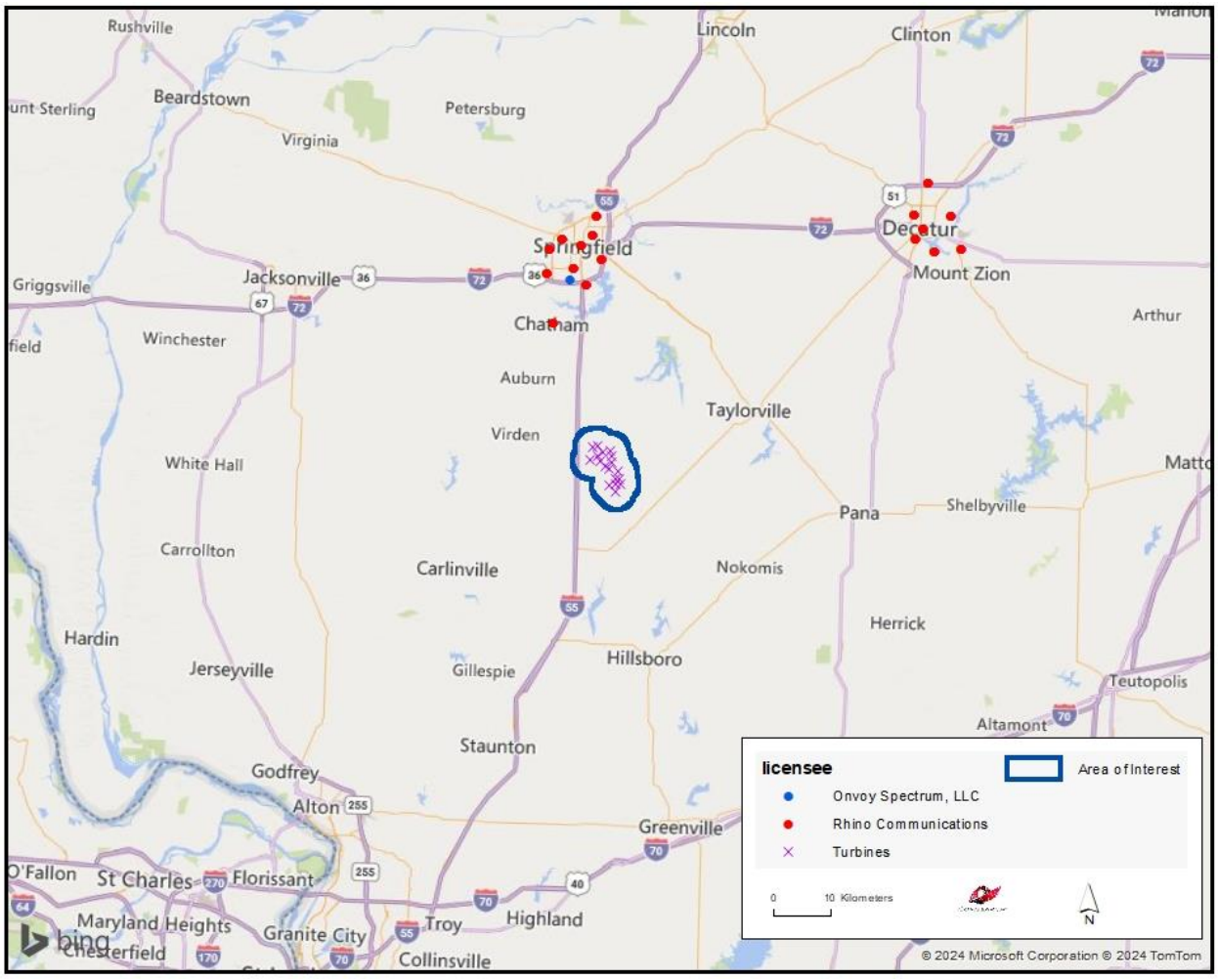


Figure 2: Licensed 3.65 GHz Transmitters within 50 km of the Proposed Turbine

Unlicensed Bands

As mentioned previously, there are no reliable data sources for unlicensed wireless internet systems because they are not required to license or register their transmitter locations according to FCC rules.

Impact Assessment

The presence of wind turbines within a coverage area of a wireless Internet provider is unlikely to pose a problem for their provision of service. As shown in the map above, all but one of the providers identified in this report use multiple base transmitter sites in and around the project area. Therefore, some locations within their service area could receive coverage from more than one base transmitter in which case a WISP could simply assign a subscriber to the best-serving base transmitter (i.e., highest signal level). Hence, if a wind turbine obstructs the line-of-sight between a particular subscriber and a transmitter, the WISP could assign the affected subscriber to an alternate signal from a different transmitter location, thereby resulting in no disruption to service.

3. Conclusion

The presence of wind turbines within a coverage area of a wireless Internet provider is unlikely to pose a problem for their provision of service. In the event that a WISP carrier believes that their coverage has been compromised by the presence of the wind energy facility, they have many options to improve their signal coverage to the area. This includes the optimization of surrounding base stations or the addition of a new sector or cell site. Utility towers, other communications towers, or even a turbine tower within the wind project area can serve as the platform for a new base station, cell enhancer, or repeater.

4. Contact

For questions or information regarding the Wireless Internet Services Report, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
Address:	21515 Ridgetop Circle, Suite 300, Sterling, VA 20166
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	David.Meyer@CommScope.com
Web site:	www.comsearch.com

Illinois Department of Natural Resources
JB Pritzker, Governor • Natalie Phelps Finnie, Director
One Natural Resources Way • Springfield, Illinois 62702-1271
www.dnr.illinois.gov

February 5, 2024

Christine Daniels
Montgomery County Board Admin.
#1 Courthouse Square
Room 202
Hillsboro, IL 62049

RE: Virden Wind Energy Project
Consultation Program
EcoCAT Review #2407619 [2317655]
Montgomery County

Dear Christine:

The Department has received your submission for this project for the purposes of consultation pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

The proposed action consists of a proposed wind development in Montgomery County, Illinois.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

State Threatened or Endangered Species
Black-billed Cuckoo (*Coccyzus erythropthalmus*) *
Indiana Bat (*Myotis sodalis*)*
Northern Long-eared Bat (*Myotis septentrionalis*)*
Upland Sandpiper (*Bartramia longicauda*)*

Due to the project scope and proximity to protected resources, the Department offers the following comments and recommends the following actions be taken to avoid adversely impacting listed species in the vicinity of the project:

* This species was not indicated to be in the vicinity of the project by the Illinois Natural Heritage Database, however, due to the potential suitable habitat in the project area and occurrence of records in the vicinity, it was added to the list of species being reviewed for this project.

Black-billed Cuckoo, Indiana Bat, Northern Long-eared Bat, & Upland Sandpiper

The Department recommends that the County require the project proponent to curtail wind turbine operations below wind speeds of 6.9 meters per second, from sunset to sunrise, between July 15 and October 15, to avoid the unlawful take of State-listed bats and birds, and to minimize mortality of all bat species. Wind turbines should be feathered (minimal rotations) during these curtailment events.

- If the above recommendations cannot be implemented, the Department has determined adverse impacts are likely and thus recommends the project proponent seek an Incidental Take Authorization (ITA) pursuant to Part 1080 and Section 5.5 of the *Illinois Endangered Species Protection Act* for the Black-billed Cuckoo, Indiana Bat, Northern Long-eared Bat, and Upland Sandpiper.

Please note that due to the federal status of the Indiana Bat and Northern Long-eared Myotis, and their potential occurrence in the project area, coordination with the U.S. Fish and Wildlife Service may be necessary and is separate from this consultation and Illinois State regulations.

Given the above recommendations are adopted, the Department has determined that impacts to these protected resources are unlikely. The Department has determined impacts to other protected resources in the vicinity of the project location are also unlikely. If the recommended ITA is pursued and issued, that authorization and associated permits provide legal protection should the project take a listed species

In accordance with 17 Ill. Adm. Code 1075.40(h), please notify the Department of your decision regarding these recommendations.

Consultation on the part of the Department is closed, unless the applicant desires additional information or advice related to this proposal. Consultation for Part 1075 is valid for two years unless new information becomes available which was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the action has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary.

The natural resource review reflects the information existing in the Illinois Natural Heritage Database at the time of the project submittal and should not be regarded as a final statement on the project being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are unexpectedly encountered during the project's implementation, the applicant must comply with the applicable statutes and regulations.

This letter does not serve as permission to take any listed or endangered species. As a reminder, no take of an endangered species is permitted without an Incidental Take Authorization or the required permits. Anyone who takes a listed or endangered species without an Incidental Take Authorization or required permit may be subject to criminal and/or civil penalties pursuant to the *Illinois Endangered Species Act*, the *Fish and Aquatic Life Act*, the *Wildlife Code* and other applicable authority.

The Department also offers the following conservation measures be considered to help protect native wildlife and enhance natural areas in the project area:

- Where industry standards allow, required night lighting should follow International Dark-Sky Association (IDA) guidance to minimize the effect of light pollution on wildlife; including shielding fixtures so no light travels upward, using "warm-white" or filtered LEDs (CCT < 3,000 K) to minimize blue emission, and avoiding over-lighting.
- Good housekeeping practices should be implemented and maintained during and after construction to prevent trash and other debris from inadvertently blowing or washing into nearby natural areas.
- Soil erosion and sediment control BMPs should be implemented and properly maintained. If erosion control blanket is to be used, wildlife-friendly plastic-free blanket should be used to prevent the entanglement of native wildlife.
- Demand-controlled night marking, which switch off the permanent night-time lighting and only activate it when an approaching flying object is near, should be implemented to minimize impacts on native bats and birds.
- The applicant should consider implementing smart curtailment technology, such as the Turbine-Integrated Mortality Reduction (TIMR) System, or other relevant best available technologies, to further minimize impacts to bats.

To avoid and minimize potential impacts to aquatic life in perennial streams and wildlife in stream riparian zones, forested areas, and CREP enrolled properties, the Department suggests the following setbacks be implemented:

- 300' linear from any perennial stream
- 1,000' linear from any forested riparian corridor
- 1,000' linear from any 5-acre forested block
- 1,000' linear from any CREP enrolled property

Please contact me with any questions about this review.
Sincerely,

Bradley Hayes
Manager, Impact Assessment Section
Division of Real Estate Services and Consultation
Office of Realty & Capital Planning
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702
Bradley.Hayes@Illinois.gov
Phone: (217) 782-0031

Cc. Heather Osborn – Incidental Take Authorization Coordinator
Charles Wright-UKA Group

EcoCAT
Ecological Compliance Assessment Tool

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Applicant:	Virden Wind Energy LLC	*IDNR Project Number:*	2407619
Contact:	Charles Wright	*Date:*	12/06/2023
Address:	1002 SE Monterey Commons Boulevard Suite 300 Stuart, FL 34996	*Alternate Number:*	2317655
Project:	Virden Wind Energy Project		
Address:	E. Frontage Road, Virden		

Description: Proposed wind development in Montgomery County, Illinois.

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)

The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Consultation is terminated. This consultation is valid for two years unless new information becomes available that was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the project has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary. Termination does not imply IDNR's authorization or endorsement.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Montgomery

Township, Range, Section:

11N, 4W, 5
11N, 4W, 6
11N, 4W, 7
11N, 4W, 8
12N, 4W, 18
12N, 4W, 19
12N, 4W, 29
12N, 4W, 30
12N, 4W, 31
12N, 4W, 32
12N, 5W, 13
12N, 5W, 14
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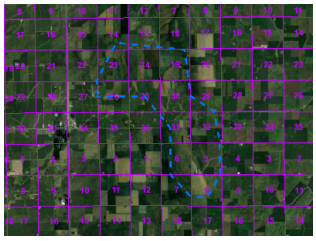
12N, 5W, 36



IL Department of Natural Resources Contact
Bradley Hayes
217-785-5500
Division of Ecosystems & Environment

Government Jurisdiction
Montgomery County Coordinated Services
Christine Daniels, County Coordinator
#1 Courthouse Square, Room 202
Hillsboro, Illinois 62049

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

2. Unauthorized attempts to upload, download, or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act.

3. IDNR reserves the right to enhance, modify, alter, or suspend the website at any time without notice, or to terminate or restrict access.

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EcoCAT operates on a state of Illinois computer system. We may use software to monitor traffic and to identify unauthorized attempts to upload, download, or change information, to cause harm or otherwise to damage this site. Unauthorized attempts to upload, download, or change information on this server is strictly prohibited by law.

Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

EcoCAT
Ecological Compliance Assessment Tool

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

EcoCAT Receipt

Project Code 2407619

APPLICANT	DATE
Virden Wind Energy LLC Charles Wright 1002 SE Monterey Commons Boulevard Suite 300 Stuart, FL 34996	12/6/2023

DESCRIPTION	FEE	CONVENIENCE FEE	TOTAL PAID
EcoCAT Consultation	$ 125.00	$ 2.81	$ 127.81

TOTAL PAID $ 127.81

Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702
217-785-5500
dnr.ecocat@illinois.gov

IN RE: CONSTRUCTION OF VIRDEN WIND PROJECT

AFFIDAVIT RE: FINANCIAL ABILITY TO COMPLETE PROJECT

AFFIDAVIT OF DANIEL DUBOIS ON BEHALF OF UKA NORTH AMERICA LLC

State of Florida)
)
County of Martin)

Daniel DuBois on behalf of UKA North America LLC, having been duly sworn and upon oath states as follows:

1. My name is Daniel DuBois. I am over the age of eighteen (18) and under no legal disability.

2. I have personal knowledge of the facts of this affidavit or have been reasonably informed regarding the facts contained in this affidavit.

3. I hold the position of Managing Director of UKA North America LLC and have been so employed since 2019.

4. I make this affidavit in compliance with the conditions of the issuance of the Special Use Permit issued by Montgomery County, Illinois.

5. UKA North America LLC (hereinafter "Company") is a renewable energy company founded in 2016. It is the sole owner of the Project company known as Virden Wind Energy LLC.

6. The Company plans to apply for a Special Use Permit with Montgomery County for the Virden Wind Project (hereinafter "Project")

7. The Project consists of approximately eighteen (18) wind energy turbines.

8. The current estimated total cost to construct the Project is $181,913,179.

9. Currently, the Company is developing fifteen (15) projects, representing approximately 1.5 gigawatts of renewable energy.

10. The Company has the capability to secure financing in order to ensure complete construction of the Project in accordance with the applied for permit and representations made in the application.

FURTHER AFFIDAVNT SAYETH NOT

Dated: March 15, 2024

By: _____ (signature) Daniel DuBois (printed name)

On behalf of: UKA North America, LLC

Subscribed and sworn to before me this 15th day of March 2024

State of FLORIDA

County of MARTIN

_____

Notary Public

DANIEL S. ZULANDT
Notary Public-State of Florida
Commission # HH 168935
My Commission Expires
August 24, 2025

*** END OF DOCUMENT ***

GENERATOR INTERCONNECTION AGREEMENT (GIA)

THIS GENERATOR INTERCONNECTION AGREEMENT ("GIA") is made and entered into this 18th day of March, 2024, by and between **Virden Wind Energy LLC**, a limited liability company organized and existing under the laws of the State of Delaware ("Interconnection Customer" with a Generating Facility), and **Ameren Services Company** as agent for **Ameren Illinois Company** d/b/a **Ameren Illinois**, a corporation organized and existing under the laws of the State of Illinois ("Transmission Owner"), and the **Midcontinent Independent System Operator, Inc**., a non-profit, non-stock corporation organized and existing under the laws of the State of Delaware ("Transmission Provider"). Interconnection Customer, Transmission Owner and Transmission Provider each may be referred to as a "Party," or collectively as the "Parties."

RECITALS

WHEREAS, Transmission Provider has functional control of the operations of the Transmission System, as defined herein, and is responsible for providing Transmission Service and Interconnection Service on the transmission facilities under its control; and

WHEREAS, Interconnection Customer intends to own, lease and/or control and operate the Generating Facility identified as a Generating Facility in Appendix A to this GIA; and

WHEREAS, Transmission Owner owns or operates the Transmission System, whose operations are subject to the functional control of Transmission Provider, to which Interconnection Customer desires to connect the Generating Facility, and may therefore be required to construct certain Interconnection Facilities and Network Upgrades, as set forth in this GIA; and

WHEREAS, Interconnection Customer, Transmission Owner and Transmission Provider have agreed to enter into this GIA, and where applicable subject to Appendix H for a Provisional Generator Interconnection Agreement, for the purpose of interconnecting the Generating Facility with the Transmission System;

NOW, THEREFORE, in consideration of and subject to the mutual covenants contained herein, it is agreed:

ARTICLE 1. DEFINITIONS

When used in this GIA, terms with initial capitalization that are not defined in Article 1 shall have the meanings specified in the Article in which they are used. Those capitalized terms used in this GIA that are not otherwise defined in this GIA have the meaning set forth in the Tariff.

10 kW Inverter Process shall mean the procedure for evaluating an Interconnection Request for a certified inverter-based Small Generating Facility no larger than 10 kW that uses the screen set forth in Section 14.

Adverse System Impact shall mean the negative effects due to technical or operational limits on conductors or equipment being exceeded that may compromise the safety and reliability of the electric system.

Affected System shall mean an electric transmission or distribution system or the electric system associated with an Existing Generating Facility or of a higher queued Generating Facility, which is an electric system other than the Transmission Owner's Transmission System that is affected by the Interconnection Request. An Affected System may or may not be subject to FERC jurisdiction.

Affected System Operator shall mean the entity that operates an Affected System.

Affiliate shall mean, with respect to a corporation, partnership or other entity, each such other corporation, partnership or other entity that directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such corporation, partnership or other entity.

Ancillary Services shall mean those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission System in accordance with Good Utility Practice.

Applicable Laws and Regulations shall mean all duly promulgated applicable federal, state and local laws, regulations, rules, ordinances, codes, decrees, judgments, directives, or judicial or administrative orders, permits and other duly authorized actions of any Governmental Authority having jurisdiction over the Parties, their respective facilities and/or the respective services they provide.

Applicable Reliability Council shall mean the Regional Entity of NERC applicable to the Local Balancing Authority of the Transmission System to which the Generating Facility is directly interconnected.

Applicable Reliability Standards shall mean Reliability Standards approved by the Federal Energy Regulatory Commission (FERC) under section 215 of the Federal Power Act, as applicable.

Base Case shall mean the base case power flow, short circuit, and stability databases used for the Interconnection Studies by Transmission Provider or Interconnection Customer.

Base Case Data shall mean base case power flow, short circuit and stability databases, including all underlying assumptions, and contingency lists. Such databases and lists, hereinafter referred to as Base Cases, shall include all (1) generation projects and (2) transmission projects, including merchant transmission projects that are proposed for the Transmission System for which a transmission expansion plan has been submitted and approved by the MISO Board.

Breach shall mean the failure of a Party to perform or observe any material term or condition of this GIA.

Breaching Party shall mean a Party that is in Breach of this GIA.

Business Day shall mean Monday through Friday, excluding Federal Holidays.

Calendar Day shall mean any day including Saturday, Sunday or a Federal Holiday. In the event that a period specified in this GIA is calculated in Calendar Days ends on a non-business day, such period shall be deemed to conclude on the following business day.

Commercial Operation shall mean the status of a Generating Facility that has commenced generating electricity for sale, excluding electricity generated during Trial Operation.

Commercial Operation Date (COD) of a unit shall mean the date on which the Generating Facility commences Commercial Operation as agreed to by the Parties pursuant to Appendix E to this GIA.

Common Use Upgrade (CUU) shall mean an Interconnection Facility, Network Upgrade, System Protection Facility, or any other classified addition, alteration, or improvement on the Transmission System or the transmission system of an Affected System, not classified under Attachment FF as a Baseline Reliability Project, Market Efficiency Project, or Multi-Value Project, that is needed for the interconnection of multiple Interconnection Customers' Generating Facilities and which is the shared responsibility of such Interconnection Customers.

Confidential Information shall mean any proprietary or commercially or competitively sensitive information, trade secret or information regarding a plan, specification, pattern, procedure, design, device, list, concept, policy or compilation relating to the present or planned business of a Party, or any other information as specified in Article 22, which is designated as confidential by the Party supplying the information, whether conveyed orally, electronically, in writing, through inspection, or otherwise, that is received by another Party.

Connection Facilities shall mean the Transmission Owner's Connection Facilities and the MHVDC Connection Customer's Connection Facilities, as defined in the MHCP.

Contingent Facilities shall mean those unbuilt Interconnection Facilities and Network Upgrades upon which the Interconnection Request's costs, timing and study findings are dependent, and if delayed or not built, could cause a need for restudies of the Interconnection Request or a reassessment of the Interconnection Facilities and/or Network Upgrades and/or costs and timing. Contingent Facilities may include facilities identified in MTEP that if delayed or not built could impact the timing of the Interconnection Request.

Default shall mean the failure of a Breaching Party to cure its Breach in accordance with Article 17 of this GIA.

Definitive Planning Phase shall mean the Generator Interconnection Procedures process which leads to a Generator Interconnection Agreement. An Interconnection Customer enters the Definitive Planning Phase pursuant to GIP Section 7.2. The Definitive Planning Phase includes three distinct phases (Definitive Planning Phases I, II, and III) pursuant to Section 7 of the Generator Interconnection Procedures.

Definitive Planning Phase Queue Position shall mean the order of a valid Interconnection Request, relative to all other pending valid Interconnection Requests, in the Definitive Planning Phase. The Definitive Planning Phase Queue Position is established based upon the date Interconnection Customer satisfies all of the requirements of GIP Section 7.2 to enter the Definitive Planning Phase. All Interconnection Requests within the same Definitive Planning Phase cycle shall have equal priority (i.e. similarly queued).

Demonstrated Capability shall mean the continuous net real power output that the Generating Facility is required to demonstrate in compliance with Applicable Reliability Standards.

Dispute Resolution shall mean the procedure for resolution of a dispute between or among the Parties in which they will first attempt to resolve the dispute on an informal basis.

Distribution System shall mean the Transmission Owner's facilities and equipment, or the Distribution System of another party that is interconnected with the Transmission Owner's Transmission System, if any, connected to the Transmission System, over which facilities Transmission Service or Wholesale Distribution Service under the Tariff is available at the time Interconnection Customer has requested interconnection of a Generating Facility for the purpose of either transmitting electric energy in interstate commerce or selling electric energy at wholesale in interstate commerce and which are used to transmit electricity to ultimate usage points such as homes and industries directly from nearby generators or from interchanges with higher voltage transmission networks which transport bulk power over longer distances. The voltage levels at which distribution systems operate differ among Local Balancing Authorities and other entities owning distribution facilities interconnected to the Transmission System.

Distribution Upgrades shall mean the additions, modifications, and upgrades to the Distribution System at or beyond the Point of Interconnection to facilitate interconnection of the Generating Facility and render the delivery service necessary to affect Interconnection

Customer's wholesale sale of electricity in interstate commerce. Distribution Upgrades do not include Interconnection Facilities.

Effective Date shall mean the date on which this GIA becomes effective upon execution by the Parties subject to acceptance by the Commission, or if filed unexecuted, upon the date specified by the Commission.

Emergency Condition shall mean a condition or situation: (1) that in the reasonable judgment of the Party making the claim is imminently likely to endanger, or is contributing to the endangerment of, life, property, or public health and safety; or (2) that, in the case of either Transmission Provider or Transmission Owner, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to the Transmission System, Transmission Owner's Interconnection Facilities or the electric systems of others to which the Transmission System is directly connected; or (3) that, in the case of Interconnection Customer, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to, the Generating Facility or Interconnection Customer's Interconnection Facilities. System restoration and blackstart shall be considered Emergency Conditions; provided that Interconnection Customer is not obligated by this GIA to possess blackstart capability. Any condition or situation that results from lack of sufficient generating capacity to meet load requirements or that results solely from economic conditions shall not constitute an Emergency Condition, unless one of the enumerated conditions or situations identified in this definition also exists.

Energy Displacement Agreement shall mean an agreement between an Interconnection Customer with an Existing Generating Facility on the Transmission Provider's Transmission System and an Interconnection Customer with a proposed Generating Facility seeking to interconnect with Surplus Interconnection Service. The Energy Displacement Agreement specifies the term of operation, the Generating Facility Interconnection Service limit, and the mode of operation for energy production (common or singular operation).

Energy Resource Interconnection Service (ER Interconnection Service) shall mean an Interconnection Service that allows Interconnection Customer to connect its Generating Facility to the Transmission System or Distribution System, as applicable, to be eligible to deliver the Generating Facility's electric output using the existing firm or non-firm capacity of the Transmission System on an as available basis. Energy Resource Interconnection Service does not convey transmission service.

Engineering & Procurement (E&P) Agreement shall mean an agreement that authorizes Transmission Owner to begin engineering and procurement of long lead-time items necessary for the establishment of the interconnection in order to advance the implementation of the Interconnection Request.

Environmental Law shall mean Applicable Laws or Regulations relating to pollution or protection of the environment or natural resources.

Existing Generating Facility shall mean a Generating Facility that is either under construction or is in service, and has an unsuspended interconnection agreement with its host transmission provider.

Facilities Construction Agreement (FCA) shall mean the form of facilities construction agreement, set forth in Appendix 8 to these Generator Interconnection Procedures. The FCA shall be used when an Interconnection Customer causes the need for the construction of Network Upgrades or System Protection Facilities on the transmission system of an Affected System.

Fast Track Process shall mean the procedure for evaluating an Interconnection Request for a certified Small Generating Facility no larger than five MW that includes the screen set forth in Section 14, customer options meeting, and optional supplemental review.

Federal Holiday shall mean a Federal Reserve Bank holiday for a Party that has its principal place of business in the United States and a Canadian Federal or Provincial banking holiday for a Party that has its principal place of business located in Canada.

Federal Power Act shall mean the Federal Power Act, as amended, 16 U.S.C. §§ 791a *et seq*.

FERC shall mean the Federal Energy Regulatory Commission, also known as Commission, or its successor.

Final System Impact Study shall mean the Interconnection System Impact Study performed during Definitive Planning Phase III.

Force Majeure shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure event does not include an act of negligence or intentional wrongdoing by the Party claiming Force Majeure.

Generating Facility shall mean Interconnection Customer's device(s) for the production and/or storage for later injection of electricity identified in the Interconnection Request, but shall not include the Interconnection Customer's Interconnection Facilities. A Generating Facility consists of one or more generating unit(s) and/or storage device(s) which usually can operate independently and be brought online or taken offline individually.

Generating Facility Capacity shall mean the net capacity of the Generating Facility and the aggregate net capacity of the Generating Facility where it includes multiple energy production devices.

Generating Facility Modification shall mean modification to an Existing Generating Facility, including comparable replacement of only a portion of its equipment at the Existing Generating Facility.

Generating Facility Replacement shall mean replacement of one or more generating units and/or storage devices at the Existing Generating Facility with one or more new generating units or storage devices at the same electrical Point of Interconnection as the generating units and/or storage devices that is/are being decommissioned and electrically disconnected.

Generator Interconnection Agreement (GIA) shall mean the form of interconnection agreement, set forth herein.

Generator Interconnection Procedures (GIP) shall mean the interconnection procedures set forth in Attachment X of the Tariff.

Generator Upgrades shall mean the additions, modifications, and upgrades to the electric system of an Existing Generating Facility or of a higher queued Generating Facility at or beyond the Point of Interconnection to facilitate interconnection of the Generating Facility and render the Transmission Service necessary to affect Interconnection Customer's wholesale sale of electricity in interstate commerce.

Good Utility Practice shall mean any of the practices, methods and acts engaged in or approved by a significant portion of the electric industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

Governmental Authority shall mean any federal, state, local or other governmental regulatory or administrative agency, court, commission, department, board, or other governmental subdivision, legislature, rulemaking board, tribunal, or other governmental authority having jurisdiction over the Parties, their respective facilities, or the respective services they provide, and exercising or entitled to exercise any administrative, executive, police, or taxing authority or power; provided, however, that such term does not include Interconnection Customer, Transmission Provider, Transmission Owner, or any Affiliate thereof.

Group Study(ies) shall mean the process whereby more than one Interconnection Request is studied together, instead of serially, for the purpose of conducting one or more of the required Studies.

Hazardous Substances shall mean any chemicals, materials or substances defined as or included in the definition of "hazardous substances," "hazardous wastes," "hazardous materials," "hazardous constituents," "restricted hazardous materials," "extremely hazardous substances," "toxic substances," "radioactive substances," "contaminants," "pollutants," "toxic pollutants" or words of similar meaning and regulatory effect under any applicable Environmental Law, or any other chemical, material or substance, exposure to which is prohibited, limited or regulated by any applicable Environmental Law.

HVDC Facilities shall mean the high voltage direct current transmission facilities, including associated alternating current facilities, if any, that are subject to Section 27A of the Tariff and that are specifically identified in (i) any Agency Agreement pertaining to such facilities between Transmission Provider and Transmission Owner that owns or operates such facilities, or (ii) in any other arrangement that permits or will permit Transmission Provider to provide HVDC Service over such facilities as set forth in Section 27A of the Tariff.

HVDC Service shall mean Firm and Non-Firm Point-To-Point Transmission Service provided by Transmission Provider on HVDC Facilities pursuant to Section 27A of the Tariff.

Initial Synchronization Date shall mean the date upon which the Generating Facility is initially synchronized and upon which Trial Operation begins.

Injection Rights shall mean the Transmission Provider's pre-certification of the Transmission System's capability to receive capacity and energy from the MHVDC Transmission Line at the requested Point of Connection, and in the specified MW quantity, without degrading the reliability of the Transmission System, as described in Section 16 of the GIP and Section 3.2.3 of the MHCP.

In-Service Date (ISD) shall mean the date upon which Interconnection Customer reasonably expects it will be ready to begin use of the Transmission Owner's Interconnection Facilities to obtain backfeed power.

Interconnection Customer shall mean any entity, including Transmission Provider, Transmission Owner or any of the Affiliates or subsidiaries of either, that proposes to interconnect its Generating Facility with the Transmission System.

Interconnection Customer Decision Point I shall mean the time period beginning when the Interconnection Customer is provided the Preliminary System Impact Study results including cost estimates for upgrades and concludes after fifteen (15) Business Days.

Interconnection Customer Decision Point II shall mean the time period beginning when the Interconnection Customer is provided the Revised System Impact Study results including cost estimates for upgrades and the Affected Systems analysis results including cost estimates for upgrades on the Affected System and concludes after fifteen (15) Business Days.

Interconnection Customer's Interconnection Facilities (ICIF) shall mean all facilities and equipment, as identified in Appendix A of this GIA, that are located between the Generating Facility and the Point of Change of Ownership, including any modification, addition, or upgrades to such facilities and equipment necessary to physically and electrically interconnect the Generating Facility to the Transmission System or Distribution System, as applicable. Interconnection Customer's Interconnection Facilities are sole use facilities.

Interconnection Facilities shall mean the Transmission Owner's Interconnection Facilities and the Interconnection Customer's Interconnection Facilities. Collectively,

Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Generating Facility to the Transmission System. Interconnection Facilities shall not include Distribution Upgrades, Generator Upgrades, Stand Alone Network Upgrades or Network Upgrades.

Interconnection Facilities Study(ies) shall mean a study conducted by Transmission Provider, or its agent, for Interconnection Customer to determine a list of facilities (including Transmission Owner's Interconnection Facilities, System Protection Facilities, and if such upgrades have been determined, Network Upgrades, Distribution Upgrades, Generator Upgrades, Common Use Upgrades, and upgrades on Affected Systems, as identified in the Interconnection System Impact Study), the cost of those facilities, and the time required to interconnect the Generating Facility with the Transmission System.

Interconnection Facilities Study Agreement shall mean the form of agreement contained in Appendix 4 of the Generator Interconnection Procedures for conducting the Interconnection Facilities Study.

Interconnection Request shall mean (1) an Interconnection Customer's request, in the form of Appendix 1 to the Generator Interconnection Procedures, to interconnect a new Generating Facility, or to increase the capacity of, or make a Material Modification to the operating characteristics of, an Existing Generating Facility that is interconnected with the Transmission System, or to interconnect an Existing Generating Facility that is external to the Transmission System, or to change Energy Resource Interconnection Service to Network Resource Interconnection Service for an Existing Generating Facility; or (2) an MHVDC Connection Customer's request, in the form of Appendix 1 to the Generator Interconnection Procedures, to obtain Injection Rights..

Interconnection Service shall mean the service provided by Transmission Provider associated with interconnecting the Generating Facility to the Transmission System, or external host transmission provider if applicable, and enabling it to receive electric energy and capacity from the Generating Facility at the Point of Interconnection pursuant to the terms of this Generator Interconnection Agreement or Point of Delivery as set forth in the Service Agreement for Network Resource Interconnection Service for an External Generating Facility and, if applicable, the Tariff.

Interconnection Study (or Study) shall mean any of the studies described in the Generator Interconnection Procedures.

Interconnection Study Agreement shall mean the form of agreement contained in Attachment B to Appendix 1 of the Generator Interconnection procedures for conducting all studies required by the Generator Interconnection Procedures.

Interconnection System Impact Study shall mean an engineering study that evaluates the impact of the proposed interconnection on the safety and reliability of Transmission System and, if applicable, an Affected System. The study shall identify and detail the system impacts

that would result if the Generating Facility were interconnected without project modifications or system modifications, or to study potential impacts, including but not limited to those identified in the Scoping Meeting as described in the Generator Interconnection Procedures.

Interconnection Study Agreement shall mean the forms of agreement contained in Attachment B to Appendix 1 of the Generator Interconnection Procedures for conducting all studies required by the Generator Interconnection Procedures.

IRS shall mean the Internal Revenue Service.

Local Balancing Authority shall mean an operational entity or a Joint Registration Organization which is (i) responsible for compliance with the subset of NERC Balancing Authority Reliability Standards defined in the Balancing Authority Agreement for their local area within the MISO Balancing Authority Area, (ii) a Party to Balancing Authority Agreement, excluding MISO, and (iii) provided in the Balancing Authority Agreement.

Loss shall mean any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's performance, or non-performance of its obligations under this GIA on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing, by the indemnified party.

Material Modification shall mean: (1) modification to an Interconnection Request in the queue, that has a material adverse impact on the cost or timing of any other Interconnection Request with a later queue priority date; or Qualified Change.

Metering Equipment shall mean all metering equipment installed or to be installed at the Generating Facility, Interconnection Customer's Interconnection Facilities, and/or Transmission Owner's Interconnection Facilities pursuant to this GIA at the metering points, including but not limited to instrument transformers, MWh-meters, data acquisition equipment, transducers, remote terminal unit, communications equipment, phone lines, and fiber optics.

Monitoring and Consent Agreement shall mean an agreement that defines the terms and conditions applicable to a Generating Facility acquiring Surplus Interconnection Service. The Monitoring and Consent Agreement will list the roles and responsibilities of an Interconnection Customer seeking to interconnect with Surplus Interconnection Service and Transmission Owner to maintain the total output of the Generating Facility inside the parameters delineated in the GIA.

Multi-Party Facilities Construction Agreement (MPFCA) shall mean the form of facilities construction agreement, set forth in Appendix 9 to these Generator Interconnection Procedures. The MPFCA shall be used when multiple Interconnection Requests cause the need for the construction of Common Use Upgrades on the Transmission System or the transmission system of an Affected System and share cost responsibility for such Common Use Upgrades.

NERC shall mean the North American Electric Reliability Corporation or its successor organization.

Network Customer shall have that meaning as provided in the Tariff.

Network Resource shall mean any designated generating resource owned, purchased, or leased by a Network Customer under the Tariff. Network Resources do not include any resource, or any portion thereof, that is committed for sale to third parties or otherwise cannot be called upon to meet the Network Customer's Network Load on a non-interruptible basis.

Network Resource Interconnection Service (NR Interconnection Service) shall mean an Interconnection Service that allows Interconnection Customer to integrate its Generating Facility with the Transmission System in the same manner as for any Generating Facility being designated as a Network Resource. Network Resource Interconnection Service does not convey transmission service. Network Resource Interconnection Service shall include any network resource interconnection service established under an agreement with, or the tariff of, a Transmission Owner prior to integration into MISO, that is determined to be deliverable through the integration deliverability study process.

Network Upgrades shall mean the additions, modifications, and upgrades to the Transmission System required at or beyond the point at which the Interconnection Facilities connect to the Transmission System or Distribution System, as applicable, to accommodate the interconnection of the Generating Facility(ies) to the Transmission System. Network Upgrades shall not include any HVDC Facility Upgrades.

Notice of Dispute shall mean a written notice of a dispute or claim that arises out of or in connection with this GIA or its performance.

Optional Interconnection Study shall mean a sensitivity analysis based on assumptions specified by Interconnection Customer in the Optional Interconnection Study Agreement.

Optional Interconnection Study Agreement shall mean the form of agreement contained in Appendix 5 of the Generator Interconnection Procedures for conducting the Optional Interconnection Study.

Outage Transfer Distribution Factor (OTDF) Outage Transfer Distribution Factor, as defined by NERC.

Party or Parties shall mean Transmission Provider, Transmission Owner, Interconnection Customer, or any combination of the above.

Permissible Technological Advancement shall mean advancements to turbines, inverters, plant supervisory controls, excitation systems, or other technological advancements submitted to the Transmission Provider prior to the issuance of this draft Generator Interconnection Agreement for such project provided that such advancements does not: (1) degrade the electrical characteristics of the generating equipment; (2) does not cause any material

adverse impact on the Transmission System with regard to short circuit capability limits, steady-state thermal and voltage limits, or dynamic system stability and response; (3) does not increase the installed capacity of the Generating Facility; or (4) change the fuel source of the proposed Generating Facility.

Point of Change of Ownership (PCO) shall mean the point, as set forth in Appendix A to the Generator Interconnection Agreement, where the Interconnection Customer's Interconnection Facilities connect to the Transmission Owner's Interconnection Facilities.

Point of Interconnection (POI) shall mean the point, as set forth in Appendix A of the GIA, where the Interconnection Facilities connect to the Transmission System.

Preliminary System Impact Study shall mean the Interconnection System Impact Study performed during Definitive Planning Phase I.

Pre-Queue Phase shall mean Interconnection Customer outreach and education effort undertaken prior to the submission of the Interconnection Request.

Provisional Generator Interconnection Agreement shall mean the interconnection agreement for Provisional Interconnection Service established between the Transmission Provider and/or the Transmission Owner and the Interconnection Customer as set forth in Section 7.9 of this Attachment X. This agreement shall take the form of the Generator Interconnection Agreement modified for provisional purposes. Unless otherwise provided in the GIP, all requirements applicable to the Generator Interconnection Agreement shall apply to the Provisional Generator Interconnection Agreement.

Provisional Interconnection Service shall mean Interconnection Service provided by the Transmission Provider associated with interconnecting the Interconnection Customer's Generating Facility to the Transmission Provider's Transmission System and enabling that Transmission System to receive electric energy and capacity from the Generating Facility at the Point of Interconnection, pursuant to the terms of the Provisional Generator Interconnection Agreement and the Tariff.

Provisional Interconnection Study shall mean an engineering study, performed at Interconnection Customer's request, as a condition to entering into a Provisional Generator Interconnection Agreement, that evaluates the impact of the proposed interconnection on the safety and reliability of the Transmission System and, if applicable, any Affected System. The study shall identify and detail the impacts on the Transmission System and, if applicable, an Affected System, from stability, short circuit, and voltage issues that would result if the Generating Facility were interconnected without project modifications or system modifications.

Qualified Change shall mean a planned modification to an Existing Generating Facility that is undergoing evaluation for a Generating Facility Modification or Generating Facility Replacement, and has a material adverse impact on the Transmission System with respect to: i) steady-state thermal or voltage limits, ii) dynamic system stability and response, or iii) short-

circuit capability limit; compared to the impacts of the Existing Generating Facility prior to the modification or replacement.

Queue Position shall mean the order of a valid Interconnection Request, relative to all other pending valid Interconnection Requests. The Queue Position is established based upon the date and time of receipt of the valid Interconnection Request by Transmission Provider.

Reasonable Efforts shall mean, with respect to an action required to be attempted or taken by a Party under this Generator Interconnection Agreement, efforts that are timely and consistent with Good Utility Practice and are otherwise substantially equivalent to those a Party would use to protect its own interests.

Reliability Assessment Study shall mean an engineering study that evaluates the impact of a proposed Generating Facility Replacement on the reliability of Transmission System during the time period between the date that the Existing Generating Facility ceases commercial operations and the Commercial Operation Date of the Replacement Generating Facility.

Replacement Generating Facility shall mean a Generating Facility that replaces an Existing Generating Facility, or a portion thereof, at the same electrical Point of Interconnection pursuant to Section 3.7 of this Attachment X.

Replacement Impact Study shall mean an engineering study that evaluates the impact of a proposed Generating Facility Replacement on the reliability of the Transmission System.

Revised System Impact Study shall mean the Interconnection System Impact Study performed during Definitive Planning Phase II.

Scoping Meeting shall mean the meeting between representatives of Interconnection Customer, Transmission Owner, Affected System Operator(s) and Transmission Provider conducted for the purpose of discussing alternative interconnection options, to exchange information including any transmission data and earlier study evaluations that would be reasonably expected to impact such interconnection options, to analyze such information, and to determine the potential feasible Points of Interconnection.

Shared Network Upgrade shall mean a Network Upgrade or Common Use Upgrade that is funded by an Interconnection Customer(s), including when the Transmission Owner elects to fund the capital cost of such a Network Upgrade or Common Use Upgrade under Section 11.3 of the GIA, and also benefits other Interconnection Customer(s) that are later identified as beneficiaries.

Site Control shall mean a documented right for one or more parcels of land for the purpose of constructing a Generating Facility, Interconnection Customer's Interconnection Facilities, and, if applicable (*i.e.*, when the Interconnection Customer is providing the site for such facilities), the Transmission Owner's Interconnection Facilities and Network Upgrades at the POI that the Interconnection Customer will develop. Such documented right shall be one of the following: (1) ownership of a site; (2) a leasehold interest in a site; or (3) an option to

purchase or acquire a leasehold interest in a site; or (4) any other contractual or legal right to possess or occupy a site.

Small Generating Facility shall mean a Generating Facility that has an aggregate net Generating Facility Capacity of no more than five MW and meets the requirements of Section 14 and Appendix 3 of the GIP.

Special Protection System (SPS) shall mean an automatic protection system or remedial action scheme designed to detect abnormal or predetermined system conditions, and take corrective actions other than and/or in addition to the isolation of faulted components, to maintain system reliability. Such action may include changes in demand (MW and MVar), energy (MWh and MVarh), or system configuration to maintain system stability, acceptable voltage, or power flows. An SPS does not include (a) underfrequency or undervoltage load shedding, (b) fault conditions that must be isolated, (c) out-of-step relaying not designed as an integral part of an SPS, or (d) Transmission Control Devices.

Stand Alone Network Upgrades shall mean Network Upgrades, that are not part of an Affected System that an Interconnection Customer may construct without affecting day-to-day operations of the Transmission System during their construction. Transmission Provider, Transmission Owner and Interconnection Customer must agree as to what constitutes Stand Alone Network Upgrades and identify them in Appendix A to this GIA. If the Transmission Provider or Transmission Owner and Interconnection Customer disagree about whether a particular Network Upgrade is a Stand Alone Network Upgrade, the Transmission Provider or Transmission Owner that disagrees with the Interconnection Customer must provide the Interconnection Customer a written technical explanation outlining why the Transmission Provider or Transmission Owner does not consider the Network Upgrade to be a Stand Alone Network Upgrade within 15 days of its determination.

Surplus Interconnection Service shall mean any Interconnection Service that is derived from the unneeded portion of Interconnection Service established in a GIA or in agreement with, or under the tariff of, a Transmission Owner prior to integration into MISO, such that if Surplus Interconnection Service is utilized the total amount of Interconnection Service at the Point of Interconnection would remain the same.

System Planning and Analysis Phase shall mean the phase of the Generator Interconnection Procedure process, prior to January 4, 2017, which consisted of an Interconnection System Impact Study for those Interconnection Requests that were studied in this phase.

System Protection Facilities shall mean the equipment, including necessary protection signal communications equipment, required to protect (1) the Transmission System or other delivery systems or other generating systems from faults or other electrical disturbances occurring at the Generating Facility and (2) the Generating Facility from faults or other electrical system disturbances occurring on the Transmission System or on other delivery systems or other generating systems to which the Transmission System is directly connected.

Tariff shall mean the Transmission Provider's Tariff through which open access transmission service and Interconnection Service are offered, as filed with the Commission, and as amended or supplemented from time to time, or any successor tariff.

Transmission Control Devices shall mean a generally accepted transmission device that is planned and designed to provide dynamic control of electric system quantities, and are usually employed as solutions to specific system performance issues. Examples of such devices include fast valving, high response exciters, high voltage DC links, active or real power flow control and reactive compensation devices using power electronics (*e.g.*, unified power flow controllers), static var compensators, thyristor controlled series capacitors, braking resistors, and in some cases mechanically-switched capacitors and reactors. In general, such systems are not considered to be Special Protection Systems.

Transmission Owner shall mean that Transmission Owner as defined in the Tariff, which includes an entity that owns, leases or otherwise possesses an interest in the portion of the Transmission System at which Interconnection Customer proposes to interconnect or otherwise integrate the operation of the Generating Facility. Transmission Owner should be read to include any Independent Transmission Company that manages the transmission facilities of Transmission Owner and shall include, as applicable, the owner and/or operator of distribution facilities interconnected to the Transmission System, over which facilities transmission service or Wholesale Distribution Service under the Tariff is available at the time Interconnection Customer requests Interconnection Service and to which Interconnection Customer has requested interconnection of a Generating Facility for the purpose of either transmitting electric energy in interstate commerce or selling electric energy at wholesale in interstate commerce.

Transmission Provider shall mean the Midcontinent Independent System Operator, Inc. ("MISO"), the Regional Transmission Organization that controls or operates the transmission facilities of its transmission-owning members used for the transmission of electricity in interstate commerce and provides transmission service under the Tariff.

Transmission Owner's Interconnection Facilities (TOIF) shall mean all facilities and equipment owned by Transmission Owner from the Point of Change of Ownership to the Point of Interconnection as identified in Appendix A to this GIA, including any modifications, additions or upgrades to such facilities and equipment. Transmission Owner's Interconnection Facilities are sole use facilities and shall not include Distribution Upgrades, Generator Upgrades, Stand Alone Network Upgrades or Network Upgrades.

Transmission System shall mean the facilities owned by Transmission Owner and controlled or operated by Transmission Provider or Transmission Owner that are used to provide Transmission Service (including HVDC Service) or Wholesale Distribution Service under the Tariff.

Trial Operation shall mean the period during which Interconnection Customer is engaged in on-site test operations and commissioning of the Generating Facility prior to Commercial Operation.

Variable Energy Resource shall mean a device for the production of electricity that is characterized by an energy source that: (1) is renewable; (2) cannot be stored by the facility owner or operator; and (3) has variability that is beyond the control of the facility owner or operator.

Wholesale Distribution Service shall have that meaning as provided in the Tariff. Wherever the term “transmission delivery service” is used, Wholesale Distribution Service shall also be implied.

ARTICLE 2. EFFECTIVE DATE, TERM AND TERMINATION

2.1 Effective Date. This GIA shall become effective upon execution by the Parties subject to acceptance by FERC (if applicable), or if filed unexecuted, upon the date specified by FERC. Transmission Provider shall promptly file this GIA with FERC upon execution in accordance with Article 3.1, if required.

2.2 Term of Agreement. Subject to the provisions of Article 2.3, this GIA shall remain in effect for a period of thirty (30) years from the Effective Date and shall be automatically renewed for each successive one-year period thereafter on the anniversary of the Effective Date.

2.3 Termination Procedures. This GIA may be terminated as follows:

2.3.1 Written Notice. This GIA may be terminated by Interconnection Customer after giving Transmission Provider and Transmission Owner ninety (90) Calendar Days advance written notice. This GIA shall be terminated by Transmission Provider if the Generating Facility or a portion of the Generating Facility fails to achieve Commercial Operation by the Commercial Operation Date established in accordance with Section 4.4.4 of Attachment X, including any extension provided thereunder, or has ceased Commercial Operation for three (3) consecutive years, beginning with the last date of Commercial Operation for the Generating Facility, after giving Interconnection Customer ninety (90) Calendar Days advance written notice. Where only a portion of the Generating Facility fails to achieve Commercial Operation by the Commercial Operation Date established in accordance with Section 4.4.4 of Attachment X, including any extension provided thereunder, Transmission Provider shall only terminate that portion of the GIA. Notwithstanding the foregoing, in the limited circumstance that the Interconnection Request is served by a contingent Network Upgrade with an in-service date that is farther out than the Commercial Operation Date permitted under Section 4.4.4 of Attachment X, Transmission Provider shall only terminate this GIA for failure to achieve Commercial Operation by that later in-service date of the contingent Network Upgrade. The Generating Facility will not be deemed to have ceased Commercial Operation for purposes of this Article 2.3.1 if Interconnection Customer can document that it has taken other significant steps to maintain or restore operational readiness of the Generating Facility for the purpose of returning the Generating Facility to Commercial Operation as soon as possible.

2.3.1.1 Surplus Interconnection Service. Where this GIA provides for Surplus Interconnection Service and the Energy Displacement Agreement or the Monitoring and Consent Agreement required for Surplus Interconnection Service are no longer in effect, Interconnection Customer shall immediately cease Commercial Operation of the Generating Facility and this GIA shall be deemed terminated. In the event that the Existing Generating Facility retires and/or permanently ceases commercial

operation, the Surplus Interconnection Service provided under this GIA shall terminate except as provided in Section 3.3.1.3 of the GIP.

2.3.2 Default. Any Party may terminate this GIA in accordance with Article 17.

2.3.3 Notwithstanding Articles 2.3.1 and 2.3.2, no termination shall become effective until the Parties have complied with all Applicable Laws and Regulations applicable to such termination, including the filing with FERC of a notice of termination of this GIA, if required, which notice has been accepted for filing by FERC.

2.4 Termination Costs. If a Party elects to terminate this GIA pursuant to Article 2.3 above, each Party shall pay all costs incurred for which that Party is responsible (including any cancellation costs relating to orders or contracts for Interconnection Facilities, applicable upgrades, and related equipment) or charges assessed by the other Parties, as of the date of the other Parties' receipt of such notice of termination, under this GIA. In the event that this GIA is terminated by Interconnection Customer, Interconnection Customer is responsible for all financial impact that is caused as a result of this termination or the termination of Interconnection Customer's FCA(s) or MPFCA(s), such financial impact being determined through the financial impact analysis performed in accordance with Section 7.8 of Attachment X. In the event of termination by a Party, the Parties shall use commercially Reasonable Efforts to mitigate the costs, damages and charges arising as a consequence of termination. Upon termination of this GIA, unless otherwise ordered or approved by FERC:

2.4.1 With respect to any portion of the Transmission Owner's Interconnection Facilities, Network Upgrades, System Protection Facilities, Distribution Upgrades, Generator Upgrades, and if so determined and made a part of this GIA, upgrades on Affected Systems, that have not yet been constructed or installed, Transmission Owner shall to the extent possible and to the extent of Interconnection Customer's written notice under Article 2.3.1, cancel any pending orders of, or return, any materials or equipment for, or contracts for construction of, such facilities; provided that in the event Interconnection Customer elects not to authorize such cancellation, Interconnection Customer shall assume all payment obligations with respect to such materials, equipment, and contracts, and Transmission Owner shall deliver such material and equipment, and, if necessary, assign such contracts, to Interconnection Customer as soon as practicable, at Interconnection Customer's expense. To the extent that Interconnection Customer has already paid Transmission Owner for any or all such costs of materials or equipment not taken by Interconnection Customer or upgrades not yet constructed, Transmission Owner shall promptly transfer such amounts to Transmission Provider, less any costs, including penalties incurred by Transmission Owner to cancel any pending orders of or return such materials, equipment, or contracts. Transmission Provider will perform a financial impact analysis in accordance with Section 7.8 of Attachment X to determine the amount that should be refunded to Interconnection Customer. Transmission Provider shall

refund such remaining amounts to Interconnection Customer, less the amount of Automatic Withdrawal Penalty funds received by the Interconnection Customer in accordance with Section 7.8.1 of the Attachment X and less any financial impact caused by the termination of this GIA or Interconnection Customer's FCA(s) or MPFCA(s), as determined through the analysis performed in accordance with Section 7.8 of Attachment X. If Interconnection Customer made its payment(s) through a letter of credit, surety bond, or parental guarantee, Transmission Owner will draw against that letter of credit, surety bond, or parental guarantee in an amount determined through the analysis performed in accordance with Section 7.8 of Attachment X plus the amount of any Automatic Withdrawal Penalty funds received by the Interconnection Customer in accordance with Section 7.8.1 of the Attachment X, and transfer that amount to Transmission Provider, unless Interconnection Customer funds the financial impact through another means.

If an Interconnection Customer terminates this GIA, it shall be responsible for all costs incurred in association with that Interconnection Customer's interconnection, including any cancellation costs relating to orders or contracts for Interconnection Facilities and equipment, and other expenses including any upgrades or related equipment for which Transmission Owner has incurred expenses and has not been reimbursed by Interconnection Customer.

2.4.2 Transmission Owner may, at its option, retain any portion of such materials, equipment, or facilities that Interconnection Customer chooses not to accept delivery of, in which case Transmission Owner shall be responsible for all costs associated with procuring such materials, equipment, or facilities. If Transmission Owner does not so elect, then Interconnection Customer shall be responsible for such costs.

2.4.3 With respect to any portion of the Interconnection Facilities, and any other facilities already installed or constructed pursuant to the terms of this GIA, Interconnection Customer shall be responsible for all costs associated with the removal, relocation, reconfiguration or other disposition or retirement of such materials, equipment, or facilities, and such other expenses actually incurred by Transmission Owner necessary to return the Transmission, Distribution or Generator System, as applicable, to safe and reliable operation.

2.5 **Disconnection**. Upon termination of this GIA, the Parties will take all appropriate steps to disconnect the Generating Facility from the Transmission or Distribution System, as applicable. All costs required to effectuate such disconnection shall be borne by the terminating Party, unless such termination resulted from the non-terminating Party's Default of this GIA or such non-terminating Party otherwise is responsible for these costs under this GIA.

2.6 **Survival.** This GIA shall continue in effect after termination to the extent necessary to provide for final billings and payments and for costs incurred hereunder, including billings and payments pursuant to this GIA; to permit the determination and enforcement

of liability and indemnification obligations arising from acts or events that occurred while this GIA was in effect; and to permit each Party to have access to the lands of the other Party pursuant to this GIA or other applicable agreements, to disconnect, remove or salvage its own facilities and equipment.

ARTICLE 3. REGULATORY FILINGS

3.1 Filing. Transmission Provider shall file this GIA (and any amendment hereto) with the appropriate Governmental Authority, if required. A Party may request that any information so provided be subject to the confidentiality provisions of Article 22. If that Party has executed this GIA, or any amendment thereto, the Party shall reasonably cooperate with Transmission Provider with respect to such filing and to provide any information reasonably requested by Transmission Provider needed to comply with applicable regulatory requirements.

ARTICLE 4. SCOPE OF SERVICE

4.1 Interconnection Product Options. Interconnection Customer has selected the following (checked) type of Interconnection Service:

Check: _____ SI or _____ ER and/or __X__ NR (See Appendix A for details)

4.1.1 Energy Resource Interconnection Service (ER Interconnection Service).

4.1.1.1 The Product. ER Interconnection Service allows Interconnection Customer to connect the Generating Facility to the Transmission or Distribution System, as applicable, and be eligible to deliver the Generating Facility's output using the existing firm or non-firm capacity of the Transmission System on an "as available" basis. To the extent Interconnection Customer wants to receive ER Interconnection Service, Transmission Owner shall construct facilities consistent with the studies identified in Appendix A.

An Interconnection Customer seeking ER Interconnection Service for new or added capacity at a Generating Facility may be granted conditional ER Interconnection Service status to the extent there is such capacity available on the Transmission System to accommodate the Interconnection Customer's Generating Facility. At the request of Interconnection Customer, conditional ER Interconnection Service status may be granted subject to the system being able to accommodate the interconnection without upgrades, until such time as a higher queued project(s) with a later service date affecting the same common elements is placed into service. The conditional ER Interconnection Service shall be terminated in the event Interconnection Customer fails to fund the necessary studies and the Network Upgrades necessary to grant the Interconnection Customer's ER Interconnection Service upon the

completion of higher queued projects involving the same common elements.

4.1.1.2 Transmission Delivery Service Implications. Under ER Interconnection Service, Interconnection Customer will be eligible to inject power from the Generating Facility into and deliver power across the Transmission System on an "as available" basis up to the amount of MW identified in the applicable stability and steady state studies to the extent the upgrades initially required to qualify for ER Interconnection Service have been constructed. After that date FERC makes effective MISO's Energy Market Tariff filed in Docket No. ER04-691-000, Interconnection Customer may place a bid to sell into the market up to the maximum identified Generating Facility output, subject to any conditions specified in the Interconnection Service approval, and the Generating Facility will be dispatched to the extent the Interconnection Customer's bid clears. In all other instances, no transmission or other delivery service from the Generating Facility is assured, but Interconnection Customer may obtain Point-To-Point Transmission Service, Network Integration Transmission Service or be used for secondary network transmission service, pursuant to the Tariff, up to the maximum output identified in the stability and steady state studies. In those instances, in order for Interconnection Customer to obtain the right to deliver or inject energy beyond the Point of Interconnection or to improve its ability to do so, transmission delivery service must be obtained pursuant to the provisions of the Tariff. The Interconnection Customer's ability to inject its Generating Facility output beyond the Point of Interconnection, therefore, will depend on the existing capacity of the Transmission or Distribution System as applicable, at such time as a Transmission Service request is made that would accommodate such delivery. The provision of Firm Point-To-Point Transmission Service or Network Integration Transmission Service may require the construction of additional Network or Distribution Upgrades.

4.1.2 Network Resource Interconnection Service (NR Interconnection Service).

4.1.2.1 The Product. Transmission Provider must conduct the necessary studies and Transmission Owner shall construct the facilities identified in Appendix A of this GIA, subject to the approval of Governmental Authorities, needed to integrate the Generating Facility in the same manner as for any Generating Facility being designated as a Network Resource.

4.1.2.2 Transmission Delivery Service Implications. NR Interconnection Service allows the Generating Facility to be designated by any Network Customer under the Tariff on the Transmission System as a Network Resource, up to the Generating Facility's full output, on the same basis

as existing Network Resources that are interconnected to the Transmission or Distribution System, as applicable, and to be studied as a Network Resource on the assumption that such a designation will occur. Although NR Interconnection Service does not convey a reservation of Transmission Service, any Network Customer can utilize Network Integration Transmission Service under the Tariff to obtain delivery of energy from the Generating Facility in the same manner as it accesses Network Resources. A Generating Facility receiving NR Interconnection Service may also be used to provide Ancillary Services after technical studies and/or periodic analyses are performed with respect to the Generating Facility's ability to provide any applicable Ancillary Services, provided that such studies and analyses have been or would be required in connection with the provision of such Ancillary Services by any existing Network Resource. However, if the Generating Facility has not been designated as a Network Resource by any Network Customer, it cannot be required to provide Ancillary Services except to the extent such requirements extend to all generating facilities that are similarly situated. The provision of Network Integration Transmission Service or Firm Point-To-Point Transmission Service may require additional studies and the construction of additional upgrades. Because such studies and upgrades would be associated with a request for delivery service under the Tariff, cost responsibility for the studies and upgrades would be in accordance with FERC's policy for pricing transmission delivery services.

NR Interconnection Service does not necessarily provide Interconnection Customer with the capability to physically deliver the output of its Generating Facility to any particular load on the Transmission System without incurring congestion costs. In the event of transmission or distribution constraints on the Transmission or Distribution System, as applicable, the Generating Facility shall be subject to the applicable congestion management procedures in the Transmission System in the same manner as Network Resources.

There is no requirement either at the time of study or interconnection, or at any point in the future, that the Generating Facility be designated as a Network Resource by a Network Customer or that Interconnection Customer identify a specific buyer (or sink). To the extent a Network Customer does designate the Generating Facility as a Network Resource, it must do so pursuant to the Tariff.

Once an Interconnection Customer satisfies the requirements for obtaining NR Interconnection Service, any future Transmission Service request for delivery from the Generating Facility within the Transmission System of any amount of capacity and/or energy, up to the amount initially studied, will not require that any additional studies be

performed or that any further upgrades associated with such Generating Facility be undertaken, regardless of whether such Generating Facility is ever designated by a Network Customer as a Network Resource and regardless of changes in ownership of the Generating Facility. To the extent Interconnection Customer enters into an arrangement for long term Transmission Service for deliveries from the Generating Facility to customers other than the studied Network Customers, or for any Point-To-Point Transmission Service, such request may require additional studies and upgrades in order for Transmission Provider to grant such request. However, the reduction or elimination of congestion or redispatch costs may require additional studies and the construction of additional upgrades.

To the extent Interconnection Customer enters into an arrangement for long term Transmission Service for deliveries from the Generating Facility outside the Transmission System, such request may require additional studies and upgrades in order for Transmission Provider to grant such request.

4.1.2.3 Conditional NR Interconnection Service. An Interconnection Customer seeking NR Interconnection Service for new or added capacity at a Generating Facility may be granted conditional NR Interconnection Service status to the extent there is such capacity available on the Transmission System to accommodate the Interconnection Customer's Generating Facility. At the request of Interconnection Customer, conditional NR Interconnection Service status may be granted subject to the system being able to accommodate the interconnection without upgrades, until such time as higher queued project(s) with a later service date affecting the same common elements is placed into service. The conditional NR Interconnection Service status may be converted to ER Interconnection Service if either of the following occurs:

1) Interconnection Customer fails to fund necessary studies and Network Upgrades required to allow the Interconnection Customer's Generating Facility to receive NR Interconnection Service upon the completion of higher queued projects involving the same common elements; or

2) The higher queued project(s) or planned and required Network Upgrades are placed in service and the Network Upgrades required to provide NR Interconnection Service status to the Interconnection Customer's Generating Facility are not in service.

In the event Interconnection Customer fails to fund the necessary studies and Network Upgrades for NR Interconnection Service, the Interconnection Customer's conditional NR Interconnection Service status

shall be converted to ER Interconnection Service status unless Interconnection Customer makes a new Interconnection Request. Such new Interconnection Request shall be evaluated in accordance with the GIP and its new queue position.

Some or all of the conditional NR Interconnection Service status may be temporarily revoked if the Network Upgrades are not in service when the higher queued project(s) are placed in service. The availability of conditional NR Interconnection Service status will be determined by Transmission Provider's studies. Upon funding and completion of the Network Upgrades required to establish the Generating Facility's NR Interconnection Service status, the Generating Facility will be granted NR Interconnection Service status.

The Parties agree that the portion of the Generating Facility classified as NR Interconnection Service is the first portion of the output of the combined output of all the units at the Generating Facility except in circumstances where Interconnection Customer otherwise elects this GIA, as amended, to allocate that portion to the output of specific unit(s) at the Generating Facility, the total of which will not exceed the output eligible for NR Interconnection Service as shown by the additional studies. To the extent Interconnection Customer desires to obtain NR Interconnection Service for any portion of the Generating Facility in addition to that supported by such additional studies, Interconnection Customer will be required to request such additional NR Interconnection Service through a separate Interconnection Request in accordance with the GIP.

4.1.3 Surplus Interconnection Service (SI).

4.1.3.1 The Product. Surplus Interconnection Service is restricted Interconnection Service that allows an Interconnection Customer to increase the gross generating capability at the same Point of Interconnection of an Existing Generating Facility without increasing the total amount of Interconnection Service at the Point of Interconnection.

4.1.3.2 Transmission Delivery Service Implications. Surplus Interconnection Service does not convey any right to deliver electricity to any specific customer or Point of Delivery.

4.2 Provision of Service. Transmission Provider shall provide Interconnection Service for the Generating Facility at the Point of Interconnection.

4.3 Performance Standards. Each Party shall perform all of its obligations under this GIA in accordance with Applicable Laws and Regulations, Applicable Reliability Standards, and Good Utility Practice. To the extent a Party is required or prevented or limited in taking any action by such regulations and standards, or if the obligations of any Party

may become limited by a change in Applicable Laws and Regulations, Applicable Reliability Standards, and Good Utility Practice after the execution of this GIA, that Party shall not be deemed to be in Breach of this GIA for its compliance therewith. The Party so limited shall notify the other Parties whereupon Transmission Provider shall amend this GIA in concurrence with the other Parties and submit the amendment to the Commission for approval.

4.4 No Transmission Delivery Service. The execution of this GIA does not constitute a request for, or the provision of, any transmission delivery service under the Tariff, and does not convey any right to deliver electricity to any specific customer or Point of Delivery.

4.5 Interconnection Customer Provided Services. The services provided by Interconnection Customer under this GIA are set forth in Article 9.6 and Article 13.4.1. Interconnection Customer shall be paid for such services in accordance with Article 11.7.

ARTICLE 5. INTERCONNECTION FACILITIES ENGINEERING, PROCUREMENT, AND CONSTRUCTION

5.1 Options. Unless otherwise mutually agreed to between the Parties, Interconnection Customer shall select: 1) the In-Service Date, Initial Synchronization Date, and Commercial Operation Date based on a reasonable construction schedule that will allow sufficient time for design, construction, equipment procurement, and permit acquisition of Transmission System equipment or right-of-way; and 2) either the Standard Option or Alternate Option set forth below and such dates and selected option shall be set forth in Appendix B. If the dates designated by Interconnection Customer are not acceptable to Transmission Owner, Transmission Owner shall so notify Interconnection Customer within thirty (30) Calendar Days. Upon receipt of the notification that Interconnection Customer's designated dates are not acceptable to Transmission Owner, the Interconnection Customer shall notify Transmission Owner within thirty (30) Calendar Days whether it elects to exercise the Option to Build if it has not already elected to exercise the Option to Build.

5.1.1 Standard Option. Transmission Owner shall design, procure, and construct the Transmission Owner's Interconnection Facilities, Network Upgrades, System Protection Facilities, Distribution Upgrades, and Generator Upgrades using Reasonable Efforts to complete the Transmission Owner's Interconnection Facilities, Network Upgrades, System Protection Facilities, Distribution Upgrades and Generator Upgrades by the dates set forth in Appendix B, Milestones, subject to the receipt of all approvals required from Governmental Authorities and the receipt of all land rights necessary to commence construction of such facilities, and such other permits or authorizations as may be required. Transmission Provider or Transmission Owner shall not be required to undertake any action which is inconsistent with its standard safety practices, its material and equipment specifications, its design criteria and construction procedures, its labor agreements, Applicable Laws and Regulations and Good Utility Practice. In the

event Transmission Owner reasonably expects that it will not be able to complete the Transmission Owner's Interconnection Facilities, Network Upgrades, System Protection Facilities, Distribution Upgrades and Generator Upgrades by the specified dates, Transmission Owner shall promptly provide written notice to Interconnection Customer and Transmission Provider and shall undertake Reasonable Efforts to meet the earliest dates thereafter.

5.1.2 Alternate Option. If the dates designated by Interconnection Customer are acceptable to Transmission Provider and Transmission Owner, Transmission Provider shall so notify Interconnection Customer within thirty (30) Calendar Days, and Transmission Owner shall assume responsibility for the design, procurement and construction of the Transmission Owner's Interconnection Facilities by the designated dates.

If Transmission Owner subsequently fails to complete the Transmission Owner's Interconnection Facilities by the In-Service Date, to the extent necessary to provide back feed power; or fails to complete Network Upgrades by the Initial Synchronization Date to the extent necessary to allow for Trial Operation at full power output, unless other arrangements are made by the Parties for such Trial Operation; or fails to complete the Network Upgrades by the Commercial Operation Date, as such dates are reflected in Appendix B, Milestones; Transmission Owner shall pay Interconnection Customer liquidated damages in accordance with Article 5.3, Liquidated Damages, provided, however, the dates designated by Interconnection Customer shall be extended day for day for each Calendar Day that Transmission Provider refuses to grant clearances to install equipment.

Transmission Owner and Interconnection Customer may adopt an incentive payment schedule that is mutually agreeable to encourage Transmission Owner to meet specified accelerated dates. Such payment by Interconnection Customer is not subject to refund.

5.1.3 Option to Build. Pursuant to Section 7.3.2.5 & 7.3.3.5 of the GIP, Interconnection Customer shall have the option to assume responsibility for the design, procurement and construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades by the dates originally designated by Interconnection Customer under Article 5.1.2. The Parties must agree as to what constitutes Stand Alone Network Upgrades and identify such Stand Alone Network Upgrades in Appendix A. Except for Stand Alone Network Upgrades, Interconnection Customer shall have no right to construct Network Upgrades under this option.

5.1.4 Negotiated Option. If the dates designated by Interconnection Customer pursuant to Article 5.1 are not acceptable to Transmission Owner, the Parties shall in good faith attempt to negotiate terms and conditions (including revision of the specified dates and liquidated damages, the provision of incentives, or the

procurement and construction of all facilities other than Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades if the Interconnection Customer elects to exercise the Option to Build under Article 5.1.3). If the Parties are unable to reach agreement on such terms and conditions, then, pursuant to Article 5.1.1 (Standard Option), Transmission Owner shall assume responsibility for the design, procurement and construction of all facilities other than Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades if the Interconnection Customer has elected to exercise the Option to Build.

Transmission Owner and Interconnection Customer may adopt an incentive payment schedule that is mutually agreeable to encourage Transmission Owner to meet specified accelerated dates. Such payment by Interconnection Customer is not subject to refund.

5.2 General Conditions Applicable to Option to Build. If Interconnection Customer assumes responsibility for the design, procurement and construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades after receipt of all required approvals from Governmental Authorities necessary to commence construction,

(1) Interconnection Customer shall engineer, procure equipment, and construct the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades (or portions thereof) using Good Utility Practice and using standards and specifications provided in advance by Transmission Owner, or as required by any Governmental Authority;

(2) Interconnection Customer's engineering, procurement and construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades shall comply with all requirements of law or Governmental Authority to which Transmission Owner would be subject in the engineering, procurement or construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades;

(3) Transmission Provider, at Transmission Provider's option, and Transmission Owner shall be entitled to review and approve the engineering design, equipment acceptance tests(including witnessing of acceptance tests), and the construction (including monitoring of construction) of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades, and shall have the right to reject any design, procurement, construction or acceptance test of any equipment that does not meet the standards and specifications of Transmission Provider, Transmission Owner and any Governmental Authority;

(4) prior to commencement of construction, Interconnection Customer shall provide to Transmission Provider and Transmission Owner a schedule for construction of the Transmission Owner's Interconnection Facilities and Stand

Alone Network Upgrades, and shall promptly respond to requests for information from Transmission Provider and Transmission Owner;

(5) at any time during construction, Transmission Provider and Transmission Owner shall have unrestricted access to the construction site for the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades and to conduct inspections of the same;

(6) at any time during construction, should any phase of the engineering, equipment procurement, or construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades not meet the standards and specifications provided by Transmission Owner, Interconnection Customer shall be obligated to remedy deficiencies in that portion of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades to meet the standards and specifications provided by Transmission Provider and Transmission Owner;

(7) Interconnection Customer shall indemnify Transmission Provider and Transmission Owner for claims arising from the Interconnection Customer's construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades under the terms and procedures applicable to Article 18.1, Indemnity;

(8) Interconnection Customer shall transfer control of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades to Transmission Owner;

(9) Unless Parties otherwise agree, Interconnection Customer shall transfer ownership of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades to Transmission Owner in accordance with Appendix B;

(10) Transmission Provider, at Transmission Provider's option, and Transmission Owner shall approve and accept for operation and maintenance the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades to the extent engineered, procured, and constructed in accordance with this Article 5.2 only if the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades meet the standards and specifications of Transmission Provider, Transmission Owner and any Governmental Authority.

(11) Interconnection Customer shall deliver to Transmission Owner "as-built" drawings, information, and any other documents that are reasonably required by Transmission Owner to assure that the Interconnection Facilities and Stand-Alone Network Upgrades are built to the standards and specifications required by Transmission Owner.

(12) If Interconnection Customer exercises the Option to Build pursuant to Article 5.1.3, Interconnection Customer shall pay Transmission Owner the agreed upon amount of [$ PLACEHOLDER] for Transmission Owner to execute the responsibilities enumerated to Transmission Owner under Article 5.2. Transmission Owner shall invoice Interconnection Customer for this total amount to be divided on a monthly basis pursuant to Article 12.

(13) If Interconnection Customer exercises the Option to Build pursuant to Article 5.1.3, and the Transmission Owner has elected to fund the costs of Network Upgrades pursuant to Article 11.3, then prior to Interconnection Customer incurring any construction costs relating to the Option to Build and by the date specified in Appendix B, Interconnection Customer shall invoice the Transmission Owner for the estimated amount to be expended by the Interconnection Customer to construct any Stand Alone Network Upgrades for which the Interconnection Customer has exercised its Option to Build in accordance with Appendix B. The Transmission Owner shall be required to reimburse Interconnection Customer for the full amount of such invoiced costs by the date specified in Appendix B, which shall be prior to the date by which Interconnection Customer must make any construction payment for such Stand Alone Network Upgrades. After completion of the construction of Stand Alone Network Upgrades by the Interconnection Customer and by the date specified in Appendix B for the Interconnection Customer to transfer such Stand Alone Network Upgrades to the Transmission Owner, Interconnection Customer shall provide an invoice of the final cost of the construction of Stand Alone Upgrades and shall set forth such costs in sufficient detail to enable the Transmission Owner to compare the actual costs with the estimates and to ascertain deviations, if any, from the cost estimates. In the event that the actual costs exceed the estimated costs previously invoiced by Interconnection Customer and paid by Transmission Owner, Transmission Owner shall pay to Interconnection Customer the difference between the amount previously paid and the actual costs within thirty (30) Calendar Days after receipt of a final construction invoice from Interconnection Customer. In the event that the actual costs are less than the estimated costs previously invoiced by Interconnection Customer and paid by Transmission Owner, Interconnection Customer shall refund, with interest (calculated in accordance with 18 C.F.R. Section 35.19a(a)(2)(iii), to Transmission Owner any amount by which the actual payment by Transmission Owner for estimated costs exceeds the actual costs of construction within thirty (30) Calendar Days of the issuance of such final construction invoice. Following the transfer of the Stand Alone Network Upgrades from the Interconnection Customer to the Transmission Owner, the Interconnection Customer shall make payments for such facilities to the Transmission Owner pursuant to an agreement between and among the Parties.

5.3 Liquidated Damages. The actual damages to Interconnection Customer, in the event the Transmission Owner's Interconnection Facilities or Network Upgrades are not completed by the dates designated by Interconnection Customer and accepted by Transmission

Provider and Transmission Owner pursuant to subparagraphs 5.1.2 or 5.1.4, above, may include Interconnection Customer's fixed operation and maintenance costs and lost opportunity costs. Such actual damages are uncertain and impossible to determine at this time. Because of such uncertainty, any liquidated damages paid by Transmission Owner to Interconnection Customer in the event that Transmission Owner does not complete any portion of the Transmission Owner's Interconnection Facilities or Network Upgrades by the applicable dates, shall be an amount equal to ½ of 1 percent per day of the actual cost of the Transmission Owner's Interconnection Facilities and Network Upgrades, in the aggregate, for which Transmission Owner has assumed responsibility to design, procure and construct.

However, in no event shall the total liquidated damages exceed 20 percent of the actual cost of the Transmission Owner's Interconnection Facilities and Network Upgrades for which Transmission Owner has assumed responsibility to design, procure, and construct. The foregoing payments will be made by Transmission Owner to Interconnection Customer as just compensation for the damages caused to Interconnection Customer, which actual damages are uncertain and impossible to determine at this time, and as reasonable liquidated damages, but not as a penalty or a method to secure performance of this GIA. Liquidated damages, when the Parties agree to them, are the exclusive remedy for the Transmission Owner's failure to meet its schedule.

No liquidated damages shall be paid to Interconnection Customer if: (1) Interconnection Customer is not ready to commence use of the Transmission Owner's Interconnection Facilities or Network Upgrades to take the delivery of power for the Generating Facility's Trial Operation or to export power from the Generating Facility on the specified dates, unless Interconnection Customer would have been able to commence use of the Transmission Owner's Interconnection Facilities or Network Upgrades to take the delivery of power for Generating Facility's Trial Operation or to export power from the Generating Facility, but for Transmission Owner's delay; (2) the Transmission Owner's failure to meet the specified dates is the result of the action or inaction of Transmission Provider, Interconnection Customer or any other earlier queued Interconnection Customer who has entered into an earlier GIA with Transmission Provider and/or a Transmission Owner or with an Affected System Operator, or any cause beyond Transmission Owner's reasonable control or reasonable ability to cure;
(3) Interconnection Customer has assumed responsibility for the design, procurement and construction of the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades; (4) the delay is due to the inability of Transmission Owner to obtain all required approvals from Governmental Authorities in a timely manner for the construction of any element of the Interconnection Facilities, Network Upgrades or Stand Alone Network Upgrades, or any other permit or authorization required, or any land rights or other private authorizations that may be required, and Transmission Owner has exercised Reasonable Efforts in procuring such approvals, permits, rights or authorizations; or (5) the Parties have otherwise agreed.

5.4 Power System Stabilizers. Interconnection Customer shall procure, install, maintain and operate power system stabilizers in accordance with the guidelines and procedures

established by the Applicable Reliability Council. Transmission Provider and Transmission Owner reserve the right to reasonably establish minimum acceptable settings for any installed power system stabilizers, subject to the design and operating limitations of the Generating Facility. If the Generating Facility's power system stabilizers are removed from service or are not capable of automatic operation, Interconnection Customer shall immediately notify the Transmission Provider's system operator, or its designated representative. The requirements of this paragraph shall not apply to induction generators.

5.5 Equipment Procurement. If responsibility for construction of the Transmission Owner's Interconnection Facilities, Network Upgrades and/or Distribution Upgrades is to be borne by Transmission Owner, then Transmission Owner shall commence design of the Transmission Owner's Interconnection Facilities, Network Upgrades and/or Distribution Upgrades, and procure necessary equipment as soon as practicable after all of the following conditions are satisfied, unless the Parties otherwise agree in writing:

5.5.1 Transmission Provider has completed the Interconnection Facilities Study pursuant to the Interconnection Facilities Study Agreement; and

5.5.2 Where applicable, Interconnection Customer has provided security to Transmission Owner in accordance with Article 11.6 by the dates specified in Appendix B, Milestones.

5.6 Construction Commencement. Transmission Owner shall commence construction of the Transmission Owner's Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, Distribution Upgrades, and Generator Upgrades for which it is responsible as soon as practicable after the following additional conditions are satisfied:

5.6.1 Approval of the appropriate Governmental Authority has been obtained for any facilities requiring regulatory approval; and

5.6.2 Where applicable, Interconnection Customer has provided security to Transmission Owner in accordance with Article 11.6 by the dates specified in Appendix B, Milestones.

5.7 Work Progress. Transmission Owner and Interconnection Customer will keep each other and Transmission Provider advised periodically as to the progress of their respective design, procurement and construction efforts. Either Transmission Owner or Interconnection Customer may, at any time, request a progress report from the other, with a copy to be provided to the other Parties. If, at any time, Interconnection Customer determines that the completion of the Transmission Owner's Interconnection Facilities, Network Upgrades, or Transmission Owner's System Protection Facilities will not be required until after the specified In-Service Date, Interconnection Customer will provide written notice to Transmission Provider and Transmission Owner of such later date upon which the completion of the Transmission Owner's Interconnection Facilities, Network

Upgrades or Transmission Owner's System Protection Facilities will be required. Transmission Owner may delay the In-Service Date of its facilities accordingly.

5.8 Information Exchange. As soon as reasonably practicable after the Effective Date, the Parties shall exchange information regarding the design and compatibility of the Interconnection Facilities and compatibility of the Interconnection Facilities with the Transmission System or Distribution System, as applicable, and shall work diligently and in good faith to make any necessary design changes.

5.9 Other Interconnection Options.

5.9.1 Limited Operation. If any of the Transmission Owner's Interconnection Facilities, Network Upgrades, or Transmission Owner's System Protection Facilities, Distribution Upgrades or Generator Upgrades are not reasonably expected to be completed prior to the Commercial Operation Date of the Generating Facility, Transmission Provider shall, upon the request and at the expense of Interconnection Customer, perform operating studies on a timely basis to determine the extent to which the Generating Facility and the Interconnection Customer's Interconnection Facilities may operate prior to the completion of the Transmission Owner's Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, Distribution Upgrades or Generator Upgrades consistent with Applicable Laws and Regulations, Applicable Reliability Standards, Good Utility Practice, and this GIA. Transmission Provider and Transmission Owner shall permit Interconnection Customer to operate the Generating Facility and the Interconnection Customer's Interconnection Facilities in accordance with the results of such studies; provided, however, such studies reveal that such operation may occur without detriment to the Transmission System as then configured and in accordance with the safety requirements of Transmission Owner and any Governmental Authority.

The maximum permissible output of the Generating Facility will be updated on a quarterly basis if the Network Upgrades necessary for the interconnection of the Generating Facility pursuant to this GIA are not in service within six (6) months following the Commercial Operation Date of the Generating Facility as specified in Appendix B of this GIA. These quarterly studies will be performed using the same methodology set forth in Section 11.5 of the GIP. These quarterly updates will end when all Network Upgrades necessary for the interconnection of the Generating Facility pursuant to this GIA are in service.

5.9.2 Provisional Interconnection Service.
Upon the request of Interconnection Customer, and prior to completion of requisite Interconnection Facilities, Network Upgrades, Distribution Upgrades, or System Protection Facilities Transmission Provider may execute a Provisional Generator Interconnection Agreement or Interconnection Customer may request the filing of an unexecuted Provisional Generator Interconnection Agreement with the Interconnection Customer for limited interconnection service at the

discretion of Transmission Provider based upon an evaluation that will consider the results of available studies. Transmission Provider shall determine, through available studies or additional studies as necessary, whether stability, short circuit, thermal, and/or voltage issues would arise if Interconnection Customer interconnects without modifications to the Generating Facility or Transmission Provider's system. Transmission Provider shall determine whether any Interconnection Facilities, Network Upgrades, Distribution Upgrades, or System Protection Facilities that are necessary to meet the requirements of NERC, or any applicable Regional Entity for the interconnection of a new, modified and/or expanded Generating Facility are in place prior to the commencement of interconnection service from the Generating Facility. Where available studies indicate that such Interconnection Facilities, Network Upgrades, Distribution Upgrades, and/or System Protection Facilities that are required for the interconnection of a new, modified and/or expanded Generating Facility are not currently in place, Transmission Provider will perform a study, at the Interconnection Customer's expense, to confirm the facilities that are required for Provisional Interconnection Service. The maximum permissible output of the Generating Facility in the Provisional Generator Interconnection Agreement shall be studied and updated on a quarterly basis. Interconnection Customer assumes all risk and liabilities with respect to changes between the Provisional Generator Interconnection Agreement and the Generator Interconnection Agreement, including changes in output limits and Interconnection Facilities, Network Upgrades, Distribution Upgrades, and/or System Protection Facilities cost responsibilities.

5.10 Interconnection Customer's Interconnection Facilities. Interconnection Customer shall, at its expense, design, procure, construct, own or control, and install the ICIF, as set forth in Appendix A.

5.10.1 Interconnection Customer's Interconnection Facility Specifications. Interconnection Customer shall submit initial design and specifications for the ICIF, including Interconnection Customer's System Protection Facilities, to Transmission Provider and Transmission Owner at least one hundred eighty (180) Calendar Days prior to the Initial Synchronization Date; and final design and specifications for review and comment at least ninety (90) Calendar Days prior to the Initial Synchronization Date. Transmission Provider at Transmission Provider's option, and Transmission Owner shall review such specifications to ensure that the ICIF are compatible with their respective technical specifications, operational control, and safety requirements and comment on such design and specifications within thirty (30) Calendar Days of Interconnection Customer's submission. All specifications provided hereunder shall be deemed confidential.

5.10.2 Transmission Provider's and Transmission Owner's Review. Transmission Provider's and Transmission Owner's review of Interconnection Customer's final specifications shall not be construed as confirming, endorsing, or providing

a warranty as to the design, fitness, safety, durability or reliability of the Generating Facility, or the ICIF. Interconnection Customer shall make such changes to the ICIF as may reasonably be required by Transmission Provider and Transmission Owner, in accordance with Good Utility Practice, to ensure that the ICIF are compatible with the technical specifications, operational control and safety requirements of Transmission Provider and Transmission Owner.

5.10.3 ICIF Construction. The ICIF shall be designed and constructed in accordance with Good Utility Practice. Within one hundred twenty (120) Calendar Days after the Commercial Operation Date, unless the Parties agree on another mutually acceptable deadline, Interconnection Customer shall deliver to Transmission Provider and Transmission Owner "as-built" drawings, information and documents for the ICIF, such as: a one-line diagram, a site plan showing the Generating Facility and the ICIF, plan and elevation drawings showing the layout of the ICIF, a relay functional diagram, relaying AC and DC schematic wiring diagrams and relay settings for all facilities associated with the Interconnection Customer's step-up transformers, the facilities connecting the Generating Facility to the step-up transformers and the ICIF, and the impedances (determined by factory tests) for the associated step-up transformers and the Generating Facility. Interconnection Customer shall provide Transmission Provider and Transmission Owner with Interconnection Customer's specifications for the excitation system, automatic voltage regulator, Generating Facility control and protection settings, transformer tap settings, and communications, if applicable.

5.11 Transmission Owner's Interconnection Facilities Construction. The Transmission Owner's Interconnection Facilities shall be designed and constructed in accordance with Good Utility Practice. Upon request, within one hundred twenty (120) Calendar Days after the Commercial Operation Date, unless the Parties agree on another mutually acceptable deadline, Transmission Owner shall deliver to Transmission Provider (if requested) and Interconnection Customer the "as-built" drawings, information and documents for the Transmission Owner's Interconnection Facilities specified in Appendix C to this GIA.

Such drawings, information and documents shall be deemed Confidential Information.

Upon completion, the Transmission Owner's Interconnection Facilities and Stand Alone Network Upgrades shall be under the control of Transmission Provider or its designated representative.

5.12 Access Rights. Upon reasonable notice by a Party, and subject to any required or necessary regulatory approvals, a Party ("Granting Party") shall furnish *at no cost* to the other Party ("Access Party") any rights of use, licenses, rights of way and easements with respect to lands owned or controlled by the Granting Party, its agents (if allowed under the applicable agency agreement), or any Affiliate, that are necessary to enable the

Access Party to obtain ingress and egress to construct, operate, maintain, repair, test (or witness testing), inspect, replace or remove facilities and equipment to: (i) interconnect the Generating Facility with the Transmission System; (ii) operate and maintain the Generating Facility, the Interconnection Facilities and the Transmission System; and (iii) disconnect or remove the Access Party's facilities and equipment upon termination of this GIA. In exercising such licenses, rights of way and easements, the Access Party shall not unreasonably disrupt or interfere with normal operation of the Granting Party's business and shall adhere to the safety rules and procedures established in advance, as may be changed from time to time, by the Granting Party and provided to the Access Party.

5.13 Lands of Other Property Owners. If any part of the Transmission Owner's Interconnection Facilities, Network Upgrades, and/or Distribution Upgrades is to be installed on property owned by persons other than Interconnection Customer or Transmission Owner, Transmission Owner shall at Interconnection Customer's expense use efforts, similar in nature and extent to those that it typically undertakes on its own behalf or on behalf of its Affiliates, including use of its eminent domain authority to the extent permitted and consistent with Applicable Laws and Regulations and, to the extent consistent with such Applicable Laws and Regulations, to procure from such persons any rights of use, licenses, rights of way and easements that are necessary to construct, operate, maintain, test, inspect, replace or remove the Transmission Owner's Interconnection Facilities, Network Upgrades and/or Distribution Upgrades upon such property.

5.14 Permits. Transmission Provider or Transmission Owner and Interconnection Customer shall cooperate with each other in good faith in obtaining all permits, licenses and authorizations that are necessary to accomplish the interconnection in compliance with Applicable Laws and Regulations. With respect to this paragraph, Transmission Owner shall provide permitting assistance to Interconnection Customer comparable to that provided to the Transmission Owner's own, or an Affiliate's, generation to the extent that Transmission Owner or its Affiliate owns generation.

5.15 Early Construction of Base Case Facilities. (Includes facilities required for all queued projects with interconnection agreements).Interconnection Customer may request Transmission Owner to construct, and Transmission Owner shall construct, using Reasonable Efforts to accommodate Interconnection Customer's In-Service Date, all or any portion of any Network Upgrades, Transmission Owner's System Protection Facilities or Distribution Upgrades required for Interconnection Customer to be interconnected to the Transmission or Distribution System, as applicable, which are included in the Base Case of the Interconnection Facilities Study for Interconnection Customer, and which also are required to be constructed for another Interconnection Customer with a prior GIA, but where such construction is not scheduled to be completed in time to achieve Interconnection Customer's In-Service Date. Any such Network Upgrades, System Protection Facilities or Distribution Upgrades are included in the facilities to be constructed and as set forth in Appendix A to this GIA to the extent they are reasonably known.

5.16 Suspension.

5.16.1 Interconnection Customer's Right to Suspend for Force Majeure Event; Obligations. Provided that such suspension is permissible under the authorizations, permits or approvals granted for the construction of such Interconnection Facilities, Network Upgrades or Stand Alone Network Upgrades, Interconnection Customer will not suspend unless a Force Majeure event occurs.

Interconnection Customer must provide written notice of its request for suspension to Transmission Provider and Transmission Owner, and provide a description of the Force Majeure event that is acceptable to Transmission Provider. Suspension will only apply to Interconnection Customer milestones and Interconnection Facilities described in the Appendices of this GIA. Prior to suspension, Interconnection Customer must also provide security acceptable to Transmission Owner, equivalent to the higher of $5 million or the total cost of all Network Upgrades, Transmission Owner's System Protection Facilities, and Distribution Upgrades listed in Appendix A of this GIA. Network Upgrades and Transmission Owner's Interconnection Facilities will be constructed on the schedule described in the Appendices of this GIA unless: (1) construction is prevented by the order of a Governmental Authority; (2) the Network Upgrades are not needed by any other project; or (3) Transmission Owner or Transmission Provider determines that a Force Majeure event prevents construction. In the event of (1), (2), or (3) security shall be released upon the determination that the Network Upgrades will no longer be constructed.

If suspension occurs, the Transmission or Distribution System, as applicable, shall be left in a safe and reliable condition in accordance with Good Utility Practice and the Transmission Provider's and Transmission Owner's safety and reliability criteria. In such event, Interconnection Customer shall be responsible for all reasonable and necessary costs which Transmission Provider and Transmission Owner (i) have incurred pursuant to this GIA prior to the suspension and (ii) incur in suspending such work, including any costs incurred to perform such work as may be necessary to ensure the safety of persons and property and the integrity of the Transmission or Distribution System, as applicable, during such suspension and, if applicable, any costs incurred in connection with the cancellation or suspension of material, equipment and labor contracts which Transmission Provider and Transmission Owner cannot reasonably avoid; provided, however, that prior to canceling or suspending any such material, equipment or labor contract, Transmission Provider and Transmission Owner shall obtain Interconnection Customer's authorization to do so.

Transmission Provider and Transmission Owner shall each invoice Interconnection Customer for such costs pursuant to Article 12 and shall use Reasonable Efforts to minimize its costs. In the event Interconnection Customer suspends work by Transmission Owner required under this GIA pursuant to this

Article 5.16, and has not requested Transmission Owner to recommence the work required under this GIA on or before the expiration of three (3) years following commencement of such suspension, this GIA shall be deemed terminated. The three-year period shall begin on the date the suspension is requested, or the date of the written notice to Transmission Provider, if no effective date is specified.

5.16.2 Effect of Missed Interconnection Customer Milestones. If Interconnection Customer fails to provide notice of suspension pursuant to Article 5.16, and Interconnection Customer fails to fulfill or complete any Interconnection Customer Milestone provided in Appendix B ("Milestone"), this constitutes a Breach under this GIA. Depending upon the consequences of the Breach and effectiveness of the cure pursuant to Article 17, the Transmission Owner's Milestones may be revised, following consultation with Interconnection Customer, consistent with Reasonable Efforts, and in consideration of all relevant circumstances. Parties shall employ Reasonable Efforts to maintain their remaining respective Milestones.

5.16.3 Effect of Suspension; Parties Obligations. In the event that Interconnection Customer suspends work pursuant to this Article 5.16, no construction duration, timelines and schedules set forth in Appendix B shall be suspended during the period of suspension unless ordered by a Governmental Authority, with such order being the Force Majeure event causing the suspension. Should Interconnection Customer request that work be recommenced, Transmission Owner shall be obligated to proceed with Reasonable Efforts and in consideration of all relevant circumstances including regional outage schedules, construction availability and material procurement in performing the work as described in Appendix A and Appendix B. Transmission Owner will provide Interconnection Customer with a revised schedule for the design, procurement, construction, installation and testing of the Transmission Owner's Interconnection Facilities and Network Upgrades. Upon any suspension by Interconnection Customer pursuant to Article 5.16, Interconnection Customer shall be responsible for only those costs specified in this Article 5.16.

5.17 Taxes.

5.17.1 Interconnection Customer Payments Not Taxable. The Parties intend that all payments or property transfers made by Interconnection Customer to Transmission Owner for the installation of the Transmission Owner's Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, Distribution Upgrades and Generator Upgrades shall be non-taxable, either as contributions to capital, or as an advance, in accordance with the Internal Revenue Code and any applicable state income tax laws and shall not be taxable as contributions in aid of construction or otherwise under the Internal Revenue Code and any applicable state income tax laws. To the extent that Transmission Owner is a limited liability company and not a corporation, and has elected to be taxed as a partnership, then the following shall apply: Transmission

Owner represents, and the Parties acknowledge, that Transmission Owner is a limited liability company and is treated as a partnership for federal income tax purposes. Any payment made by Interconnection Customer to Transmission Owner for Network Upgrades is to be treated as an upfront payment in accordance with Rev Proc 2005-35. It is anticipated by the parties that any amounts paid by Interconnection Customer to Transmission Owner for Network Upgrades will be reimbursed to Interconnection Customer in accordance with the terms of this GIA, provided Interconnection Customer fulfills its obligations under this GIA.

5.17.2 Representations and Covenants. In accordance with IRS Notice 2016-36, Interconnection Customer represents and covenants that (i) ownership of the electricity generated at the Generating Facility will pass to another party prior to the transmission of the electricity on the Transmission System, (ii) for income tax purposes, the amount of any payments and the cost of any property transferred to Transmission Owner for the Transmission Owner's Interconnection Facilities will be capitalized by Interconnection Customer as an intangible asset and recovered using the straight-line method over a useful life of twenty (20) years, and (iii) any portion of the Transmission Owner's Interconnection Facilities that is a "dual-use intertie," within the meaning of IRS Notice 2016-36, is reasonably expected to carry only a de minimis amount of electricity in the direction of the Generating Facility. For this purpose, "de minimis amount" means no more than 5 percent of the total power flows in both directions, calculated in accordance with the "5 percent test" set forth in IRS Notice 2016-36. This is not intended to be an exclusive list of the relevant conditions that must be met to conform to IRS requirements for non-taxable treatment.

At Transmission Owner's request, Interconnection Customer shall provide Transmission Owner with a report from an independent engineer confirming its representation in clause (iii), above, with a copy to Transmission Provider. Transmission Owner represents and covenants that the cost of the Transmission Owner's Interconnection Facilities paid for by Interconnection Customer will have no net effect on the base upon which rates are determined.

5.17.3 Indemnification for the Cost Consequences of Current Tax Liability Upon Transmission Owner. Notwithstanding Article 5.17.1 and to the extent permitted by law, Interconnection Customer shall protect, indemnify and hold harmless Transmission Owner from the cost consequences of any tax liability imposed against Transmission Owner as the result of payments or property transfers made by Interconnection Customer to Transmission Owner under this GIA for Interconnection Facilities, as well as any interest and penalties, other than interest and penalties attributable to any delay caused by Transmission Owner.

Transmission Owner shall not include a gross-up for the cost consequences of any current tax liability in the amounts it charges Interconnection Customer under this GIA unless (i) Transmission Owner has determined, in good faith, that the payments or property transfers made by Interconnection Customer to Transmission Owner should be reported as income subject to taxation or (ii) any Governmental Authority directs Transmission Owner to report payments or property as income subject to taxation; provided, however, that Transmission Owner may require Interconnection Customer to provide security for Interconnection Facilities, in a form reasonably acceptable to Transmission Owner (such as a parental guarantee or a letter of credit), in an amount equal to the cost consequences or any current tax liability under this Article 5.17. Interconnection Customer shall reimburse Transmission Owner for such costs on a fully grossed-up basis, in accordance with Article 5.17.4, within thirty (30) Calendar Days of receiving written notification from Transmission Owner of the amount due, including detail about how the amount was calculated.

The indemnification obligation shall terminate at the earlier of (1) the expiration of the ten-year testing period and the applicable statute of limitation, as it may be extended by Transmission Owner upon request of the IRS, to keep these years open for audit or adjustment, or (2) the occurrence of a subsequent taxable event and the payment of any related indemnification obligations as contemplated by this Article 5.17.

5.17.4 Tax Gross-Up Amount. Interconnection Customer's liability for the cost consequences of any current tax liability under this Article 5.17 shall be calculated on a fully grossed-up basis. Except as may otherwise be agreed to by the parties, this means that Interconnection Customer will pay Transmission Owner, in addition to the amount paid for the Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, and/or Distribution Upgrades, an amount equal to (1) the current taxes imposed on Transmission Owner ("Current Taxes") on the excess of (a) the gross income realized by Transmission Owner as a result of payments or property transfers made by Interconnection Customer to Transmission Owner under this GIA (without regard to any payments under this Article 5.17) (the "Gross Income Amount") over (b) the present value of future tax deductions for depreciation that will be available as a result of such payments or property transfers (the "Present Value Depreciation Amount"), plus (2) an additional amount sufficient to permit Transmission Owner to receive and retain, after the payment of all Current Taxes, an amount equal to the net amount described in clause (1).

For this purpose, (i) Current Taxes shall be computed based on Transmission Owner's composite federal and state tax rates at the time the payments or property transfers are received and Transmission Owner will be treated as being subject to tax at the highest marginal rates in effect at that time (the "Current Tax Rate"), and (ii) the Present Value Depreciation Amount shall be computed by discounting Transmission Owner's anticipated tax depreciation deductions as

a result of such payments or property transfers by Transmission Owner's current weighted average cost of capital. Thus, the formula for calculating Interconnection Customer's liability to Transmission Owner pursuant to this Article 5.17.4 can be expressed as follows: (Current Tax Rate x (Gross Income Amount – Present Value of Tax Depreciation))/(1-Current Tax Rate). Interconnection Customer's estimated tax liability in the event taxes are imposed shall be stated in Appendix A, Interconnection Facilities, Network Upgrades and Distribution Upgrades.

5.17.5 Private Letter Ruling or Change or Clarification of Law. At Interconnection Customer's request and expense, Transmission Owner shall file with the IRS a request for a private letter ruling as to whether any property transferred or sums paid, or to be paid, by Interconnection Customer to Transmission Owner under this GIA are subject to federal income taxation. Interconnection Customer will prepare the initial draft of the request for a private letter ruling, and will certify under penalties of perjury that all facts represented in such request are true and accurate to the best of Interconnection Customer's knowledge. Transmission Owner and Interconnection Customer shall cooperate in good faith with respect to the submission of such request.

Transmission Owner shall keep Interconnection Customer fully informed of the status of such request for a private letter ruling and shall execute either a privacy act waiver or a limited power of attorney, in a form acceptable to the IRS, that authorizes Interconnection Customer to participate in all discussions with the IRS regarding such request for a private letter ruling. Transmission Owner shall allow Interconnection Customer to attend all meetings with IRS officials about the request and shall permit Interconnection Customer to prepare the initial drafts of any follow-up letters in connection with the request.

5.17.6 Subsequent Taxable Events. If, within 10 years from the date on which the relevant Transmission Owner's Interconnection Facilities are placed in service, (i) Interconnection Customer breaches the covenant contained in Article 5.17.2, (ii) a "disqualification event" occurs within the meaning of IRS Notice 88-129, or (iii) this GIA terminates and Transmission Owner retains ownership of the Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, and/or Distribution Upgrades, Interconnection Customer shall pay a tax gross-up for the cost consequences of any current tax liability imposed on Transmission Owner, calculated using the methodology described in Article 5.17.4 and in accordance with IRS Notice 90-60.

5.17.7 Contests. In the event any Governmental Authority determines that Transmission Owner's receipt of payments or property constitutes income that is subject to taxation, Transmission Owner shall notify Interconnection Customer, in writing, within thirty (30) Calendar Days of receiving notification of such determination by a Governmental Authority. Upon the timely written request by Interconnection Customer and at Interconnection Customer's sole

expense, Transmission Owner may appeal, protest, seek abatement of, or otherwise oppose such determination. Upon Interconnection Customer's written request and sole expense, Transmission Owner shall file a claim for refund with respect to any taxes paid under this Article 5.17, whether or not it has received such a determination. Transmission Owner reserves the right to make all decisions with regard to the prosecution of such appeal, protest, abatement or other contest, including the selection of counsel and compromise or settlement of the claim, but Transmission Owner shall keep Interconnection Customer informed, shall consider in good faith suggestions from Interconnection Customer about the conduct of the contest, and shall reasonably permit Interconnection Customer or an Interconnection Customer representative to attend contest proceedings.

Interconnection Customer shall pay to Transmission Owner on a periodic basis, as invoiced by Transmission Owner, Transmission Owner's documented reasonable costs of prosecuting such appeal, protest, abatement or other contest. At any time during the contest, Transmission Owner may agree to a settlement either with Interconnection Customer's consent or after obtaining written advice from nationally-recognized tax counsel, selected by Transmission Owner, but reasonably acceptable to Interconnection Customer, that the proposed settlement represents a reasonable settlement given the hazards of litigation. Interconnection Customer's obligation shall be based on the amount of the settlement agreed to by Interconnection Customer, or if a higher amount, so much of the settlement that is supported by the written advice from nationally-recognized tax counsel selected under the terms of the preceding sentence. The settlement amount shall be calculated on a fully grossed-up basis to cover any related cost consequences of the current tax liability. Any settlement without Interconnection Customer's consent or such written advice will relieve Interconnection Customer from any obligation to indemnify Transmission Owner for the tax at issue in the contest.

5.17.8 Refund. In the event that (a) a private letter ruling is issued to Transmission Owner which holds that any amount paid or the value of any property transferred by Interconnection Customer to Transmission Owner under the terms of this GIA is not subject to federal income taxation, (b) any legislative change or administrative announcement, notice, ruling or other determination makes it reasonably clear to Transmission Owner in good faith that any amount paid or the value of any property transferred by Interconnection Customer to Transmission Owner under the terms of this GIA is not taxable to Transmission Owner, (c) any abatement, appeal, protest, or other contest results in a determination that any payments or transfers made by Interconnection Customer to Transmission Owner are not subject to federal income tax, or (d) if Transmission Owner receives a refund from any taxing authority for any overpayment of tax attributable to any payment or property transfer made by Interconnection Customer to Transmission Owner pursuant to this GIA,

Transmission Owner shall promptly refund to Interconnection Customer the following:

any payment made by Interconnection Customer under this Article 5.17 for taxes that is attributable to the amount determined to be non-taxable, together with interest thereon,

(ii) interest on any amounts paid by Interconnection Customer to Transmission Owner for such taxes which Transmission Owner did not submit to the taxing authority, calculated in accordance with the methodology set forth in 18 C.F.R. Section 35.19a(a)(2)(iii) from the date payment was made by Interconnection Customer to the date Transmission Owner refunds such payment to Interconnection Customer, and

(iii) with respect to any such taxes paid by Transmission Owner, any refund or credit Transmission Owner receives or to which it may be entitled from any Governmental Authority, interest (or that portion thereof attributable to the payment described in clause (i), above) owed to Transmission Owner for such overpayment of taxes (including any reduction in interest otherwise payable by Transmission Owner to any Governmental Authority resulting from an offset or credit); provided, however, that Transmission Owner will remit such amount promptly to Interconnection Customer only after and to the extent that Transmission Owner has received a tax refund, credit or offset from any Governmental Authority for any applicable overpayment of income tax related to the Transmission Owner's Interconnection Facilities.

The intent of this provision is to leave both parties, to the extent practicable, in the event that no taxes are due with respect to any payment for Interconnection Facilities and Network Upgrades hereunder, in the same position they would have been in had no such tax payments been made.

5.17.9 Taxes Other Than Income Taxes. Upon the timely request by Interconnection Customer, and at Interconnection Customer's sole expense, Transmission Owner shall appeal, protest, seek abatement of, or otherwise contest any tax (other than federal or state income tax) asserted or assessed against Transmission Owner for which Interconnection Customer may be required to reimburse Transmission Owner under the terms of this GIA. Interconnection Customer shall pay to Transmission Owner on a periodic basis, as invoiced by Transmission Owner, Transmission Owner's documented reasonable costs of prosecuting such appeal, protest, abatement, or other contest. Interconnection Customer and Transmission Owner shall cooperate in good faith with respect to any such contest. Unless the payment of such taxes is a prerequisite to an appeal or abatement or cannot be deferred, no amount shall be payable by Interconnection Customer to Transmission Owner for such taxes until they are

assessed by a final, non-appealable order by any court or agency of competent jurisdiction. In the event that a tax payment is withheld and ultimately due and payable after appeal, Interconnection Customer will be responsible for all taxes, interest and penalties, other than penalties attributable to any delay caused by Transmission Owner.

5.18 Tax Status. Each Party shall cooperate with the other Parties to maintain each Party's tax status. Nothing in this GIA is intended to adversely affect any Party's tax-exempt status with respect to the issuance of bonds including, but not limited to, Local Furnishing Bonds.

5.19 Modification.

5.19.1 General. Either Party may undertake modifications to its facilities. If a Party plans to undertake a modification that reasonably may be expected to affect another Party's facilities, that Party shall provide to the other Parties sufficient information regarding such modification so that the other Parties may evaluate the potential impact of such modification prior to commencement of the work. Such information shall be deemed to be Confidential Information hereunder and shall include information concerning the timing of such modifications and whether such modifications are expected to interrupt the flow of electricity from the Generating Facility. The Party desiring to perform such work shall provide the relevant drawings, plans, and specifications to the other Parties at least ninety (90) Calendar Days in advance of the commencement of the work or such shorter period upon which the Parties may agree, which agreement shall not unreasonably be withheld, conditioned or delayed.

In the case of Generating Facility modifications that do not require Interconnection Customer to submit an Interconnection Request, Transmission Provider shall provide, within thirty (30) Calendar Days (or such other time as the Parties may agree), an estimate of any additional modifications to the Transmission or Distribution System as applicable, Transmission Owner's Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, and/or Distribution Upgrades necessitated by such Interconnection Customer modification and a good faith estimate of the costs thereof which shall be the responsibility of Interconnection Customer.

5.19.2 Standards. Any additions, modifications, or replacements made to a Party's facilities shall be designed, constructed and operated in accordance with this GIA and Good Utility Practice.

5.19.3 Modification Costs. Interconnection Customer shall not be directly assigned the costs of any additions, modifications, or replacements that Transmission Owner makes to the Transmission Owner's Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities, Distribution Upgrades, or the Transmission or Distribution System, as applicable, to

facilitate the interconnection of a third party to the Transmission Owner's Interconnection Facilities or the Transmission or Distribution System, as applicable, or to provide transmission service to a third party under the Tariff. Interconnection Customer shall be responsible for the costs of any additions, modifications, or replacements to the Interconnection Customer's Interconnection Facilities that may be necessary to maintain or upgrade such Interconnection Customer's Interconnection Facilities consistent with Applicable Laws and Regulations, Applicable Reliability Standards or Good Utility Practice.

ARTICLE 6. TESTING AND INSPECTION

6.1 Pre-Commercial Operation Date Testing and Modifications. Prior to the Commercial Operation Date, Transmission Owner shall test the Transmission Owner's Interconnection Facilities, Network Upgrades, Transmission Owner's System Protection Facilities and Distribution Upgrades, and Interconnection Customer shall test each electric production device at the Generating Facility, Interconnection Customer's System Protection Facilities, including control equipment to limit injection at the POI to the level of Interconnection Service set forth in Appendix A and the Interconnection Customer's Interconnection Facilities to ensure their safe and reliable operation. Similar testing may be required after initial operation. Transmission Owner and Interconnection Customer shall make any modifications to their respective facilities that are found to be necessary as a result of such testing. Interconnection Customer shall bear the cost of all such testing and modifications. Interconnection Customer shall generate test energy at the Generating Facility only if it has arranged for the delivery of such test energy.

6.2 Post-Commercial Operation Date Testing and Modifications. Each Party shall at its own expense perform routine inspection and testing of its facilities and equipment in accordance with Good Utility Practice as may be necessary to ensure the continued interconnection of the Generating Facility with the Transmission or Distribution System, as applicable, in a safe and reliable manner. Each Party shall have the right, upon advance written notice, to require reasonable additional testing of the Interconnection Facilities, at the requesting Party's expense, as may be in accordance with Good Utility Practice.

6.3 Right to Observe Testing. Each Party shall notify the other Parties in advance of its performance of tests of its Interconnection Facilities. The other Parties shall each have the right, at its own expense, to observe such testing.

6.4 Right to Inspect. Each Party shall have the right, but shall have no obligation to: (i) observe Transmission Owner's and Interconnection Customer's tests and/or inspection of any of their respective System Protection Facilities and other protective equipment, including power system stabilizers and control equipment; (ii) review the settings of the System Protection Facilities and other protective equipment; and (iii) review the maintenance records relative to the Interconnection Facilities, the System Protection Facilities and other protective equipment. A Party may exercise these rights from time to

time as it deems necessary upon reasonable notice to the other Parties. The exercise or non-exercise by a Party of any such rights shall not be construed as an endorsement or confirmation of any element or condition of the Interconnection Facilities or the System Protection Facilities or other protective equipment or the operation thereof, or as a warranty as to the fitness, safety, desirability, or reliability of same. Any information that a Party obtains through the exercise of any of its rights under this Article 6.4 shall be deemed to be Confidential Information and treated pursuant to Article 22 of this GIA.

ARTICLE 7. METERING

7.1 General. Each Party shall comply with the Applicable Reliability Council requirements. Unless the Interconnection Customer is utilizing shared Interconnection Customer Interconnection Facilities, or unless otherwise agreed by the Parties, Transmission Owner, at its election, or otherwise Interconnection Customer, shall install Metering Equipment (the "Metering Party") at the Point of Interconnection prior to any operation of the Generating Facility. Transmission Owner, at its election, or otherwise Interconnection Customer shall own, operate, test and maintain such Metering Equipment. Power flows to and from the Generating Facility shall be measured at or, at the Metering Party's option, compensated to, the Point of Interconnection. If Interconnection Customer will share Interconnection Facilities with any other projects, Interconnection Customer shall install Metering Equipment either on its own Generating Facility or its own non-shared facilities sufficient to measure the output of such Interconnection Customer's Generating Facility separately from any other Generating Facilities with which it will share Interconnection Facilities. The Metering Party shall provide metering quantities, in analog and/or digital form, to the other Parties upon request. Interconnection Customer shall bear all reasonable documented costs associated with the purchase, installation, operation, testing and maintenance of the Metering Equipment.

7.2 Check Meters. Interconnection Customer, at its option and expense, may install and operate, on its premises and on its side of the Point of Interconnection, one or more check meters to check the Metering Equipment owned by the Metering Party. Such check meters shall be for check purposes only and shall not be used for the measurement of power flows for purposes of this GIA, except as provided in Article 7.4 below. The check meters shall be subject at all reasonable times to inspection and examination by Transmission Provider, Transmission Owner or their designees. The installation, operation and maintenance thereof shall be performed entirely by Interconnection Customer in accordance with Good Utility Practice.

7.3 Standards. The Metering Party shall install, calibrate, and test revenue quality Metering Equipment in accordance with applicable ANSI standards.

7.4 Testing of Metering Equipment. The Metering Party shall inspect and test Metering Equipment upon installation and at least once every two (2) years thereafter. If requested to do so by a Party, the Metering Party shall, at the requesting Party's expense, inspect or test Metering Equipment more frequently than every two (2) years. The Metering Party

shall give reasonable notice to the other Parties of the time when any inspection or test shall take place, and the other Parties may have representatives present at the test or inspection. If at any time Metering Equipment is found to be inaccurate or defective, it shall be adjusted, repaired or replaced at Interconnection Customer's expense, in order to provide accurate metering, unless the inaccuracy or defect is due to the Metering Party's failure to maintain, then the Metering Party shall pay. If Metering Equipment fails to register, or if the measurement made by Metering Equipment during a test varies by more than two percent (2%) from the measurement made by the standard meter used in the test, the Metering Party shall adjust the measurements by correcting all measurements for the period during which Metering Equipment was in error by using Interconnection Customer's check meters, if installed. If no such check meters are installed or if the period cannot be reasonably ascertained, the adjustment shall be for the period immediately preceding the test of the Metering Equipment equal to one-half the time from the date of the previous test of the Metering Equipment.

7.5 **Metering Data**. At Interconnection Customer's expense, the metered data shall be telemetered to one or more locations designated by Transmission Provider and Transmission Owner and one or more locations designated by Interconnection Customer. Such telemetered data shall be used, under normal operating conditions, as the official measurement of the amount of energy delivered from the Generating Facility to the Point of Interconnection.

ARTICLE 8. COMMUNICATIONS

8.1 **Interconnection Customer Obligations**. Interconnection Customer shall maintain satisfactory operating communications with Transmission Provider's Transmission System dispatcher or representative designated by Transmission Provider. Interconnection Customer shall provide standard voice line, dedicated voice line and facsimile communications at its Generating Facility control room or central dispatch facility through use of either the public telephone system, or a voice communications system that does not rely on the public telephone system. Interconnection Customer shall also provide the dedicated data circuit(s) necessary to provide Interconnection Customer data to Transmission Provider as set forth in Appendix D, Security Arrangements Details. The data circuit(s) shall extend from the Generating Facility to the location(s) specified by Transmission Provider. Any required maintenance of such communications equipment shall be performed by and at the cost of Interconnection Customer. Operational communications shall be activated and maintained under, but not be limited to, the following events: system paralleling or separation, scheduled and unscheduled shutdowns, equipment clearances, and hourly and daily load data.

Unless the Generating Facility is an Intermittent Resource not relying on wind or solar as a fuel source, Interconnection Customer shall install communication and control equipment such that the Generating Facility can receive and respond to the appropriate dispatch signals while operating under the Tariff. Where applicable, the requirements of the communication and control equipment will be enumerated in Appendix C to this GIA.

8.2 Remote Terminal Unit (RTU). Prior to the Initial Synchronization Date of the Generating Facility, a remote terminal unit, or equivalent data collection and transfer equipment acceptable to both Parties, shall be installed by Interconnection Customer, or by Transmission Owner at Interconnection Customer's expense, to gather accumulated and instantaneous data to be telemetered to the location(s) designated by Transmission Owner and Transmission Provider through use of a dedicated point-to-point data circuit(s) as indicated in Article 8.1. The communication protocol for the data circuit(s) shall be specified by Transmission Owner and Transmission Provider. Instantaneous bi-directional analog real power and reactive power flow information must be telemetered directly to the location(s) specified by Transmission Provider and Transmission Owner.

Each Party will promptly advise the other Parties if it detects or otherwise learns of any metering, telemetry or communications equipment errors or malfunctions that require the attention and/or correction. The Party owning such equipment shall correct such error or malfunction as soon as reasonably feasible.

8.3 No Annexation. Any and all equipment placed on the premises of a Party shall be and remain the property of the Party providing such equipment regardless of the mode and manner of annexation or attachment to real property, unless otherwise mutually agreed by the Parties.

8.4 Provision of Data from a Variable Energy Resource. The Interconnection Customer whose Generating Facility is a Variable Energy Resource shall provide meteorological and forced outage data to the Transmission Provider to the extent necessary for the Transmission Provider's development and deployment of power production forecasts for that class of Variable Energy Resources. The Interconnection Customer with a Variable Energy Resource having wind as the energy source will, upon request by the Transmission Provider, be required to provide the Transmission Provider with site-specific meteorological data including: temperature, wind speed, wind direction, and atmospheric pressure. The Interconnection Customer with a Variable Energy Resource having solar as the energy source will, upon request by the Transmission Provider, be required to provide the Transmission Provider with site-specific meteorological data including: temperature, atmospheric pressure, and irradiance. The Transmission Provider and Interconnection Customer whose Generating Facility is a Variable Energy Resource shall mutually agree to any additional meteorological data that are required for the development and deployment of a power production forecast. The Interconnection Customer whose Generating Facility is a Variable Energy Resource also shall submit data to the Transmission Provider regarding all forced outages to the extent necessary for the Transmission Provider's development and deployment of power production forecasts for that class of Variable Energy Resources. The exact specifications of the meteorological and forced outage data to be provided by the Interconnection Customer to the Transmission Provider, including the frequency and timing of data submittals, shall be made taking into account the size and configuration of the Variable Energy Resource, its characteristics, location, and its importance in maintaining generation resource adequacy and transmission system reliability in its area. All requirements for meteorological and forced outage data must be commensurate with the power production forecasting

employed by the Transmission Provider. Data requirements for meteorological and forced outage data will be negotiated by the Transmission Provider and the Interconnection Customer, and will be set forth in Appendix C, Interconnection Details, of this GIA.

ARTICLE 9. OPERATIONS

9.1 **General.** Each Party shall comply with the Applicable Reliability Council requirements. Each Party shall provide to any Party all information that may reasonably be required by that Party to comply with Applicable Laws and Regulations and Applicable Reliability Standards.

9.2 **Local Balancing Authority Notification**. At least three (3) months before Initial Synchronization Date, Interconnection Customer shall notify Transmission Provider and Transmission Owner in writing of the Local Balancing Authority in which the Generating Facility will be located. If Interconnection Customer elects to locate the Generating Facility through dynamic metering/scheduling in a Local Balancing Authority other than the Local Balancing Authority in which the Generating Facility is physically located, and if permitted to do so by the relevant transmission tariffs, all necessary arrangements, including but not limited to those set forth in Article 7 and Article 8 of this GIA, and remote Local Balancing Authority generator interchange agreements, if applicable, and the appropriate measures under such agreements, shall be executed and implemented prior to the placement of the Generating Facility in the other Local Balancing Authority.

9.3 **Transmission Provider and Transmission Owner Obligations**. Transmission Provider shall cause the Transmission System and the Transmission Owner's Interconnection Facilities to be operated, maintained and controlled in a safe and reliable manner in accordance with this GIA. Transmission Provider, or its designee, may provide operating instructions to Interconnection Customer consistent with this GIA and the Tariff and, if applicable, Transmission Owner's operating protocols and procedures as they may change from time to time. Transmission Provider will consider changes to its operating protocols and procedures proposed by Interconnection Customer.

9.4 **Interconnection Customer Obligations**. Interconnection Customer shall at its own expense operate, maintain and control the Generating Facility and the Interconnection Customer's Interconnection Facilities in a safe and reliable manner and in accordance with this GIA. The Generating Facility must be operated in accordance with the operating limits, if any, in the Interconnection Facilities Study and specified in Appendix C of this GIA. Interconnection Customer shall operate the Generating Facility and the Interconnection Customer's Interconnection Facilities in accordance with all applicable requirements of Transmission Provider or its designated Local Balancing Authority Operator of which the Generating Facility is part, as such requirements are set forth in Appendix C, Interconnection Details, of this GIA. Appendix C, Interconnection Details, will be modified to reflect changes to the requirements as they may change from time to time. Any Party may request that a Party provide copies of the requirements set forth in Appendix C, Interconnection Details, of this GIA.

9.5 Start-Up and Synchronization. Consistent with the Parties' mutually acceptable procedures, Interconnection Customer is responsible for the proper synchronization of the Generating Facility to the Transmission or Distribution System, as applicable.

9.6 Reactive Power and Primary Frequency Response.

9.6.1 Power Factor Design Criteria.

9.6.1.1 Synchronous Generation. Interconnection Customer shall design the Generating Facility to be capable of maintaining a composite power delivery at continuous rated power output at the Point of Interconnection at all power factors over 0.95 leading to 0.95 lagging, unless the Transmission Provider has established different requirements that apply to all synchronous generators in the Local Balancing Authority on a comparable basis. The applicable Local Balancing Authority power factor requirements are listed on the Transmission Provider's website at

https://cdn.misoenergy.org/Reactive_Generator_Requirements108137.pdf

and may be referenced in the Appendices to this GIA. The Generating Facility shall be capable of continuous dynamic operation throughout the power factor design range as measured at the Point of Interconnection. Such operation shall account for the net effect of all energy production devices on the Interconnection Customer's side of the Point of Interconnection.

9.6.1.2 Non-Synchronous Generation. Interconnection Customer shall design the Generating Facility to be capable of maintaining a composite power delivery at continuous rated power output at the high-side of the generator substation at all power factors over 0.95 leading to 0.95 lagging, unless the Transmission Provider has established different requirements that apply to all non-synchronous generators in the Local Balancing Authority on a comparable basis. The applicable Local Balancing Authority power factor requirements are listed on the Transmission Provider's website at

https://cdn.misoenergy.org/Reactive_Generator_Requirements108137.pdf

and may be referenced in the Appendices to this GIA. This power factor range standard shall be dynamic and can be met using, for example, power electronics designed to supply this level of reactive capability (taking into account any limitations due to voltage level, real power output, etc.) or fixed and switched capacitors, or a combination of the two. This requirement shall only apply to newly interconnecting non-synchronous generators that have not yet completed a System Impact Study as of the effective date of the Final Rule establishing this requirement (Order No. 827). These requirements apply to existing non-synchronous generators making upgrades that require a new Generator

Interconnection Agreement only where the Transmission Provider's System Impact Study shows the need for reactive power as a result of an upgrade. If applicable, these requirements will be memorialized in Appendix C to this GIA.

9.6.2 Voltage Schedules. Once Interconnection Customer has synchronized the Generating Facility with the Transmission System, Transmission Provider shall require Interconnection Customer to operate the Generating Facility to produce or absorb reactive power within the design limitations of the Generating Facility set forth in Article 9.6.1 (Power Factor Design Criteria), to maintain the output voltage or power factor at the Point of Interconnection as specified by Transmission Provider. Transmission Provider's voltage schedules shall treat all sources of reactive power in the Local Balancing Authority in an equitable and not unduly discriminatory manner. Transmission Provider shall exercise Reasonable Efforts to provide Interconnection Customer with such schedules at least one (1) Calendar Day in advance, and may make changes to such schedules as necessary to maintain the reliability of the Transmission or Distribution System as applicable. Interconnection Customer shall operate the Generating Facility to maintain the specified output voltage or power factor at the Point of Interconnection within the design limitations of the Generating Facility set forth in Article 9.6.1 (Power Factor Design Criteria). If Interconnection Customer is unable to maintain the specified voltage or power factor, it shall promptly notify Transmission Provider's system operator, or its designated representative.

9.6.2.1 Voltage Regulators. Whenever the Generating Facility is operated in parallel with the Transmission or Distribution System as applicable and voltage regulators are capable of operation, Interconnection Customer shall operate the Generating Facility with its speed governors and voltage regulators in automatic operation. If the Generating Facility's voltage regulators are not capable of such automatic operation, Interconnection Customer shall immediately notify Transmission Provider's system operator, or its designated representative, and ensure that such Generating Facility's reactive power production or absorption (measured in MVARs) are within the design capability of the Generating Facility's generating unit(s) and steady state stability limits. Interconnection Customer shall not cause its Generating Facility to disconnect automatically or instantaneously from the Transmission or Distribution System, as applicable, or trip any generating unit comprising the Generating Facility for an under or over frequency condition unless the abnormal frequency condition persists for a time period beyond the limits set forth in ANSI/IEEE Standard C37.106, or such other standard as applied to other generators in the Local Balancing Authority on a comparable basis.

9.6.3 Payment for Reactive Power. Payments for reactive power shall be pursuant to any tariff or rate schedule filed by Transmission Provider and approved by the FERC.

9.6.4 Primary Frequency Response. This Section 9.6.4 shall only apply in the event that the Interconnection Request for the Generating Facility completed Definitive Planning Phase Interconnection Customer Decision Point 2 after May 15, 2018.

Interconnection Customer shall ensure the primary frequency response capability of its Generating Facility by installing, maintaining, and operating a functioning governor or equivalent controls. The term "functioning governor or equivalent controls" as used herein shall mean the required hardware and/or software that provides frequency responsive real power control with the ability to sense changes in system frequency and autonomously adjust the Generating Facility's real power output in accordance with the droop and deadband parameters and in the direction needed to correct frequency deviations. Interconnection Customer is required to install a governor or equivalent controls with the capability of operating: (1) with a maximum 5 percent droop and ±0.036 Hz deadband; or (2) in accordance with the relevant droop, deadband, and timely and sustained response settings from an approved NERC Reliability Standard providing for equivalent or more stringent parameters. The droop characteristic shall be: (1) based on the nameplate capacity of the Generating Facility, and shall be linear in the range of frequencies between 59 to 61 Hz that are outside of the deadband parameter; or (2) based on an approved NERC Reliability Standard providing for an equivalent or more stringent parameter. The deadband parameter shall be: the range of frequencies above and below nominal (60 Hz) in which the governor or equivalent controls is not expected to adjust the Generating Facility's real power output in response to frequency deviations. The deadband shall be implemented: (1) without a step to the droop curve, that is, once the frequency deviation exceeds the deadband parameter, the expected change in the Generating Facility's real power output in response to frequency deviations shall start from zero and then increase (for under-frequency deviations) or decrease (for over-frequency deviations) linearly in proportion to the magnitude of the frequency deviation; or (2) in accordance with an approved NERC Reliability Standard providing for an equivalent or more stringent parameter. Interconnection Customer shall notify Transmission Provider that the primary frequency response capability of the Generating Facility has been tested and confirmed during commissioning. Once Interconnection Customer has synchronized the Generating Facility with the Transmission System, Interconnection Customer shall operate the Generating Facility consistent with the provisions specified in Sections 9.6.4.1 and 9.6.4.2 of this GIA. The primary frequency response requirements contained herein shall apply to both synchronous and non-synchronous Generating Facilities.

9.6.4.1 Governor or Equivalent Controls. Whenever the Generating Facility is operated in parallel with the Transmission System, Interconnection Customer shall operate the Generating Facility with its governor or equivalent controls in service and responsive to frequency. Interconnection Customer shall: (1) in coordination with Transmission Provider and/or the relevant balancing authority, set the deadband

parameter to: (a) a maximum of ±0.036 Hz and set the droop parameter to a maximum of 5 percent; or (b) implement the relevant droop and deadband settings from an approved NERC Reliability Standard that provides for equivalent or more stringent parameters. Interconnection Customer shall be required to provide the status and settings of the governor or equivalent controls to Transmission Provider and/or the relevant balancing authority upon request. If Interconnection Customer needs to operate the Generating Facility with its governor or equivalent controls not in service, Interconnection Customer shall immediately notify Transmission Provider and the relevant balancing authority, and provide both with the following information: (1) the operating status of the governor or equivalent controls (i.e., whether it is currently out of service or when it will be taken out of service); (2) the reasons for removing the governor or equivalent controls from service; and (3) a reasonable estimate of when the governor or equivalent controls will be returned to service. Interconnection Customer shall make Reasonable Efforts to return its governor or equivalent controls into service as soon as practicable. Interconnection Customer shall make Reasonable Efforts to keep outages of the Generating Facility's governor or equivalent controls to a minimum whenever the Generating Facility is operated in parallel with the Transmission System.

9.6.4.2 Timely and Sustained Response. Interconnection Customer shall ensure that the Generating Facility's real power response to sustained frequency deviations outside of the deadband setting is automatically provided and shall begin immediately after frequency deviates outside of the deadband, and to the extent the Generating Facility has operating capability in the direction needed to correct the frequency deviation. Interconnection Customer shall not block or otherwise inhibit the ability of the governor or equivalent controls to respond and shall ensure that the response is not inhibited, except under certain operational constraints including, but not limited to, ambient temperature limitations, physical energy limitations, outages of mechanical equipment, or regulatory requirements. The Generating Facility shall sustain the real power response at least until system frequency returns to a value within the deadband setting of the governor or equivalent controls. A Commission-approved Reliability Standard with equivalent or more stringent requirements shall supersede the above requirements.

9.6.4.3 Exemptions. Generating Facilities that are regulated by the United States Nuclear Regulatory Commission shall be exempt from Sections 9.6.4, 9.6.4.1, and 9.6.4.2 of this GIA. Generating Facilities that are behind the meter generation that is sized-to-load (i.e., the thermal load and the generation are near-balanced in real-time operation and the generation is primarily controlled to maintain the unique thermal, chemical, or mechanical output necessary for the operating requirements

of its host facility) shall be required to install primary frequency response capability in accordance with the droop and deadband capability requirements specified in Section 9.6.4, but shall be otherwise exempt from the operating requirements in Sections 9.6.4, 9.6.4.1, 9.6.4.2, and 9.6.4.4 of this GIA.

9.6.4.4 Electric Storage Resources. Interconnection Customer interconnecting an electric storage resource shall establish an operating range in Appendix C that specifies a minimum state of charge and a maximum state of charge between which the electric storage resource will be required to provide primary frequency response consistent with the conditions set forth in Sections 9.6.4, 9.6.4.1, 9.6.4.2 and 9.6.4.3 of this GIA. Appendix C shall specify whether the operating range is static or dynamic, and shall consider (1) the expected magnitude of frequency deviations in the interconnection; (2) the expected duration that system frequency will remain outside of the deadband parameter in the interconnection; (3) the expected incidence of frequency deviations outside of the deadband parameter in the interconnection; (4) the physical capabilities of the electric storage resource; (5) operational limitations of the electric storage resource due to manufacturer specifications; and (6) any other relevant factors agreed to by Transmission Provider and Interconnection Customer, and in consultation with the relevant transmission owner or balancing authority as appropriate. If the operating range is dynamic, then Appendix C must establish how frequently the operating range will be reevaluated and the factors that may be considered during its reevaluation.

Interconnection Customer's electric storage resource is required to provide timely and sustained primary frequency response consistent with Section 9.6.4.2 of this GIA when it is online and dispatched to inject electricity to the Transmission System and/or receive electricity from the Transmission System. This excludes circumstances when the electric storage resource is not dispatched to inject electricity to the Transmission System and/or dispatched to receive electricity from the Transmission System. If Interconnection Customer's electric storage resource is charging at the time of a frequency deviation outside of its deadband parameter, it is to increase (for over-frequency deviations) or decrease (for under-frequency deviations) the rate at which it is charging in accordance with its droop parameter. Interconnection Customer's electric storage resource is not required to change from charging to discharging, or vice versa, unless the response necessitated by the droop and deadband settings requires it to do so and it is technically capable of making such a transition.

9.7 Outages and Interruptions.

9.7.1 Outages.

9.7.1.1 Outage Authority and Coordination. Interconnection Customer and Transmission Owner may each in accordance with Good Utility Practice in coordination with the other Party and Transmission Provider remove from service any of its respective Interconnection Facilities, System Protection Facilities, Network Upgrades, System Protection Facilities or Distribution Upgrades that may impact the other Party's facilities as necessary to perform maintenance or testing or to install or replace equipment. Absent an Emergency Condition, the Party scheduling a removal of such facility(ies) from service will use Reasonable Efforts to notify one another and schedule such removal on a date and time mutually acceptable to the Parties. In all circumstances, any Party planning to remove such facility(ies) from service shall use Reasonable Efforts to minimize the effect on the other Parties of such removal.

9.7.1.2 Outage Schedules. Transmission Provider shall post scheduled outages of transmission facilities on the OASIS. Interconnection Customer shall submit its planned maintenance schedules for the Generating Facility to Transmission Provider and Transmission Owner for a minimum of a rolling twenty-four (24) month period in accordance with the Transmission Provider's procedures. Interconnection Customer shall update its planned maintenance schedules as necessary. Transmission Provider may request Interconnection Customer to reschedule its maintenance as necessary to maintain the reliability of the Transmission System; provided, however, adequacy of generation supply shall not be a criterion in determining Transmission System reliability.

Transmission Provider shall compensate, pursuant to applicable Transmission Provider tariff or rate schedule, Interconnection Customer for any additional direct costs that Interconnection Customer incurs as a result of having to reschedule maintenance, including any additional overtime, breaking of maintenance contracts or other costs above and beyond the cost Interconnection Customer would have incurred absent the Transmission Provider's request to reschedule maintenance. Interconnection Customer will not be eligible to receive compensation, if during the twelve (12) months prior to the date of the scheduled maintenance, Interconnection Customer had modified its schedule of maintenance activities.

Costs shall be determined by negotiation between Transmission Provider and Interconnection Customer prior to implementation of the voluntary change in outage schedules, or if such request is made by or on behalf of a Transmission Customer requesting firm service, costs and recovery of costs shall be determined through a bilateral agreement between the Transmission Customer and Interconnection Customer. Voluntary

changes to outage schedules under this Article 9.7.1.2 are separate from actions and compensation required under Article 13 and for which costs are recovered in accordance with Transmission Provider's applicable tariff or rate schedule.

9.7.1.3 Outage Restoration. If an outage on either the Interconnection Customer's or Transmission Owner's Interconnection Facilities, Network Upgrades, System Protection Facilities or Distribution Upgrades adversely affects a Party's operations or facilities, the Party that owns or controls the facility that is out of service shall use Reasonable Efforts to promptly restore such facility(ies) to a normal operating condition consistent with the nature of the outage. The Party that owns or controls the facility that is out of service shall provide the other Parties, to the extent such information is known, information on the nature of the Emergency Condition, an estimated time of restoration, and any corrective actions required. Initial verbal notice shall be followed up as soon as practicable with written notice to the other Parties explaining the nature of the outage.

9.7.2 Interruption of Service. If required by Good Utility Practice to do so, Transmission Provider may require Interconnection Customer to interrupt or reduce deliveries of electricity if such delivery of electricity could adversely affect Transmission Provider's ability to perform such activities as are necessary to safely and reliably operate and maintain the Transmission System. The following provisions shall apply to any interruption or reduction permitted under this Article 9.7.2:

9.7.2.1 The interruption or reduction shall continue only for so long as reasonably necessary under Good Utility Practice;

9.7.2.2 Any such interruption or reduction shall be made on an equitable, non-discriminatory basis with respect to all generating facilities directly connected to the Transmission or Distribution System, as applicable;

9.7.2.3 When the interruption or reduction must be made under circumstances which do not allow for advance notice, Transmission Provider shall notify Interconnection Customer by telephone as soon as practicable of the reasons for the curtailment, interruption, or reduction, and, if known, its expected duration. Telephone notification shall be followed by written notification as soon as practicable;

9.7.2.4 Except during the existence of an Emergency Condition, when the interruption or reduction can be scheduled without advance notice, Transmission Provider shall notify Interconnection Customer in advance regarding the timing of such scheduling and further notify Interconnection Customer of the expected duration. Transmission

Provider shall coordinate with Interconnection Customer using Good Utility Practice to schedule the interruption or reduction during periods of least impact to Interconnection Customer, Transmission Owner and Transmission Provider;

9.7.2.5 The Parties shall cooperate and coordinate with each other to the extent necessary in order to restore the Generating Facility, Interconnection Facilities, and the Transmission or Distribution System, as applicable to their normal operating state, consistent with system conditions and Good Utility Practice.

9.7.3 Under-Frequency, Over-Frequency, Under-Voltage, and Over-Voltage Conditions. The Transmission System is designed to automatically activate a load-shed program as required by the Applicable Reliability Council in the event of an under-frequency or under-voltage system disturbance. Interconnection Customer shall implement under-frequency, over-frequency, under-voltage, and over-voltage relay set points for the Generating Facility as required by the Applicable Reliability Council to ensure "ride through" capability of the Transmission System. Generating Facility response to frequency and/or voltage deviations of pre-determined magnitudes, including under-frequency, over-frequency, under-voltage, and over-voltage, shall be studied and coordinated with Transmission Provider in accordance with Good Utility Practice. The term "ride through" as used herein shall mean the ability of a Generating Facility to stay connected to and synchronized with the Transmission System during system disturbances within a range of under-frequency, over-frequency, under-voltage, and over-voltage conditions, in accordance with Good Utility Practice.

9.7.4 System Protection and Other Control Requirements.

9.7.4.1 System Protection Facilities. Interconnection Customer shall, at its expense, install, operate and maintain its System Protection Facilities as a part of the Generating Facility or the Interconnection Customer's Interconnection Facilities. Transmission Owner shall install at Interconnection Customer's expense any Transmission Owner's System Protection Facilities that may be required on the Transmission Owner's Interconnection Facilities or the Transmission Owner's transmission or distribution facilities as a result of the interconnection of the Generating Facility and the Interconnection Customer's Interconnection Facilities.

9.7.4.2 Interconnection Customer's and Transmission Owner's System Protection Facilities shall be designed and coordinated with Affected Systems in accordance with Good Utility Practice.

9.7.4.3 Each Party shall be responsible for protection of its facilities consistent with Good Utility Practice.

9.7.4.4 Each Party's protective relay design shall incorporate the necessary test switches to perform the tests required in Article 6. The required test switches will be placed such that they allow operation of lockout relays while preventing breaker failure schemes from operating and causing unnecessary breaker operations and/or the tripping of the Generating Facility.

9.7.4.5 Each Party will test, operate and maintain their respective System Protection Facilities in accordance with Good Utility Practice.

9.7.4.6 Prior to the In-Service Date, and again prior to the Commercial Operation Date, Interconnection Customer or Transmission Owner, or their respective agents, shall perform a complete calibration test and functional trip test of the System Protection Facilities. At intervals suggested by Good Utility Practice and following any apparent malfunction of the System Protection Facilities, Interconnection Customer or Transmission Owner shall each perform both calibration and functional trip tests of their respective System Protection Facilities. These tests do not require the tripping of any in-service generating unit. These tests do, however, require that all protective relays and lockout contacts be activated.

9.7.5 Requirements for Protection. In compliance with Good Utility Practice, Interconnection Customer shall provide, install, own, and maintain relays, circuit breakers and all other devices necessary to remove any fault contribution of the Generating Facility to any short circuit occurring on the Transmission or Distribution System, as applicable, not otherwise isolated by Transmission Owner's equipment, such that the removal of the fault contribution shall be coordinated with the protective requirements of the Transmission or Distribution System, as applicable. Such protective equipment shall include, without limitation, a disconnecting device or switch with load-interrupting capability located between the Generating Facility and the Transmission or Distribution System, as applicable, at a site selected upon mutual agreement (not to be unreasonably withheld, conditioned or delayed) of the Parties. Interconnection Customer shall be responsible for protection of the Generating Facility and Interconnection Customer's other equipment from such conditions as negative sequence currents, over- or under-frequency, sudden load rejection, over- or under-voltage, and generator loss-of-field. Interconnection Customer shall be solely responsible to disconnect the Generating Facility and Interconnection Customer's other equipment if conditions on the Transmission or Distribution System, as applicable, could adversely affect the Generating Facility.

9.7.6 Power Quality. Neither Party's facilities shall cause excessive voltage flicker nor introduce excessive distortion to the sinusoidal voltage or current waves as defined by ANSI Standard C84.1, in accordance with IEEE Standard 519, or any applicable superseding electric industry standard. In the event of a conflict

between ANSI Standard C84.1, and any applicable superseding electric industry standard, the applicable superseding electric industry standard shall control.

9.8 Switching and Tagging Rules. Prior to the Initial Synchronization Date, each Party shall provide the other Parties a copy of its switching and tagging rules that are applicable to the other Parties' activities. Such switching and tagging rules shall be developed on a non-discriminatory basis. The Parties shall comply with applicable switching and tagging rules, as amended from time to time, in obtaining clearances for work or for switching operations on equipment.

9.9 Use of Interconnection Facilities by Other Parties.

9.9.1 Purpose of Interconnection Facilities. Except as may be required by Applicable Laws and Regulations, or as otherwise agreed to among the Parties, the Interconnection Facilities shall be constructed for the sole purpose of interconnecting the Generating Facility to the Transmission or Distribution System, as applicable, and shall be used for no other purpose.

9.9.2 Other Users. If required by Applicable Laws and Regulations or if the Parties mutually agree, such agreement not to be unreasonably withheld or delayed, to allow one or more Parties to use the Transmission Owner's Interconnection Facilities, or any part thereof, Interconnection Customer will be entitled to compensation for the capital expenses it incurred in connection with the Interconnection Facilities based upon the pro rata use of the Interconnection Facilities by Transmission Owner, all non-Party users, and Interconnection Customer, in accordance with Applicable Laws and Regulations or upon some other mutually-agreed upon methodology. In addition, cost responsibility for ongoing costs, including operation and maintenance costs associated with the Interconnection Facilities, will be allocated between Interconnection Customer and any non-Party users based upon the pro rata use of the Interconnection Facilities by Transmission Owner, all non-Party users, and Interconnection Customer, in accordance with Applicable Laws and Regulations or upon some other mutually agreed upon methodology. If the issue of such compensation or allocation cannot be resolved through such negotiations, it shall be submitted to Dispute Resolution pursuant to Section 12 of the Tariff.

9.10 Disturbance Analysis Data Exchange. The Parties will cooperate with one another in the analysis of disturbances to either the Generating Facility or the Transmission System by gathering and providing access to any information relating to any disturbance, including information from oscillography, protective relay targets, breaker operations and sequence of events records, and any disturbance information required by Good Utility Practice.

ARTICLE 10. MAINTENANCE

10.1 Transmission Owner Obligations. Transmission Owner shall maintain the Transmission Owner's Interconnection Facilities in a safe and reliable manner and in accordance with this GIA and all Applicable Laws and Regulations.

10.2 Interconnection Customer Obligations. Interconnection Customer shall maintain the Generating Facility and the Interconnection Customer's Interconnection Facilities in a safe and reliable manner and in accordance with this GIA and all Applicable Laws and Regulations.

10.3 Coordination. The Parties shall confer regularly to coordinate the planning, scheduling and performance of preventive and corrective maintenance on the Generating Facility and the Interconnection Facilities.

10.4 Secondary Systems. Each Party shall cooperate with the other in the inspection, maintenance, and testing of control or power circuits that operate below 600 volts, AC or DC, including, but not limited to, any hardware, control or protective devices, cables, conductors, electric raceways, secondary equipment panels, transducers, batteries, chargers, and voltage and current transformers that directly affect the operation of a Party's facilities and equipment which may reasonably be expected to impact another Party. Each Party shall provide advance notice to the other Parties before undertaking any work on such circuits, especially on electrical circuits involving circuit breaker trip and close contacts, current transformers, or potential transformers.

10.5 Operating and Maintenance Expenses. Subject to the provisions herein addressing the use of facilities by others, and except for operations and maintenance expenses associated with modifications made for providing Interconnection Service or Transmission Service to a non-Party and such non-Party pays for such expenses, Interconnection Customer shall be responsible for all reasonable expenses including overheads, associated with: (1) owning, operating, maintaining, repairing, and replacing Interconnection Customer's Interconnection Facilities; and (2) operation, maintenance, repair and replacement of Transmission Owner's Interconnection Facilities to the extent required by Transmission Owner on a comparable basis.

ARTICLE 11. PERFORMANCE OBLIGATION

11.1 Interconnection Customer's Interconnection Facilities. Interconnection Customer shall design, procure, construct, install, own and/or control the Interconnection Customer's Interconnection Facilities described in Appendix A at its sole expense.

11.2 Transmission Owner's Interconnection Facilities. Transmission Owner shall design, procure, construct, install, own and/or control the Transmission Owner's Interconnection Facilities described in Appendix A at the sole expense of Interconnection Customer.

11.3 Network Upgrades, System Protection Facilities and Distribution Upgrades. Transmission Owner shall design, procure, construct, install, and own the Network Upgrades, Transmission Owner's System Protection Facilities and Distribution Upgrades

described in Appendix A. Interconnection Customer shall be responsible for all costs related to Distribution Upgrades and/or Generator Upgrades. As required by Section 7.3.2.1 and 7.3.3.1 of Attachment X, Transmission Owner shall have provided Transmission Provider with written notice if Transmission Owner elects to fund the capital for the Network Upgrades and Transmission Owner's System Protection Facilities; otherwise, such facilities, if any, shall be solely funded by Interconnection Customer. In the event that the Transmission Owner elects to fund the capital costs of the Network Upgrades and/or Transmission Owner's System Protection Facilities, then the Parties shall enter into a Facilities Service Agreement. The Facilities Service Agreement shall take the form of the *pro forma* Facilities Service Agreement that is included as Appendix 14 of Attachment X to the MISO Tariff.

11.3.1 Contingencies Affecting Network Upgrades, System Protection Facilities and Distribution Upgrades. Network Upgrades, System Protection Facilities and Distribution Upgrades that are required to accommodate the Generating Facility may be modified because (1) a higher queued Interconnection Request withdrew or was deemed to have withdrawn, (2) the interconnection agreement associated with a higher queued Interconnection Request was terminated prior to the project's In-Service Date, (3) the Commercial Operation Date for a higher queued Interconnection Request is delayed, or the project itself is delayed (including due to suspension) such that facilities required to accommodate lower queued projects or the project itself may be altered, (4) the queue position is reinstated for a higher-queued Interconnection Request whose queue position was subject to dispute resolution, (5) changes occur in Transmission Provider or Transmission Owner equipment design standards or reliability criteria giving rise to the need for restudy, (6) the facilities required to accommodate a higher queued Interconnection Request were modified constituting a Material Modification pursuant to Section 4.4 of the GIP, (7) a GIA with an effective date prior to this GIA is terminated, (8) when ordered to restudy by FERC, or (9) the Network Upgrade Facilities Study for a Network Upgrade, which is to be included in this GIA, is completed after execution of this GIA. The higher queued Interconnection Requests that could impact the Network Upgrades, System Protection Facilities and Distribution Upgrades required to accommodate the Generating Facility, and possible Modifications that may result from the above listed events affecting the higher queued Interconnection Requests, to the extent such modifications are reasonably known and can be determined, and estimates of the costs associated with such required Network Upgrades, System Protection Facilities and Distribution Upgrades, are provided in Appendix A.

11.3.2 Agreement to Restudy and Cost Reallocation. In the event that one of the contingencies listed in Article 11.3.1 occurs, at any time before the Network Upgrades, Common Use Upgrades, Shared Network Upgrades, System Protection Facilities and/or Distribution Upgrades associated with higher queued Interconnection Requests with GIA in effect prior to this GIA are completed, Transmission Provider may determine, in its discretion, that a restudy is required. If a restudy is required, Transmission Provider will provide notice to

Interconnection Customer and Interconnection Customer agrees to enter into an Interconnection Study Agreement for such restudy. Transmission Provider will reevaluate the need for any Common Use Upgrade(s) and/or Shared Network Upgrade(s), and if still required, reallocate the cost and responsibility for any Common Use Upgrade and/or Shared Network Upgrade, without a restudy when possible, or with a restudy if the Transmission Provider deems it necessary in order to ensure reliability of the Transmission System. The Parties agree to amend Appendix A to this GIA in accordance with Article 30.10 to reflect the results of any cost reallocation required under this Article 11.3.2.

11.3.3 Agreement to Fund Shared Network Upgrades. Interconnection Customer agrees to fund Shared Network Upgrades, as determined by Transmission Provider. Where applicable, payments to fund Shared Network Upgrade(s) that are made to Transmission Provider by Interconnection Customer will be disbursed by Transmission Provider to the appropriate entities that funded the Shared Network Upgrades in accordance with Attachment X and Attachment FF of the Tariff. In the event that Interconnection Customer fails to meet its obligation to fund Shared Network Upgrades, Transmission Owner and Transmission Provider shall not be responsible for the Interconnection Customer's funding obligation.

11.4 Transmission Credits.

11.4.1 Repayment of Amounts Advanced for Network Upgrades. Interconnection Customer shall be entitled to a cash repayment by Transmission Owner(s) and the Affected System Owner(s) that own the Network Upgrades, of the amount paid respectively to Transmission Owner and Affected System Operator, if any, for the Network Upgrades, as provided under Attachment FF of this Tariff and including any tax gross-up or other tax-related payments associated with the repayable portion of the Network Upgrades, and not repaid to Interconnection Customer pursuant to Article 5.17.8 or otherwise, to be paid to Interconnection Customer on a dollar-for-dollar basis for the non-usage sensitive portion of transmission charges, as payments are made under the Tariff and Affected System's Tariff for Transmission Services with respect to the Generating Facility. Any repayment shall include interest calculated in accordance with the methodology set forth in FERC's regulations at 18 C.F.R. § 35.19 (a)(2)(iii) from the date of any payment for Network Upgrades through the date on which Interconnection Customer receives a repayment of such payment pursuant to this subparagraph. Interest shall not accrue during periods in which Interconnection Customer has suspended construction pursuant to Article 11 or the Network Upgrades have been determined not to be needed pursuant to this Article 11.4.1. Interconnection Customer may assign such repayment rights to any person.

If the Generating Facility is designated a Network Resource under the Tariff, or if there are otherwise no incremental payments for Transmission Service resulting from the use of the Generating Facility by Transmission Customer, and

in the absence of another mutually agreeable payment schedule any repayments provided under Attachment FF shall be established equal to the applicable rate for Firm Point-To-Point Transmission Service for the pricing zone where the Network Load is located multiplied by the portion of the demonstrated output of the Generating Facility designated as a Network Resource by the Network Customer(s) or in the absence of such designation, equal to the monthly firm single system-wide rate defined under Schedule 7 of the Tariff multiplied by the portion of the demonstrated output of the Generating Facility under contract to Network Customer(s) and consistent with studies pursuant to Section 3.2.2.2 of the GIP.

Notwithstanding the foregoing, as applicable and consistent with the provisions of Attachment FF of this Tariff, Interconnection Customer, Transmission Provider, Transmission Owner, and Affected System Operator may adopt any alternative payment schedule that is mutually agreeable so long as Transmission Owner and Affected System Operator take one of the following actions no later than five (5) years from the Commercial Operation Date: (1) return to Interconnection Customer any amounts advanced for Network Upgrades not previously repaid, or (2) declare in writing that Transmission Owner or Affected System Operator will continue to provide payments to Interconnection Customer on a dollar-for-dollar basis for the non-usage sensitive portion of transmission charges, or develop an alternative schedule that is mutually agreeable and provides for the return of all amounts advanced for Network Upgrades not previously repaid; however, full reimbursement shall not extend beyond twenty (20) years from the Commercial Operation Date.

If the Generating Facility is installed in phases, the amount eligible for refund as each phase achieves Commercial Operation will be reduced by the proportional amount of generation capacity not yet installed. However, all facilities in Appendix A other than the Generating Facility shall be built without consideration for the phasing of the Generating Facility as though the entire Generating Facility will be placed in Commercial Operation for the full output or increased output of the Generating Facility constructed by Interconnection Customer under this GIA.

If the Generating Facility fails to achieve Commercial Operation, but it or another generating facility is later constructed and makes use of the Network Upgrades, Transmission Owner and Affected System Operator shall at that time reimburse Interconnection Customer for the remaining applicable amounts that may be refundable pursuant to Attachment FF of this Tariff that were advanced for the Network Upgrades on their respective systems as described above. Before any such reimbursement can occur, Interconnection Customer, or the entity that ultimately constructs the Generating Facility, if different, is responsible for identifying the entity to which the reimbursement must be made.

11.4.2 Special Provisions for Transmission Provider as an Affected System to be covered under Separate Agreements. When the Transmission Owner's Transmission or Distribution System (including for this Article 11.4.2 independent distribution systems connected to the Transmission System) is an Affected System for an interconnection in another electric system, Transmission Provider will coordinate the performance of Interconnection Studies with the other system. Transmission Provider will determine if any Network Upgrades or Distribution Upgrades, which may be required on the Transmission System as a result of the interconnection, would not have been needed but for the interconnection. Unless Transmission Owner provides, under the interconnection agreement between Interconnection Customer and the other system, for the repayment of amounts advanced to Transmission Provider or an impacted Transmission Owner for Network Upgrades, Interconnection Customer, Transmission Provider, and the impacted Transmission Owner(s) shall enter into an agreement that provides for such repayment by Transmission Owner(s) as directed by Transmission Provider. The agreement shall specify the terms governing payments to be made by Interconnection Customer to the Affected System Operator as well as the payment of refunds by the Affected System Operator.

11.4.3 Notwithstanding any other provision of this GIA, nothing herein shall be construed as relinquishing or foreclosing any rights, including but not limited to firm transmission rights, capacity rights, transmission congestion rights, or transmission credits, that Interconnection Customer, shall be entitled to, now or in the future under any other agreement or tariff as a result of, or otherwise associated with, the transmission capacity, if any, created by the Network Upgrades, including the right to obtain cash reimbursement or transmission credits for transmission service that is not associated with the Generating Facility.

11.5 Initial Payment. For upgrades that the Transmission Owner has elected to self-fund, the Interconnection Customer is responsible for making the initial payment for the total cost of Network Upgrades or Transmission Owner's System Protection Facilities in the form of security pursuant to Article 11.6. For upgrades where the Transmission Owner did not elect to self-fund, the Interconnection Customer shall elect (and provide its election to the Transmission Provider within five days of the commencement of negotiation of the GIA pursuant to Section 11.2 of the GIP) to make either 1) an initial payment equal to twenty (20) percent of the total cost of Network Upgrades, Transmission Owner Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and/or Generator Upgrades (if the In-Service Date is less than or equal to five (5) years of the initial payment date); or 2) an initial payment equal to ten (10) percent of the total cost of Network Upgrades, Transmission Owner Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and/or Generator Upgrades (if the In-Service Date exceeds the initial payment date by more than five (5) years); or 3) the total cost of Network Upgrades, Transmission Owner Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and/or

Generator Upgrades in the form of security pursuant to Article 11.6. The initial payment shall be provided to Transmission Owner by Interconnection Customer pursuant to this Article 11.5 within the later of a) forty-five (45) Calendar Days of the execution of the GIA by all Parties, or b) forty-five (45) Calendar Days of acceptance by FERC if the GIA is filed unexecuted and the payment is being protested by Interconnection Customer, or c) forty-five (45) Calendar Days of the filing if the GIA is filed unexecuted and the initial payment is not being protested by Interconnection Customer. If the Interconnection Customer made its milestone payments in the form of cash and the Interconnection Customer elects a cash initial payment, then the Transmission Provider shall transfer those funds to the Transmission Owner on the Interconnection Customer's behalf.

11.6 Provision of Security. Unless a milestone cash payment schedule is provided in Appendix B, Interconnection Customer shall, at least forty-five (45) Calendar Days prior to the commencement of the design, procurement, installation, or construction of a discrete portion of a facility, not otherwise funded under Article 11.5, provide additional security. Additionally, the Interconnection Customer will be required to provide security more than forty-five (45) Calendar Days in advance if requested by Transmission Owner because regulatory approvals are required for the construction of such facilities. Interconnection Customer shall provide Transmission Owner, at Interconnection Customer's selection, a guarantee, a surety bond, letter of credit or other form of security that is reasonably acceptable to Transmission Owner and is consistent with the Uniform Commercial Code of the jurisdiction identified in Article 14.2.1. Such security for payment shall be in an amount sufficient to cover the applicable costs and cost commitments, in addition to those funded under Article 11.5, required of the Party responsible for building the facilities pursuant to the construction schedule developed in Appendix B for designing, engineering, seeking regulatory approval from any Governmental Authority, constructing, procuring and installing the applicable portion of the Transmission Owner's Interconnection Facilities, Transmission Owner's System Protection Facilities, Network Upgrades, Distribution Upgrades or Stand-Alone Network Upgrades and shall be reduced on a dollar-for-dollar basis for payments made to Transmission Owner for these purposes.

In addition:

11.6.1 The guarantee must be made by an entity that meets the creditworthiness requirements of Transmission Owner, and contain terms and conditions that guarantee payment of any amount that may be due from Interconnection Customer, up to an agreed-to maximum amount.

11.6.2 The letter of credit must be issued by a financial institution reasonably acceptable to Transmission Owner and must specify a reasonable expiration date.

11.6.3 The surety bond must be issued by an insurer reasonably acceptable to Transmission Owner and must specify a reasonable expiration date.

11.6.4 If the Shared Network Upgrade is not in service, Interconnection Customer will not be required to make a payment under Schedule 26-B until the Shared Network Upgrade is in service, but Interconnection Customer will provide, as applicable, an Irrevocable Letter of Credit to fund any Shared Network Upgrade pursuant to Attachment FF of the Tariff. The Irrevocable Letter of Credit shall be in an amount sufficient to cover the Interconnection Customer's share of the applicable costs and cost commitments associated with the Shared Network Upgrades. Transmission Provider may periodically adjust the Interconnection Customer's share of the applicable costs and cost commitment of Shared Network Upgrades and may require Interconnection Customer to adjust the amount of the Irrevocable Letter of Credit accordingly.

11.7 Interconnection Customer Compensation. If Transmission Provider requests or directs Interconnection Customer to provide a service pursuant to Article 13.4 of this GIA, Transmission Provider shall compensate Interconnection Customer in accordance with any tariff or rate schedule filed by Transmission Provider and approved by the FERC.

ARTICLE 12. INVOICE

12.1 General. Each Party shall submit to the other Party, on a monthly basis, invoices of amounts due, if any, for the preceding month. Each invoice shall state the month to which the invoice applies and fully describe the services and equipment provided. The Parties may discharge mutual debts and payment obligations due and owing to each other on the same date through netting, in which case all amounts a Party owes to the other Party under this GIA, including interest payments or credits, shall be netted so that only the net amount remaining due shall be paid by the owing Party.

12.2 Final Invoice. Within six (6) months after completion of the construction of the Transmission Owner's Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and the Network Upgrades, Transmission Owner shall provide an invoice of the final cost of the construction of the Transmission Owner's Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and the Network Upgrades and shall set forth such costs in sufficient detail to enable Interconnection Customer to compare the actual costs with the estimates and to ascertain deviations, if any, from the cost estimates. Transmission Owner shall refund, with interest (calculated in accordance with 18 C.F.R. Section 35.19a(a)(2)(iii), to Interconnection Customer any amount by which the actual payment by Interconnection Customer for estimated costs exceeds the actual costs of construction within thirty (30) Calendar Days of the issuance of such final construction invoice.

12.3 Payment. Invoices shall be rendered to the paying Party at the address specified in Appendix F. The Party receiving the invoice shall pay the invoice within thirty (30) Calendar Days of receipt. All payments shall be made in immediately available funds payable to the other Party, or by wire transfer to a bank named and account designated by the invoicing Party. Payment of invoices by a Party will not constitute a waiver of any rights or claims that Party may have under this GIA.

12.4 Disputes. In the event of a billing dispute among the Parties, Transmission Provider shall continue to provide Interconnection Service under this GIA as long as Interconnection Customer: (i) continues to make all payments not in dispute; and (ii) pays to Transmission Provider or Transmission Owner or into an independent escrow account the portion of the invoice in dispute, pending resolution of such dispute. If Interconnection Customer fails to meet these two requirements for continuation of service, then Transmission Provider may or, at Transmission Owner's request upon Interconnection Customer's failure to pay, Transmission Owner, shall provide notice to Interconnection Customer of a Default pursuant to Article 17. Within thirty (30) Calendar Days after the resolution of the dispute, the Party that owes money to another Party shall pay the amount due with interest calculated in accord with the methodology set forth in 18 C.F.R. § 35.19a(a)(2)(iii).

ARTICLE 13. EMERGENCIES

13.1 Obligations. Each Party shall comply with the Emergency Condition procedures of Transmission Provider, NERC, the Applicable Reliability Council, and Applicable Laws and Regulations.

13.2 Notice. Transmission Provider or Transmission Owner shall notify the other Parties promptly when it becomes aware of an Emergency Condition that affects the Transmission Owner's Interconnection Facilities or the Transmission or Distribution System, as applicable, that may reasonably be expected to affect Interconnection Customer's operation of the Generating Facility or the Interconnection Customer's Interconnection Facilities.

Interconnection Customer shall notify Transmission Provider and Transmission Owner, which includes by definition if applicable, the operator of a Distribution System, promptly when it becomes aware of an Emergency Condition that affects the Generating Facility or the Interconnection Customer's Interconnection Facilities that may reasonably be expected to affect the Transmission or Distribution System, as applicable, or the Transmission Owner's Interconnection Facilities.

To the extent information is known, the notification shall describe the Emergency Condition, the extent of the damage or deficiency, the expected effect on the operation of Interconnection Customer's or Transmission Provider's or Transmission Owner's facilities and operations, its anticipated duration and the corrective action taken and/or to be taken. The initial notice shall be followed as soon as practicable with written notice.

13.3 Immediate Action. Unless, in a Party's reasonable judgment, immediate action is required, the Party exercising such judgment shall notify and obtain the consent of the other Parties, such consent to not be unreasonably withheld, prior to performing any manual switching operations at the Generating Facility or the Interconnection Customer's Interconnection Facilities in response to an Emergency Condition either declared by

Transmission Provider or otherwise regarding the Transmission or Distribution System, as applicable.

13.4 Transmission Provider and Transmission Owner Authority.

13.4.1 General. Transmission Provider or Transmission Owner may take whatever actions or inactions with regard to the Transmission System or the Transmission Owner's Interconnection Facilities it deems necessary during an Emergency Condition in order to (i) preserve public health and safety, (ii) preserve the reliability of the Transmission System or the Transmission Owner's Interconnection Facilities, (iii) limit or prevent damage, and (iv) expedite restoration of service.

Transmission Provider or Transmission Owner shall use Reasonable Efforts to minimize the effect of such actions or inactions on the Generating Facility or the Interconnection Customer's Interconnection Facilities. Transmission Provider or Transmission Owner may, on the basis of technical considerations, require the Generating Facility to mitigate an Emergency Condition by taking actions necessary and limited in scope to remedy the Emergency Condition, including, but not limited to, directing Interconnection Customer to shut-down, start-up, increase or decrease the real or reactive power output of the Generating Facility; implementing a reduction or disconnection pursuant to Article 13.4.2; directing Interconnection Customer to assist with blackstart (if available) or restoration efforts; or altering the outage schedules of the Generating Facility and the Interconnection Customer's Interconnection Facilities. Interconnection Customer shall comply with all of Transmission Provider's or Transmission Owner's operating instructions concerning Generating Facility real power and reactive power output within the manufacturer's design limitations of the Generating Facility's equipment that is in service and physically available for operation at the time, in compliance with Applicable Laws and Regulations.

13.4.2 Reduction and Disconnection. Transmission Provider or Transmission Owner may reduce Interconnection Service or disconnect the Generating Facility or the Interconnection Customer's Interconnection Facilities, when such reduction or disconnection is necessary under Good Utility Practice due to Emergency Conditions. These rights are separate and distinct from any right of curtailment of Transmission Provider pursuant to the Tariff. When Transmission Provider can schedule the reduction or disconnection in advance, Transmission Provider shall notify Interconnection Customer of the reasons, timing and expected duration of the reduction or disconnection. Transmission Provider shall coordinate with Interconnection Customer and Transmission Owner using Good Utility Practice to schedule the reduction or disconnection during periods of least impact to Interconnection Customer, Transmission Owner and Transmission Provider. Any reduction or disconnection shall continue only for so long as reasonably necessary pursuant to Good Utility Practice. The Parties shall cooperate with each other to restore the Generating Facility, the

Interconnection Facilities, and the Transmission System to their normal operating state as soon as practicable consistent with Good Utility Practice.

13.5 Interconnection Customer Authority. Consistent with Good Utility Practice and this GIA and the GIP, Interconnection Customer may take whatever actions or inactions with regard to the Generating Facility or the Interconnection Customer's Interconnection Facilities during an Emergency Condition in order to (i) preserve public health and safety, (ii) preserve the reliability of the Generating Facility or the Interconnection Customer's Interconnection Facilities, (iii) limit or prevent damage, and (iv) expedite restoration of service. Interconnection Customer shall use Reasonable Efforts to minimize the effect of such actions or inactions on the Transmission System and the Transmission Owner's Interconnection Facilities. Transmission Provider and Transmission Owner shall use Reasonable Efforts to assist Interconnection Customer in such actions.

13.6 Limited Liability. Except as otherwise provided in Article 11.6 of this GIA, no Party shall be liable to any other for any action it takes in responding to an Emergency Condition so long as such action is made in good faith and is consistent with Good Utility Practice.

13.7 Audit. In accordance with Article 25.3, any Party may audit the performance of another Party when that Party declared an Emergency Condition.

ARTICLE 14. REGULATORY REQUIREMENTS AND GOVERNING LAW

14.1 Regulatory Requirements. Each Party's obligations under this GIA shall be subject to its receipt of any required approval or certificate from one or more Governmental Authorities in the form and substance satisfactory to the applying Party, or the Party making any required filings with, or providing notice to, such Governmental Authorities, and the expiration of any time period associated therewith. Each Party shall in good faith seek, and if necessary assist the other Party and use its Reasonable Efforts to obtain such other approvals. Nothing in this GIA shall require Interconnection Customer to take any action that could result in its inability to obtain, or its loss of, status or exemption under the Federal Power Act, the Public Utility Holding Company Act of 2005, as amended, or the Public Utility Regulatory Policies Act of 1978.

14.2 Governing Law.

14.2.1 The validity, interpretation and performance of this GIA and each of its provisions shall be governed by the laws of the state where the Point of Interconnection is located, without regard to its conflicts of law principles.

14.2.2 This GIA is subject to all Applicable Laws and Regulations.

14.2.3 Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, rules, or regulations of a Governmental Authority.

ARTICLE 15. NOTICES

15.1 General. Unless otherwise provided in this GIA, any notice, demand or request required or permitted to be given by any Party to the other Parties and any instrument required or permitted to be tendered or delivered by a Party in writing to the other Parties shall be effective when delivered and may be so given, tendered or delivered, by recognized national courier, or by depositing the same with the United States Postal Service with postage prepaid, for delivery by certified or registered mail, addressed to the Party, or personally delivered to the Party, at the address set out in Appendix F, Addresses for Delivery of Notices and Billings.

Either Party may change the notice information in this GIA by giving five (5) Business Days written notice prior to the effective date of the change.

15.2 Billings and Payments. Billings and payments shall be sent to the addresses set out in Appendix F.

15.3 Alternative Forms of Notice. Any notice or request required or permitted to be given by any Party to the other and not required by this GIA to be given in writing may be so given by telephone, facsimile or email to the telephone numbers and email addresses set out in Appendix F.

15.4 Operations and Maintenance Notice. Each Party shall notify the other Parties in writing of the identity of the person(s) that it designates as the point(s) of contact with respect to the implementation of Articles 9 and 10.

ARTICLE 16. FORCE MAJEURE

16.1 Force Majeure.

16.1.1 Economic hardship is not considered a Force Majeure event.

16.1.2 A Party shall not be considered to be in Default with respect to any obligation hereunder, (including obligations under Article 4 and 5), other than the obligation to pay money when due, if prevented from fulfilling such obligation by Force Majeure. A Party unable to fulfill any obligation hereunder (other than an obligation to pay money when due) by reason of Force Majeure shall give notice and the full particulars of such Force Majeure to the other Parties in writing or by telephone as soon as reasonably possible after the occurrence of the cause relied upon. Telephone, facsimile or email notices given pursuant to this Article shall be confirmed in writing as soon as reasonably possible and shall specifically state full particulars of the Force Majeure, the time and date when the Force Majeure occurred and when the Force Majeure is reasonably expected to cease. The Party affected shall exercise Reasonable Efforts to remove such disability with reasonable dispatch, but shall not be required to

accede or agree to any provision not satisfactory to it in order to settle and terminate a strike or other labor disturbance.

ARTICLE 17. DEFAULT

17.1 Default

17.1.1 General. No Default shall exist where such failure to discharge an obligation (other than the payment of money) is the result of Force Majeure as defined in this GIA or the result of an act or omission of another Party. Upon a Breach, the non-Breaching Party or Parties shall give written notice of such Breach to the Breaching Party with a copy to the other Party if one Party gives notice of such Breach. Except as provided in Article 17.1.2, the Breaching Party shall have thirty (30) Calendar Days from receipt of the Breach notice within which to cure such Breach; provided however, if such Breach is not capable of cure within thirty (30) Calendar Days, the Breaching Party shall commence such cure within thirty (30) Calendar Days after notice and continuously and diligently complete such cure within ninety (90) Calendar Days from receipt of the Breach notice; and, if cured within such time, the Breach specified in such notice shall cease to exist.

17.1.2 Termination. If a Breach is not cured as provided in this Article, or if a Breach is not capable of being cured within the period provided for herein, the non-Breaching Party or Parties shall terminate this GIA, subject to Article 2.3.2 of this GIA, by written notice to the Breaching Party, with a copy to the other Party if one Party gives notice of termination, and be relieved of any further obligation hereunder and, whether or not that Party(ies) terminates this GIA, to recover from the Breaching Party all amounts due hereunder, plus all other damages and remedies to which it is (they are) entitled at law or in equity. The provisions of this Article will survive termination of this GIA.

17.1.3 Cross-Default. Pursuant to Article 11.3 of this GIA, the Parties shall enter into a Facilities Service Agreement if the Transmission Owner has elected to fund the capital for the Network Upgrades and/or Transmission Owner's System Protection Facilities. Notwithstanding anything to the contrary contained in this GIA, a breach by Interconnection Customer of any provision, covenant, or other term or condition contained in the Facilities Service Agreement shall be considered a breach under this GIA. Such breach shall be subject to the terms of Article 17 of this GIA. If a default under this GIA results from the Interconnection Customer's breach of the Facilities Service Agreement and subsequent failure to cure, the Transmission Owner and Transmission Provider shall be entitled, but in no event required, to apply all rights and remedies available by reason of default under the Facilities Service Agreement and this GIA.

ARTICLE 18. LIMITATION OF LIABILITY, INDEMNITY, CONSEQUENTIAL DAMAGES AND INSURANCE

18.1 Limitation of Liability. A Party shall not be liable to another Party or to any third party or other person for any damages arising out of actions under this GIA, including, but not limited to, any act or omission that results in an interruption, deficiency or imperfection of Interconnection Service, except as provided in this Tariff. The provisions set forth in the Tariff shall be additionally applicable to any Party acting in good faith to implement or comply with its obligations under this GIA, regardless of whether the obligation is preceded by a specific directive.

18.2 Indemnity. To the extent permitted by law, an Indemnifying Party shall at all times indemnify, defend and hold the other Parties harmless from Loss.

18.2.1 Indemnified Party. If an Indemnified Party is entitled to indemnification under this Article 18 as a result of a claim by a non-Party, and the Indemnifying Party fails, after notice and reasonable opportunity to proceed under Article 18.2, to assume the defense of such claim, such Indemnified Party may at the expense of the Indemnifying Party contest, settle or consent to the entry of any judgment with respect to, or pay in full, such claim.

18.2.2 Indemnifying Party. If an Indemnifying Party is obligated to indemnify and hold any Indemnified Party harmless under this Article 18, the amount owing to the Indemnified Party shall be the amount of such Indemnified Party's actual Loss, net of any insurance or other recovery.

18.2.3 Indemnity Procedures. Promptly after receipt by an Indemnified Party of any claim or notice of the commencement of any action or administrative or legal proceeding or investigation as to which the indemnity provided for in Article 18.2 may apply, the Indemnified Party shall notify the Indemnifying Party of such fact. Any failure of or delay in such notification shall not affect a Party's indemnification obligation unless such failure or delay is materially prejudicial to the Indemnifying Party.

The Indemnifying Party shall have the right to assume the defense thereof with counsel designated by such Indemnifying Party and reasonably satisfactory to the Indemnified Party. If the defendants in any such action include one or more Indemnified Parties and the Indemnifying Party and if the Indemnified Party reasonably concludes that there may be legal defenses available to it and/or other Indemnified Parties which are different from or additional to those available to the Indemnifying Party, the Indemnified Party shall have the right to select separate counsel to assert such legal defenses and to otherwise participate in the defense of such action on its own behalf. In such instances, the Indemnifying Party shall only be required to pay the fees and expenses of one additional attorney to represent an Indemnified Party or Indemnified Parties having such differing or additional legal defenses.

The Indemnified Party shall be entitled, at its expense, to participate in any such action, suit or proceeding, the defense of which has been assumed by the Indemnifying Party. Notwithstanding the foregoing, the Indemnifying Party (i) shall not be entitled to assume and control the defense of any such action, suit or proceedings if and to the extent that, in the opinion of the Indemnified Party and its counsel, such action, suit or proceeding involves the potential imposition of criminal liability on the Indemnified Party, or there exists a conflict or adversity of interest between the Indemnified Party and the Indemnifying Party, in such event the Indemnifying Party shall pay the reasonable expenses of the Indemnified Party, and (ii) shall not settle or consent to the entry of any judgment in any action, suit or proceeding without the consent of the Indemnified Party, which shall not be reasonably withheld, conditioned or delayed.

18.3 Consequential Damages. Other than the Liquidated Damages heretofore described, in no event shall either Party be liable under any provision of this GIA for any losses, damages, costs or expenses for any special, indirect, incidental, consequential, or punitive damages, including but not limited to loss of profit or revenue, loss of the use of equipment, cost of capital, cost of temporary equipment or services, whether based in whole or in part in contract, in tort, including negligence, strict liability, or any other theory of liability; provided; however, that damages for which a Party may be liable to the other Party under another agreement will not be considered to be special, indirect, incidental, or consequential damages hereunder.

18.4 Insurance. Transmission Owner and Interconnection Customer shall, at their own expense, maintain in force throughout the period of this GIA pursuant to 18.4.9, and until released by the other Party, the following minimum insurance coverages, with insurers authorized to do business or an approved surplus lines carrier in the state where the Point of Interconnection is located:

18.4.1 Employers' Liability and Workers' Compensation Insurance providing statutory benefits in accordance with the laws and regulations of the state in which the Point of Interconnection is located.

18.4.2 Commercial General Liability Insurance including premises and operations, personal injury, broad form property damage, broad form blanket contractual liability coverage (including coverage for the contractual indemnification) products and completed operations coverage, coverage for explosion, collapse and underground hazards, independent contractors coverage, coverage for pollution to the extent normally available and punitive damages to the extent normally available and a cross liability endorsement, with minimum limits of One Million Dollars ($1,000,000) per occurrence/One Million Dollars ($1,000,000) aggregate combined single limit for personal injury, bodily injury, including death and property damage.

18.4.3 Comprehensive Automobile Liability Insurance, for coverage of owned and non-owned and hired vehicles, trailers or semi-trailers licensed for travel on public roads, with a minimum combined single limit of One Million Dollars ($1,000,000) each occurrence for bodily injury, including death, and property damage.

18.4.4 Excess Public Liability Insurance over and above the Employer's Liability, Commercial General Liability and Comprehensive Automobile Liability Insurance coverage, with a minimum combined single limit of Twenty Million Dollars ($20,000,000) per occurrence/Twenty Million Dollars ($20,000,000) aggregate.

18.4.5 The Commercial General Liability Insurance, Comprehensive Automobile Insurance and Excess Public Liability Insurance policies shall name the other Parties, their parents, associated and Affiliate companies and their respective directors, officers, agents, servants and employees ("Other Party Group") as additional insured. All policies shall contain provisions whereby the insurers waive all rights of subrogation in accordance with the provisions of this GIA against the Other Party Groups and provide thirty (30) Calendar Days' advance written notice to the Other Party Groups prior to anniversary date of cancellation or any material change in coverage or condition.

18.4.6 The Commercial General Liability Insurance, Comprehensive Automobile Liability Insurance and Excess Public Liability Insurance policies shall contain provisions that specify that the policies are primary and shall apply to such extent without consideration for other policies separately carried and shall state that each insured is provided coverage as though a separate policy had been issued to each, except the insurer's liability shall not be increased beyond the amount for which the insurer would have been liable had only one insured been covered. Each Party shall be responsible for its respective deductibles or retentions.

18.4.7 The Commercial General Liability Insurance, Comprehensive Automobile Liability Insurance and Excess Public Liability Insurance policies, if written on a Claims First Made Basis, shall be maintained in full force and effect for two (2) years after termination of this GIA, which coverage may be in the form of tail coverage or extended reporting period coverage if agreed by Transmission Owner and Interconnection Customer.

18.4.8 The requirements contained herein as to the types and limits of all insurance to be maintained by Transmission Owner and Interconnection Customer are not intended to and shall not in any manner, limit or qualify the liabilities and obligations assumed by Transmission Owner and Interconnection Customer under this GIA.

18.4.9 As of the date set forth in Appendix B, Milestones, and as soon as practicable after the end of each fiscal year or at the renewal of the insurance policy and in any event within ninety (90) Calendar Days thereafter, Interconnection Customer and Transmission Owner shall provide the other Party with certification of all insurance required in this GIA, executed by each insurer or by an authorized representative of each insurer.

18.4.10 Notwithstanding the foregoing, Transmission Owner or Interconnection Customer may self-insure to meet the minimum insurance requirements of Articles 18.4.1 through 18.4.8, to the extent it maintains a self-insurance program; provided that, Transmission Owner's or Interconnection Customer's senior secured debt is rated at investment grade, or better, by Standard & Poor's and that its self-insurance program meets minimum insurance requirements under Articles 18.4.1 through 18.4.8. For any period of time that a Transmission Owner's or Interconnection Customer's senior secured debt is unrated by Standard & Poor's or is rated at less than investment grade by Standard & Poor's, such Party shall comply with the insurance requirements applicable to it under Articles 18.4.1 through 18.4.9. In the event that Transmission Owner or Interconnection Customer is permitted to self-insure pursuant to this article, it shall notify the other Party that it meets the requirements to self-insure and that its self-insurance program meets the minimum insurance requirements in a manner consistent with that specified in Article 18.4.9.

18.4.11 Transmission Owner and Interconnection Customer agree to report to each other in writing as soon as practical all accidents or occurrences resulting in injuries to any person, including death, and any property damage arising out of this GIA.

ARTICLE 19. ASSIGNMENT

19.1 Assignment. This GIA may be assigned by any Party only with the written consent of the other Parties; provided that a Party may assign this GIA without the consent of the other Parties to any Affiliate of the assigning Party with an equal or greater credit rating and with the legal authority and operational ability to satisfy the obligations of the assigning Party under this GIA; and provided further that Interconnection Customer shall have the right to assign this GIA, without the consent of either Transmission Provider or Transmission Owner, for collateral security purposes to aid in providing financing for the Generating Facility, provided that Interconnection Customer will promptly notify Transmission Provider of any such assignment. Any financing arrangement entered into by Interconnection Customer pursuant to this Article will provide that prior to or upon the exercise of the secured party's, trustee's or mortgagee's assignment rights pursuant to said arrangement, the secured creditor, the trustee or mortgagee will notify Transmission Provider of the date and particulars of any such exercise of assignment right(s), including providing Transmission Provider and Transmission Owner with proof that it meets the requirements of Article 11.5 and 18.4. Any attempted assignment that violates this Article is void and ineffective. Any assignment under this GIA shall not relieve a

Party of its obligations, nor shall a Party's obligations be enlarged, in whole or in part, by reason thereof. Where required, consent to assignment will not be unreasonably withheld, conditioned or delayed.

ARTICLE 20. SEVERABILITY

20.1 Severability. If any provision in this GIA is finally determined to be invalid, void or unenforceable by any court or other Governmental Authority having jurisdiction, such determination shall not invalidate, void or make unenforceable any other provision, agreement or covenant of this GIA; provided that if Interconnection Customer (or any non-Party, but only if such non-Party is not acting at the direction of either Transmission Provider or Transmission Owner) seeks and obtains such a final determination with respect to any provision of the Alternate Option (Article 5.1.2), or the Negotiated Option (Article 5.1.4), then none of these provisions shall thereafter have any force or effect and the Parties' rights and obligations shall be governed solely by the Standard Option (Article 5.1.1).

ARTICLE 21. COMPARABILITY

21.1 Comparability. The Parties will comply with all applicable comparability and code of conduct laws, rules and regulations including such laws, rules and regulations of Governmental Authorities establishing standards of conduct, as amended from time to time.

ARTICLE 22. CONFIDENTIALITY

22.1 Confidentiality. Confidential Information shall include, without limitation, all information relating to a Party's technology, research and development, business affairs, and pricing, and any information supplied by a Party to another Party prior to the execution of this GIA.

Information is Confidential Information only if it is clearly designated or marked in writing as confidential on the face of the document, or, if the information is conveyed orally or by inspection, if the Party providing the information orally informs the Party receiving the information that the information is confidential. The Parties shall maintain as confidential any information that is provided and identified by a Party as Critical Energy Infrastructure Information (CEII), as that term is defined in 18 C.F.R. Section 388.113(c). Such confidentiality will be maintained in accordance with this Article 22.

If requested by the receiving Party, the disclosing Party shall provide in writing, the basis for asserting that the information referred to in this Article warrants confidential treatment, and the requesting Party may disclose such writing to the appropriate Governmental Authority. Each Party shall be responsible for the costs associated with affording confidential treatment to its information.

22.1.1 Term**.** During the term of this GIA, and for a period of three (3) years after the expiration or termination of this GIA, except as otherwise provided in this Article 22 or with regard to CEII, each Party shall hold in confidence and shall not disclose to any person Confidential Information. CEII shall be treated in accordance with Commission policy and regulations.

22.1.2 Scope. Confidential Information shall not include information that the receiving Party can demonstrate: (1) is generally available to the public other than as a result of a disclosure by the receiving Party; (2) was in the lawful possession of the receiving Party on a non-confidential basis before receiving it from the disclosing Party; (3) was supplied to the receiving Party without restriction by a non-Party, who, to the knowledge of the receiving Party after due inquiry, was under no obligation to the disclosing Party to keep such information confidential; (4) was independently developed by the receiving Party without reference to Confidential Information of the disclosing Party; (5) is, or becomes, publicly known, through no wrongful act or omission of the receiving Party or Breach of this GIA; or (6) is required, in accordance with Article 22.1.7 of this GIA, Order of Disclosure, to be disclosed by any Governmental Authority or is otherwise required to be disclosed by law or subpoena, or is necessary in any legal proceeding establishing rights and obligations under this GIA. Information designated as Confidential Information will no longer be deemed confidential if the Party that designated the information as confidential notifies the receiving Party that it no longer is confidential.

22.1.3 Release of Confidential Information. No Party shall release or disclose Confidential Information to any other person, except to its Affiliates (limited by the Standards of Conduct requirements), subcontractors, employees, agents, consultants, or to non-parties who may be or are considering providing financing to or equity participation with Interconnection Customer, or to potential purchasers or assignees of Interconnection Customer, on a need-to-know basis in connection with this GIA, unless such person has first been advised of the confidentiality provisions of this Article 22 and has agreed to comply with such provisions. Notwithstanding the foregoing, a Party providing Confidential Information to any person shall remain primarily responsible for any release of Confidential Information in contravention of this Article 22.

22.1.4 Rights. Each Party retains all rights, title, and interest in the Confidential Information that it discloses to the receiving Party. The disclosure by a Party to the receiving Party of Confidential Information shall not be deemed a waiver by the disclosing Party or any other person or entity of the right to protect the Confidential Information from public disclosure.

22.1.5 No Warranties. By providing Confidential Information, no Party makes any warranties or representations as to its accuracy or completeness. In addition, by supplying Confidential Information, no Party obligates itself to provide any particular information or Confidential Information to another Party nor to enter

into any further agreements or proceed with any other relationship or joint venture.

22.1.6 Standard of Care. Each Party shall use at least the same standard of care to protect Confidential Information it receives as it uses to protect its own Confidential Information from unauthorized disclosure, publication or dissemination. Each Party may use Confidential Information solely to fulfill its obligations to another Party under this GIA or its regulatory requirements.

22.1.7 Order of Disclosure. If a court or a Governmental Authority or entity with the right, power, and apparent authority to do so requests or requires any Party, by subpoena, oral deposition, interrogatories, requests for production of documents, administrative order, or otherwise, to disclose Confidential Information, that Party shall provide the disclosing Party with prompt notice of such request(s) or requirement(s) so that the disclosing Party may seek an appropriate protective order or waive compliance with the terms of this GIA. Notwithstanding the absence of a protective order or waiver, the Party may disclose such Confidential Information which, in the opinion of its counsel, the Party is legally compelled to disclose. Each Party will use Reasonable Efforts to obtain reliable assurance that confidential treatment will be accorded any Confidential Information so furnished.

22.1.8 Termination of Agreement. Upon termination of this GIA for any reason, each Party shall, within ten (10) Calendar Days of receipt of a written request from another Party, use Reasonable Efforts to destroy, erase, or delete (with such destruction, erasure, and deletion certified in writing to the requesting Party) or return to the requesting Party, without retaining copies thereof, any and all written or electronic Confidential Information received from the requesting Party, except that each Party may keep one copy for archival purposes, provided that the obligation to treat it as Confidential Information in accordance with this Article 22 shall survive such termination.

22.1.9 Remedies**.** The Parties agree that monetary damages would be inadequate to compensate a Party for another Party's Breach of its obligations under this Article 22. Each Party accordingly agrees that the disclosing Party shall be entitled to equitable relief, by way of injunction or otherwise, if the receiving Party Breaches or threatens to Breach its obligations under this Article 22, which equitable relief shall be granted without bond or proof of damages, and the Breaching Party shall not plead in defense that there would be an adequate remedy at law. Such remedy shall not be deemed an exclusive remedy for the Breach of this Article 22, but shall be in addition to all other remedies available at law or in equity. The Parties further acknowledge and agree that the covenants contained herein are necessary for the protection of legitimate business interests and are reasonable in scope. No Party, however, shall be liable for indirect, incidental, or consequential or punitive damages of any nature or kind resulting from or arising in connection with this Article 22.

22.1.10 Disclosure to FERC, its Staff or a State**.** Notwithstanding anything in this Article 22 to the contrary, and pursuant to 18 CFR § 1b.20, if FERC or its staff, during the course of an investigation or otherwise, requests information from a Party that is otherwise required to be maintained in confidence pursuant to this GIA, the Party shall provide the requested information to FERC or its staff, within the time provided for in the request for information. In providing the information to FERC or its staff, the Party must, consistent with 18 CFR § 388.112, request that the information be treated as confidential and non-public by FERC and its staff and that the information be withheld from public disclosure. Parties are prohibited from notifying the other Parties to this GIA prior to the release of the Confidential Information to FERC or its staff. The Party shall notify the other Parties to this GIA when it is notified by FERC or its staff that a request to release Confidential Information has been received by FERC, at which time any of the Parties may respond before such information would be made public, pursuant to 18 CFR § 388.112. Requests from a state regulatory body conducting a confidential investigation shall be treated in a similar manner if consistent with the applicable state rules and regulations.

22.1.11 Subject to the exception in Article 22.1.10, any information that a disclosing Party claims is competitively sensitive, commercial or financial information under this GIA shall not be disclosed by the receiving Party to any person not employed or retained by the receiving Party, except to the extent disclosure is (i) required by law; (ii) reasonably deemed by the receiving Party to be required to be disclosed in connection with a dispute between or among the Parties, or the defense of litigation or dispute; (iii) otherwise permitted by consent of the disclosing Party, such consent not to be unreasonably withheld; or (iv) necessary to fulfill its obligations under this GIA or as the Regional Transmission Organization or a Local Balancing Authority operator including disclosing the Confidential Information to a regional or national reliability organization. The Party asserting confidentiality shall notify the receiving Party in writing of the information that Party claims is confidential. Prior to any disclosures of that Party's Confidential Information under this subparagraph, or if any non-Party or Governmental Authority makes any request or demand for any of the information described in this subparagraph, the Party who received the Confidential Information from the disclosing Party agrees to promptly notify the disclosing Party in writing and agrees to assert confidentiality and cooperate with the disclosing Party in seeking to protect the Confidential Information from public disclosure by confidentiality agreement, protective order or other reasonable measures.

ARTICLE 23. ENVIRONMENTAL RELEASES

23.1 Each Party shall notify the other Parties, first orally and then in writing, of the release of any Hazardous Substances, any asbestos or lead abatement activities, or any type of remediation activities related to the Generating Facility or the Interconnection Facilities,

each of which may reasonably be expected to affect another Party. The notifying Party shall: (i) provide the notice as soon as practicable, provided such Party makes a good faith effort to provide the notice no later than twenty-four hours after such Party becomes aware of the occurrence; and (ii) promptly furnish to the other Parties copies of any publicly available reports filed with any Governmental Authorities addressing such events.

ARTICLE 24. INFORMATION REQUIREMENTS

24.1 Information Acquisition. Transmission Provider, Transmission Owner and Interconnection Customer shall submit specific information regarding the electrical characteristics of their respective facilities to each other as described below and in accordance with Applicable Reliability Standards.

24.2 Information Submission by Transmission Provider and Transmission Owner The initial information submission by Transmission Provider to Interconnection Customer, with copy provided to Transmission Owner, shall occur no later than one hundred eighty (180) Calendar Days prior to Trial Operation and shall include Transmission or Distribution System information, as applicable and available, necessary to allow Interconnection Customer to select equipment and meet any system protection and stability requirements, unless otherwise mutually agreed to by the Parties. On a monthly basis, Transmission Owner shall provide Interconnection Customer a status report on the construction and installation of Transmission Owner's Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and Network Upgrades, including, but not limited to, the following information: (1) progress to date; (2) a description of the activities since the last report (3) a description of the action items for the next period; and (4) the delivery status of equipment ordered.

24.3 Updated Information Submission by Interconnection Customer. The updated information submission by Interconnection Customer to Transmission Provider, with copy to Transmission Owner, including manufacturer information, shall occur no later than one hundred eighty (180) Calendar Days prior to the Trial Operation. Interconnection Customer shall submit to Transmission Provider and Transmission Owner a completed copy of the Generating Facility data requirements contained in Appendix 1 to the GIP. It shall also include any additional information provided to Transmission Provider for the Interconnection Facilities Study. Information in this submission shall be the most current Generating Facility design or expected performance data. Information submitted for stability models shall be compatible with Transmission Provider standard models. If there is no compatible model, Interconnection Customer will work with a consultant mutually agreed to by Transmission Provider and Interconnection Customer to develop and supply a standard model and associated information.

If the Interconnection Customer's data is materially different from what was originally provided to Transmission Provider pursuant to the Interconnection Study Agreement between Transmission Provider and Interconnection Customer, then Transmission

Provider will conduct appropriate studies to determine the impact on the Transmission System based on the actual data submitted pursuant to this Article 24.3. Interconnection Customer shall not begin Trial Operation until such studies are completed.

24.4 Information Supplementation. Prior to the Commercial Operation Date, the Parties shall supplement their information submissions described above in this Article 24 with any and all "as-built" Generating Facility information or "as-tested" performance information that differs from the initial submissions or, alternatively, written confirmation that no such differences exist. Interconnection Customer shall conduct tests on the Generating Facility as required by Good Utility Practice, such as an open circuit "step voltage" test on the Generating Facility to verify proper operation of the Generating Facility's automatic voltage regulator.

Unless otherwise agreed, the test conditions shall include: (1) Generating Facility at synchronous speed; (2) automatic voltage regulator on and in voltage control mode; and (3) a five percent (5 %) change in Generating Facility terminal voltage initiated by a change in the voltage regulators reference voltage. Interconnection Customer shall provide validated test recordings showing the responses in Generating Facility terminal and field voltages. In the event that direct recordings of these voltages is impractical, recordings of other voltages or currents that mirror the response of the Generating Facility's terminal or field voltage are acceptable if information necessary to translate these alternate quantities to actual Generating Facility terminal or field voltages is provided. Generating Facility testing shall be conducted and results provided to Transmission Provider and Transmission Owner for each individual generating unit in a station.

Subsequent to the Commercial Operation Date, Interconnection Customer shall provide Transmission Provider and Transmission Owner any information changes due to equipment replacement, repair, or adjustment. Transmission Owner shall provide Interconnection Customer, with copy to Transmission Provider, any information changes due to equipment replacement, repair or adjustment in the directly connected substation or any adjacent Transmission Owner substation that may affect the Interconnection Customer's Interconnection Facilities equipment ratings, protection or operating requirements. The Parties shall provide such information no later than thirty (30) Calendar Days after the date of the equipment replacement, repair or adjustment.

ARTICLE 25. INFORMATION ACCESS AND AUDIT RIGHTS

25.1 Information Access. Each Party (the "disclosing Party") shall make available to the other Parties information that is in the possession of the disclosing Party and is necessary in order for the other Parties to: (i) verify the costs incurred by the disclosing Party for which another Party is responsible under this GIA; and (ii) carry out its obligations and responsibilities under this GIA. The Parties shall not use such information for purposes other than those set forth in this Article 25.1 and to enforce their rights under this GIA.

25.2 Reporting of Non-Force Majeure Events. A Party (the "notifying Party") shall notify the other Parties when the notifying Party becomes aware of its inability to comply with the provisions of this GIA for a reason other than a Force Majeure event. The Parties agree to cooperate with each other and provide necessary information regarding such inability to comply, including the date, duration, reason for the inability to comply, and corrective actions taken or planned to be taken with respect to such inability to comply. Notwithstanding the foregoing, notification, cooperation or information provided under this Article shall not entitle any Party receiving such notification to allege a cause for anticipatory breach of this GIA.

25.3 Audit Rights. Subject to the requirements of confidentiality under Article 22 of this GIA, each Party shall have the right, during normal business hours, and upon prior reasonable notice to the other Parties, to audit at its own expense the other Parties' accounts and records pertaining to the Parties' performance or the Parties' satisfaction of obligations under this GIA. Such audit rights shall include audits of the other Parties' costs, calculation of invoiced amounts, the Transmission Provider's efforts to allocate responsibility for the provision of reactive support to the Transmission or Distribution System, as applicable, the Transmission Provider's efforts to allocate responsibility for interruption or reduction of generation, and each Party's actions in an Emergency Condition. Any audit authorized by this Article shall be performed at the offices where such accounts and records are maintained and shall be limited to those portions of such accounts and records that relate to each Party's performance and satisfaction of obligations under this GIA. Each Party shall keep such accounts and records for a period equivalent to the audit rights periods described in Article 25.4.

25.4 Audit Rights Periods.

25.4.1 Audit Rights Period for Construction-Related Accounts and Records. Accounts and records related to the design, engineering, procurement, and construction of the Transmission Owner's Interconnection Facilities, Transmission Owner's System Protection Facilities, Distribution Upgrades and Network Upgrades shall be subject to audit for a period of twenty-four months following Transmission Owner's issuance of a final invoice in accordance with Article 12.2.

25.4.2 Audit Rights Period for All Other Accounts and Records. Accounts and records related to a Party's performance or satisfaction of all obligations under this GIA other than those described in Article 25.4.1 shall be subject to audit as follows: (i) for an audit relating to cost obligations, the applicable audit rights period shall be twenty-four (24) months after the auditing Party's receipt of an invoice giving rise to such cost obligations; and (ii) for an audit relating to all other obligations, the applicable audit rights period shall be twenty-four (24) months after the event for which the audit is sought.

25.5 Audit Results. If an audit by a Party determines that an overpayment or an underpayment has occurred, a notice of such overpayment or underpayment shall be

given to the Party or from whom the overpayment or underpayment is owed together with those records from the audit which support such determination.

ARTICLE 26. SUBCONTRACTORS

26.1 General. Nothing in this GIA shall prevent a Party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this GIA; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of this GIA in providing such services and each Party shall remain primarily liable to the other Parties for the performance of such subcontractor.

26.2 Responsibility of Principal. The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under this GIA. The hiring Party shall be fully responsible to the other Parties for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall Transmission Provider or Transmission Owner be liable for the actions or inactions of Interconnection Customer or its subcontractors with respect to obligations of Interconnection Customer under Article 5 of this GIA. Any applicable obligation imposed by this GIA upon the hiring Party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such Party.

26.3 No Limitation by Insurance. The obligations under this Article 26 will not be limited in any way by any limitation of subcontractor's insurance.

ARTICLE 27. DISPUTES

27.1 Submission. In the event any Party has a dispute, or asserts a claim, that arises out of or in connection with this GIA or its performance, such Party (the "disputing Party") shall provide the other Parties with written notice of the dispute or claim ("Notice of Dispute"). Such dispute or claim shall be referred to a designated senior representative of each Party for resolution on an informal basis as promptly as practicable after receipt of the Notice of Dispute by the non-disputing Parties. In the event the designated representatives are unable to resolve the claim or dispute through unassisted or assisted negotiations within thirty (30) Calendar Days of the non-disputing Parties' receipt of the Notice of Dispute, such claim or dispute shall be submitted for resolution in accordance with the dispute resolution procedures of the Tariff.

ARTICLE 28. REPRESENTATIONS, WARRANTIES AND COVENANTS

28.1 General. Each Party makes the following representations, warranties and covenants:

28.1.1 Good Standing. Such Party is duly organized, validly existing and in good standing under the laws of the state in which it is organized, formed, or incorporated, as applicable; that it is qualified to do business in the state or states in which the Generating Facility, Interconnection Facilities and Network Upgrades owned by such Party, as applicable, are located; and that it has the

corporate power and authority to own its properties, to carry on its business as now being conducted and to enter into this GIA and carry out the transactions contemplated hereby and perform and carry out all covenants and obligations on its part to be performed under and pursuant to this GIA.

28.1.2 Authority**.** Such Party has the right, power and authority to enter into this GIA, to become a Party hereto and to perform its obligations hereunder. This GIA is a legal, valid and binding obligation of such Party, enforceable against such Party in accordance with its terms, except as the enforceability thereof may be limited by applicable bankruptcy, insolvency, reorganization or other similar laws affecting creditors' rights generally and by general equitable principles (regardless of whether enforceability is sought in a proceeding in equity or at law).

28.1.3 No Conflict. The execution, delivery and performance of this GIA does not violate or conflict with the organizational or formation documents, or bylaws or operating agreement, of such Party, or any judgment, license, permit, order, material agreement or instrument applicable to or binding upon such Party or any of its assets.

28.1.4 Consent and Approval. Such Party has sought or obtained, or, in accordance with this GIA will seek or obtain, each consent, approval, authorization, order, or acceptance by any Governmental Authority in connection with the execution, delivery and performance of this GIA, and it will provide to any Governmental Authority notice of any actions under this GIA that are required by Applicable Laws and Regulations.

ARTICLE 29. {RESERVED}

ARTICLE 30. MISCELLANEOUS

30.1 Binding Effect. This GIA and the rights and obligations hereof, shall be binding upon and shall inure to the benefit of the successors and assigns of the Parties hereto.

30.1.1 Reversion. If offered pursuant to an Agency Agreement under which this GIA is executed by Transmission Provider as agent for the relevant Transmission Owner, in the event that the relevant Agency Agreement terminates, any HVDC Service offered by Transmission Provider under this GIA shall revert to the relevant Transmission Owner and Transmission Provider shall be released from all obligations and responsibilities under this GIA.

30.2 Conflicts. In the event of a conflict between the body of this GIA and any attachment, appendices or exhibits hereto, the terms and provisions of the body of this GIA shall prevail and be deemed the final intent of the Parties.

30.3 Rules of Interpretation. This GIA, unless a clear contrary intention appears, shall be construed and interpreted as follows: (1) the singular number includes the plural number and vice versa; (2) reference to any person includes such person's successors and assigns but, in the case of a Party, only if such successors and assigns are permitted by this GIA, and reference to a person in a particular capacity excludes such person in any other capacity or individually; (3) reference to any agreement (including this GIA), document, instrument or tariff means such agreement, document, instrument, or tariff as amended or modified and in effect from time to time in accordance with the terms thereof and, if applicable, the terms hereof; (4) reference to any Applicable Laws and Regulations means such Applicable Laws and Regulations as amended, modified, codified, or reenacted, in whole or in part, and in effect from time to time, including, if applicable, rules and regulations promulgated thereunder; (5) unless expressly stated otherwise, reference to any Article, Section or Appendix means such Article of this GIA or such Appendix to this GIA, or such Section to the GIP or such Appendix to the GIP, as the case may be; (6) "hereunder", "hereof", "herein", "hereto" and words of similar import shall be deemed references to this GIA as a whole and not to any particular Article or other provision hereof or thereof; (7) "including" (and with correlative meaning "include") means including without limiting the generality of any description preceding such term; and (8) relative to the determination of any period of time, "from" means "from and including", "to" means "to but excluding" and "through" means "through and including."

30.4 Entire Agreement. This GIA, including all Appendices and attachments hereto, constitutes the entire agreement between the Parties with reference to the subject matter hereof, and supersedes all prior and contemporaneous understandings or agreements, oral or written, between the Parties with respect to the subject matter of this GIA. There are no other agreements, representations, warranties, or covenants, which constitute any part of the consideration for, or any condition to, any Party's compliance with its obligations under this GIA.

30.5 No Third Party Beneficiaries. This GIA is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and, where permitted, their assigns.

30.6 Waiver. The failure of a Party to this GIA to insist, on any occasion, upon strict performance of any provision of this GIA will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party.

Any waiver at any time by any Party of its rights with respect to this GIA shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this GIA. Termination or Default of this GIA for any reason by Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain Interconnection Service from Transmission Provider. Any waiver of this GIA shall, if requested, be provided in writing.

30.7 Headings. The descriptive headings of the various Articles of this GIA have been inserted for convenience of reference only and are of no significance in the interpretation or construction of this GIA.

30.8 Multiple Counterparts. This GIA may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

30.9 Amendment. The Parties may by mutual agreement amend this GIA by a written instrument duly executed by all of the Parties.

30.10 Modification by the Parties. The Parties may by mutual agreement amend the Appendices to this GIA by a written instrument duly executed by all of the Parties. Such amendment shall become effective and a part of this GIA upon satisfaction of all Applicable Laws and Regulations.

30.11 Reservation of Rights. Transmission Provider shall have the right to make a unilateral filing with FERC to modify this GIA with respect to any rates, terms and conditions, charges, classifications of service, rule or regulation under Section 205 or any other applicable provision of the Federal Power Act and FERC's rules and regulations thereunder, and Transmission Owner and Interconnection Customer shall have the right to make a unilateral filing with FERC to modify this GIA pursuant to Section 206 or any other applicable provision of the Federal Power Act and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this GIA shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the Federal Power Act and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

30.12 No Partnership. This GIA shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership among or between the Parties or to impose any partnership obligation or partnership liability upon any Party. No Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Parties.

IN WITNESS WHEREOF, the Parties have executed this GIA in multiple originals; each of which shall constitute and be an original GIA among the Parties.

Transmission Provider
Midcontinent Independent System Operator, Inc.

By: _____ DMK 03/18/2024

Name: Aubrey Johnson

Title: VP, System Planning & Competitive Development

Transmission Owner
Ameren Services Company, as agent for
Ameren Illinois Company d/b/a **Ameren Illinois**

By: _____

Name: Shawn E. Shukar

Title: President – Ameren Transmission

Interconnection Customer
Virden Wind Energy LLC

By: _____

Name: Daniel Dubois

Title: Managing Director

APPENDICES TO GIA

Appendix A Interconnection Facilities, System Protection Facilities, Distribution Upgrades, Generator Upgrades and Network Upgrades

Appendix B Milestones

Appendix B-1 Pre-Certification Generation Test Notification Form

Appendix C Interconnection Details

Appendix D Security Arrangements Details

Appendix E Commercial Operation Date

Appendix F Addresses for Delivery of Notices and Billings

Appendix G Interconnection Requirements for a Non-synchronous Generating Facility

Appendix H Interconnection Requirements for Provisional GIA

Appendix I Requirements Applicable to Surplus Interconnection Service

Appendix A to GIA
Interconnection Facilities, System Protection Facilities, Distribution Upgrades, Generator Upgrades and Network Upgrades

1. Description of Generating Facility

Interconnection Customer shall install a switchyard with the appropriate protection equipment coordinated per Appendix C to this GIA. The Switchyard shall contain one (1) generator step-up transformer 138 / 34.5 kV, 69/92/115 MVA, Z=8%, one (1) 138 kV 2000A circuit breaker connected in series fashion as described in Exhibit A1-1.

The Generating Facility shall provide reactive compensation as necessary to meet the FERC Order 827.

2. Interconnection Facilities

(a) Point of Interconnection.

i. The Point of Interconnection will be at the point where the Transmission Owner Interconnection Facilities connect to the 138 kV bus at the Virden Substation.
ii. The Point of Change of Ownership between the Interconnection Customer and Transmission Owner occurs at the arbor connection for hardware and shield wire, at the terminal pads on the arbor for conductor, and the splice box for OPGW or other form of fiber optic cable.
iii. The metering point will be at the 138 kV terminal for the Generating Facility leadline in the Virden South Substation.

(b) Interconnection Facilities to be constructed by Interconnection Customer.

Interconnection Customer shall construct Interconnection Customer Interconnection Facilities and are detailed in Exhibit A1. These facilities shall include:

- Approximately 5.75 miles of 138 kV generator leadline.
- Dual OPGW on 138 kV generator leadline .
- Interconnection Customer will provide all connection hardware for conductor and shield wire up to the arbor, and for OPGW or other form of fiber-optic

cable up to the splice box, including downward-pointing NEMA four-hole terminal pads finished on both sides for the conductor, for Transmission Owner connections at the Point of Change of Ownership. Transmission Owner will provide hardware to secure OPGW to the arbor leg and splicing of OPGW or other form of fiber-optic cable at the splice box inside the Transmission Owner's station.

- The Interconnection Customer's OPGW or other form of fiber-optic cable will comply with the Transmission Owner's requirements during the design phase of the work.
- The Interconnection Customer will install, own, and maintain its conductor, hardware, shield wire, and OPGW or other form of fiber-optic cable with prearranged escorted station access provided by the Transmission Owner.
- Interconnection Customer will coordinate with Transmission Owner on final physical connection logistics following GIA execution. In accordance with Section 5.2 of the GIA, Transmission Owner grants Interconnection Customer a license to construct, operate, maintain, repair, test (or witness testing), inspect, replace, or remove facilities and equipment within or upon the lands of the Transmission Owner as maybe required under the terms of this GIA. Interconnection Customer agrees to coordinate and meet all security and safety requirements of the Transmission Owner prior to access inside the fence line of any Transmission Owner facility. All Interconnection Customer transmission structures must be at least 150 feet from the station fence.

(c) Transmission Owner Interconnection Facilities (including metering equipment) to be constructed by Transmission Owner.

The Transmission Owner Interconnection Facilities will consist of one 138 kV terminal in the Virden South Substation. The terminal will consist of all necessary terminal equipment to connect the J1408 leadline to the Virden South Substation 138 kV bus. See Exhibit A2.

Major Items:

- One (1) 138 kV steel dead-end arbor structure
- One (1) 138 kV motor operated disconnect switch, 2000A rated
- Three (3) 138 kV surge arresters
- Three (3) 138 kV potential/voltage transformers
- Three (3) 138 kV free-standing current transformers
- Revenue metering
- One (1) line relay panel (SEL 411L and SEL 311C)
- Two fiber patch panel housing, fiber splice box, and fiber termination in the control house
- Bus and Fittings: five (5) inch aluminum tube and portions of 1590 and/or 2500 AAC (2) wire conductor with bolted aluminum bus connectors, fittings, and terminals

- Insulators: high-strength porcelain station post insulators
- Foundations: designed per Transmission Owner standard design criteria
- Structures: steel tapered tube style

3. **Network Upgrades** As provided under Article 11.3 of the GIA, Transmission Owner has elected to fund the capital for the Network Upgrades to be constructed under the GIA. Pursuant to the Tariff, Interconnection Customer remains ultimately responsible for the actual costs of Network Upgrades, and pursuant to Article 11.6 of the GIA Interconnection Customer remains responsible for providing security to Transmission Owner for the estimated costs of the Network Upgrades.

Transmission Owner and Interconnection Customer will establish a service agreement between the Transmission Owner and the Interconnection Customer pursuant to which the Interconnection Customer will pay the Transmission Owner's revenue requirement associated with the Network Upgrades identified in Exhibit A9 to the GIA (the "Revenue Requirement"). The service agreement shall be filed with FERC for FERC's acceptance, either on an executed or unexecuted basis.

(a) **Stand-Alone Network Upgrades to be installed by Transmission Owner.**
None.

(b) **Network Upgrades to be installed by Transmission Owner.**
Transmission Owner will install the following Network Upgrades:

i. Upgrade Tap Line to Ring Bus at the Virden South Substation

The J1408 Interconnection Switching Station will be located in Macoupin County, Illinois. The Switching Station will be an expansion of existing Virden South Substation that currently taps the Jerseyville NW-Austin 138kV transmission line. This station is located north of Crown 2 Mines Road, near Old Route 4. The west, north, and east parcel property boundaries are enclosed by railroad tracks. The approximate GPS coordinates are 39º28'49.62" North, 89º46'13.21" West.

The switching station will be a ring bus arrangement with three line terminal positions, one transformer position, and provisions for two additional future terminal positions. The future terminal positions are not included in the scope of work or cost given in the GIA; it will be funded by whatever entity drives the need for the future installation. The Jerseyville Northwest-Austin 138kV transmission line will be cut and the new ends terminated at two terminal positions in the switching station. The J1408 Generating Facility will interconnect at the third line position. See Exhibit A2.

The Virden South Ring Bus will be constructed adjacent to and on the north side of the existing Virden South substation. The property for the site will be purchased by the Interconnection Customer and quit claimed to the Transmission

Owner. A minimum of 6 acres to the north and east of the existing Virden South substation must be provided, a larger site may be required if the terrain and shape of the site will not accommodate Transmission Owner's standard design for a ring-bus switching station. The Interconnection Customer will bear the full cost and responsibility for property acquisition to Transmission Owner specifications. The Interconnection Customer will bear the full costs for acquiring the necessary real estate for the ring bus.

Major Items:

- Four (4) 138 kV gas circuit breakers, 3000A rated, 40kA interrupting capability
- Three (3) 138 kV motor-operated disconnect switches, 2000A rated
- Ten (10) 138 kV disconnect switches, 3000A rated
- Two (2) 138 kV steel dead-end arbor structures
- Nine (9) 138 kV coupling-capacitor voltage transformers
- Fifteen (15) 138 kV surge arresters
- Bus and Fittings: five (5) inch aluminum tube with portions of 1590 & 2500 AAC (2) wire conductor with bolted aluminum bus connectors, fittings, and terminals
- Insulators: high strength porcelain station post insulators
- Ground Grid: designed per Transmission Owner standards utilizing buried copper wire and exothermic welds
- Fence: standard chain link fencing with seven foot fabric, three strands of barbed wire, and reinforcement cables
- Prefabricated Steel Control Enclosure containing:
  - Relaying and Control: one (1) transformer protection relay panel, two (2) line protection relay panels, four (4) breaker control panels, one (1) RTU panel, one (1) communications panel
  - DC Station Service Equipment: One (1) 125 volt battery, two (2) battery chargers, and two (2) DC distribution panels
  - AC Station Service Equipment: two (2) station service voltage transformers, one (1) automatic AC transfer switch, and three (3) AC distribution panels

ii. Re-Route existing Jerseyville NW – Austin 1557 138 kV transmission line and terminate the ends at new Arbor positions at Virden South Station

Transmission Owner will remove (3) existing transmission structures and install three (3) Steel Monopole Dead End transmission structures on drilled pier foundation in-line with the existing line. The existing conductor will be dead-ended on these structures and new tapping conductor will be run from these dead-end structures to arbor structures in the J1408 Interconnection Switching Station. Jumpers will be installed at the dead-end structures to connect the existing line conductor to the new tapping conductor.

Major Items:

- Three (3) 138 kV Steel Monopoles on Drilled Pier Foundation
- Conductor, shield wire, and OPGW
- Typical 138 kV insulators
- Compression type connectors

(c) Shared Network Upgrade(s) to be funded by Interconnection Customer. None.

4. System Protection Facilities

(a) System Protection Facilities not listed in Section 2 or 3 to be constructed by Interconnection Customer. None.

(b) System Protection Facilities not listed in 2 or 3 to be constructed by Transmission Owner. None.

5. Distribution Upgrades

(a) Distribution Upgrades to be constructed by Transmission Owner. None.

6. Contingency List See Exhibit A10.

7. Affected System Upgrades List Interconnection Customer is responsible to enter into applicable agreements with the Affected System Owner for the Interconnection Customer's share of following upgrades:

- AECI
  - McCredie – Overton 345 kV Line Rebuild (remote end work)

8. Common Use Upgrades List Interconnection Customer is responsible to enter into Facilities Construction Agreements and/or Multi-Party Facilities Construction Agreements and/or Facilities Service Agreements with the Transmission Provider and transmission owner for the Interconnection Customer's share of following upgrades:

- McCredie – Overton 345 kV Line Rebuild - AMMO
- New Moro - Cottage Hills 138 kV Line + Cottage Hills - Laclede 138kV Line Upgrade – AMIL
- J1453 – Havana 138 kV Line Rebuild - AMIL

9. Exhibits – The following exhibits are included:

A1. Interconnection Customer One-Line and Site Map
  A1-1: Interconnection Customer One-Line Diagram
  A1-2: Interconnection Customer Generating Facility Site Map

A2. Transmission Owner J1408 Interconnection Switching Station One-Line Diagram (CEII)

A3. Transmission Owner J1408 Interconnection Switching Station Arrangement Drawing (CEII)
A4. { Reserved }
A5. Facilities to be Constructed by Transmission Owner
A6. Detailed Cost of Facilities to be Constructed by Transmission Owner
A7. Facilities to be Constructed by Interconnection Customer
A8. Detailed Cost of Facilities to be Constructed by Interconnection Customer
A9. Facilities Subject To Transmission Owner Reimbursement
A10. Contingent Facilities
A11. { Reserved }
A12. { Reserved }
A13. Permits, Licenses, Regulatory Approvals and Authorization
A14. Interconnection and Operating Guidelines

Exhibit A1. Interconnection Customer One-Line and Site Map
A1-1: Interconnection Customer One-Line Diagram

CUI//CEII MATERIAL – DO NOT RELEASE

A1-2: Interconnection Customer Generating Facility Site Map

CUI//CEII MATERIAL – DO NOT RELEASE

Exhibit A2. Transmission Owner J1408 Interconnection Switching Station One-Line Diagram (CEII)

CUI//CEII MATERIAL – DO NOT RELEASE

Exhibit A3. Transmission Owner J1408 Interconnection Switching Station Arrangement Drawing (CEII)

CUI//CEII MATERIAL – DO NOT RELEASE

Exhibit A4. { Reserved }

Exhibit A5. Facilities to be Constructed by Transmission Owner

Exhibit A6. Detailed Cost of Facilities to be Constructed by Transmission Owner

Exhibit A7. Facilities to be Constructed by Interconnection Customer

Exhibit A8. Detailed Cost of Facilities to be Constructed by Interconnection Customer

Exhibit A9. Facilities Subject to Transmission Owner Reimbursement

Exhibit A10. Contingent Facilities

Higher queue and/or same DPP group study Interconnection Requests that may create contingencies pursuant to Article 11.3.1 are listed in tables below. Table A10-1 describes transmission assumptions modeled in the studies that were deemed necessary to allow for the Interconnection Service as described in Appendix A of this GIA and is not related to Article 11.3.1, i.e., does not describe projects associated with a higher queued and/or same DPP group study Interconnection Request. Nevertheless, if the transmission assumptions are not completed or significantly modified, the Interconnection Service granted under this GIA may be restricted until such time as the Interconnection Customer funds a study to determine the applicable ERIS and NRIS level that results due to the changes in Table A10-1.

The list of higher-queued and/or same DPP group study projects in Tables A10-2 and A10-3, not yet in service, were included in the interconnection study for this project. However, a project's inclusion in the System Impact Study does not necessarily mean that these facilities would be contingencies for the Interconnection Customer's Generating Facility. In the event that any of the higher queued and/or same DPP group study generators were to drop out, then the Interconnection Customer may be subject to restudy pursuant to Article 11.3.2.

Table A10-1: Transmission Assumptions

None.

Table A10-2: Higher Queued Projects

Project #	Service Type	Transmission Owner	POI Name	pMax (MW)	Fuel Type	Status
J1022	ERIS	Ameren Illinois	Weedman Substation 138kV Bus	150	Wind	Not Started
J1025	NRIS	Ameren Transmission Company of Illinois	Zachary - Maywood 345 kV Line Tap	290	Wind	Not Started
J1026	NRIS	Ameren Missouri	Maywood - Spencer Creek 345 kV Line Tap	380	Wind	Not Started
J1027	NRIS	Hoosier Energy	Ratts 161 kV Substation	150	Solar	Not Started
J1028	NRIS	Hoosier Energy	Ratts - Victory 161 kV Line Tap	150	Solar	Not Started
J1034	NRIS	Ameren Missouri	Stoddard - Morley 161kV Line Tap	225	Solar	Not Started
J1058	NRIS	Northern Indiana Public Service Company	Schahfer-St. John 345kV Line Tap	200	Solar	Not Started

J1063	NRIS	Duke Energy	New London - Frankfort 230kV Line Tap	195	Solar	Not Started
J1067	NRIS	Northern Indiana Public Service Company	Reynolds - Burr Oak 345kV Line	240	Solar	Under Construction
J1069	NRIS	Northern Indiana Public Service Company	Reynolds 345kV Substation	200	Wind	Under Construction
J1074	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Francisco 138 kV sub	200	Solar	Not Started
J1087	NRIS	Ameren Missouri	Miner - Kelso 161 kV Line Tap	200	Solar	Not Started
J1094	NRIS	Ameren Illinois	Prest 138kV Switching Station	150	Solar	Not Started
J1096	NRIS	Ameren Illinois	Norris City North - Muddy 138 kV Line	150	Solar	Under Construction
J1102	NRIS	Ameren Illinois	Fogarty 138 kV Substation	70	Solar	Under Construction
J1107	NRIS	Ameren Missouri	Kelso - Lutesville 345 kV Line Tap	200	Solar	Not Started
J1115	NRIS	Ameren Illinois	Latham - Oreana 345kV Line	200	Wind	Not Started
J1139	NRIS	Ameren Illinois	Sidney Substation 138 kV Bus	135	Solar	Not Started
J1145	NRIS	Ameren Missouri	Overton - (McCrede) - Montgomery 345 kV Line Tap	250	Solar	Not Started
J1152	NRIS	Duke Energy Indiana	Gwynneville 345 kV Substation	200	Solar	Not Started
J1180	NRIS	Ameren Illinois	Casey West - Sullivan 345 kV Line	75	Solar	Under Construction
J1182	NRIS	Ameren Transmission Company of Illinois	Zachary Substation 345 kV Bus	250	Solar	Not Started
J1189	NRIS	Duke Energy Indiana	Crane Solar 69kV Substation	4.95	Battery Storage	Not Started

J351	NRIS	Northern Indiana Public Service Company	Stillwell 345 kV	0	Gas	Under Construction
J446	NRIS	Duke Energy Corporation	Frankfort-New London 230 kV	200	Wind	Under Construction
J641	NRIS	Ameren Illinois	Line tap of Meredoisa sub to Jacksonville Industrial Park 138kv	140	Solar	Under Construction
J643	NRIS	Northern Indiana Public Service Company	Schahfer Tap (17 SCHAFR_TAP)13 8kv	175	Solar	Under Construction
J644	NRIS	Ameren Illinois	Jerseyville 138kV	110	Solar	Under Construction
J750	NRIS	City of Springfield, IL - CWLP	Westchester 138kV Substation	150	Wind	Under Construction
J753	NRIS	Big Rivers Electric Corporation	Hardinsburg Sub 161kV	100	Solar	Under Construction
J762	NRIS	Big Rivers Electric Corporation	Meade Sub 161kV	200	Solar	Under Construction
J783	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Grandview Sub	70	Solar	Under Construction
J800	NRIS	Ameren Illinois	Crossville West Substation 138kV Bus - Albion South - Norris City 138 kV Line	250	Solar	Under Construction
J805	NRIS	Duke Energy Corporation	Gwynneville 345kV Substation	199	Solar	Under Construction
J813	NRIS	Ameren Illinois	Louisville South Substation 138kV Line	250	Solar	Under Construction
J815	NRIS	Ameren Illinois	Taylorville South-Austin (formerly Pawnee)138kV Line	250	Solar	Under Construction
J817	NRIS	Ameren Missouri	Warrenton 161kV Substation	139	Solar	Under Construction

J826	NRIS	Ameren Illinois	Weedman Substation 138kV Bus	100	Wind	Under Construction
J829	NRIS	Duke Energy Corporation	Dresser - Merom 345kV Line	250	Solar	Under Construction
J844	ERIS	Ameren Transmission Company of Illinois	Sandburg Substation 138kV Bus	147	Wind	Under Construction
J845	NRIS	Ameren Illinois	Gibson City South - Paxton East 138kV Line	120	Wind	Under Construction
J847	NRIS	Northern Indiana Public Service Company	Schahfer Tap 138kV Substation	90	Solar	Under Construction
J848	NRIS	Ameren Transmission Company of Illinois	Pana Substation 138kV Bus	235	Wind	Under Construction
J853	NRIS	Ameren Illinois	Norris City North Substation 138kV Bus	149	Solar	Under Construction
J856	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Scott (TWP 138/69) 138 kV Substation	80	Solar	Under Construction
J859	NRIS	Ameren Illinois	Frederick North - Meredosia East 138kV Line	149.94	Solar	Under Construction
J903	NRIS	Duke Energy Corporation	Greensboro 138 kV Substation	100	Solar	Under Construction
J912	NRIS	Ameren Transmission Company of Illinois	Pana Substation 138kV Bus	100	Solar	Under Construction
J913	NRIS	Northern Indiana Public Service Company	Reynolds 345kV Substation	200	Solar	Under Construction
J955	NRIS	Ameren Transmission Company of Illinois	Austin Substation 345kV Bus	1165	Gas	Not Started
J956	NRIS	Ameren Missouri	Spencer Creek 345kV Substation	200	Solar	Not Started

J968	NRIS	Northern Indiana Public Service Company	Reynolds 345kV Substation	200	Wind	Under Construction
J974	NRIS	Ameren Illinois	Mapleridge 345kV Switching Station	225	Wind	Under Construction
J976	NRIS	Ameren Missouri	Montgomery - Enon 345kV Line Tap	300	Solar	Not Started
J987	NRIS	Ameren Missouri	Montgomery 161kV Substation	100	Solar	Not Started
J991	NRIS	Ameren Illinois	Xenia 345kV Switching Station	150	Solar	Under Construction
J992	NRIS	Duke Energy Indiana	Walton 230kV Substation	200	Solar	Under Construction
J993	NRIS	Indianapolis Power & Light Company	Hortonville - Whitestown 345kV Line Tap	200	Solar	Under Construction
J994	NRIS	Ameren Missouri	Guthrie 161 kV Substation	100	Solar	Not Started

Table A10-1: Similar Queued Projects

Project #	Service Type	Transmission Owner	POI Name	Pmax (MW)	Fuel Type	Status
J1191	NRIS	City of Columbia, MO	Bolstad 69 kV Substation	64	Solar	Not Started
J1198	NRIS	Ameren Illinois	Newton 345kV Substation	51.8	Hybrid	Not Started
J1199	NRIS	Ameren Illinois	Duck Creek 345kV Substation	20	Hybrid	Not Started
J1200	NRIS	Ameren Illinois	Putnam 138kV Substation	24.2	Hybrid	Not Started
J1201	NRIS	Ameren Illinois	North Coffeen 138kV Substation	44.2	Hybrid	Not Started
J1202	NRIS	Ameren Illinois	Baldwin Plant 345kV Switchyard - Baldwin Unit 2	68.4	Hybrid	Not Started
J1204	NRIS	Ameren Illinois	Casey West 345kV Substation	199.3	Solar	Not Started
J1208	NRIS	Ameren Illinois	Muddy - Crab Orchard 138 kV line	80	Solar	Not Started
J1209	NRIS	Ameren Illinois	Muddy - Crab Orchard 138kV Line	80	Solar	Not Started

J1213	NRIS	Ameren Missouri	Taum Sauk 138kV Switchyard, Bus 1 & 2	60	Hydro	Not Started
J1216	NRIS	Ameren Illinois	Ashley 138 kV Substation	185	Solar	Not Started
J1231	NRIS	Big Rivers Electric Corporation	Barkley - Caldwell 161kV Line	125	Solar	Not Started
J1232	NRIS	Ameren Illinois	Chesterville - Mattoon West 138kV Line	99	Solar	Not Started
J1233	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Cato 138 kV Substation	32.5	Battery Storage	Not Started
J1234	NRIS	Duke Energy Indiana	Edwardsport - Washington Mun, Linton 138kV Line	100	Solar	Not Started
J1235	NRIS	Duke Energy Indiana	Edwardsport - Washington Mun, Linton 138kV Line	50	Solar	Not Started
J1241	NRIS	Ameren Illinois	West Mt Vernon - Xenia 345kV Line	165	Solar	Not Started
J1263	NRIS	Ameren Illinois	Casey - Kansas West 345kV Line	408.6	Hybrid	Not Started
J1265	NRIS	Northern Indiana Public Service Company	Wolcottville - South Milford 69kV Line	43	Solar	Not Started
J1266	NRIS	Ameren Illinois	Kinmundy - Salem 138kV Line	99	Solar	Not Started
J1268	NRIS	Ameren Missouri	Pike - Troy 161kV Line	150	Solar	Not Started
J1269	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Elliott 69kV Substation	100	Hybrid	Not Started
J1272	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Angel Mound 138kV Substation	50	Battery Storage	Not Started

J1276	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Point 69kV Substation	100	Hybrid	Not Started
J1289	NRIS	Ameren Illinois	Turner - Austin 345kV Line	200	Wind	Not Started
J1295	NRIS	Duke Energy Indiana	Gibson - Francisco 345kV Line	280	Solar	Under Construction
J1299	NRIS	Ameren Missouri	Miner - Kelso 161kV Line	149	Solar	Not Started
J1302	NRIS	Ameren Illinois	Muddy - Norris City 138kV Line	150	Solar	Not Started
J1303	NRIS	Southern Illinois Power Cooperative	Campbell Hill - Jackson 161kV Line	95	Solar	Not Started
J1306	NRIS	Ameren Illinois	Commodore-Jordan 345kV Line	200	Solar	Not Started
J1308	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	AB Brown - Gibson 345kV Line	300	Solar	Not Started
J1311	NRIS	Ameren Illinois	Fayetteville Bee Hollow Road 138 kV Substation	150	Solar	Not Started
J1323	NRIS	Northern Indiana Public Service Company	Lagrange 138 kV Substation	25	Battery Storage	Not Started
J1332	NRIS	Northern Indiana Public Service Company	Schahfer 345kV Substation	200	Solar	Not Started
J1333	NRIS	Northern Indiana Public Service Company	Schahfer - Burr Oak 345kV Line	199.5	Hybrid	Not Started
J1334	NRIS	Northern Indiana Public Service Company	Schahfer - Burr Oak 345kV Line	199.5	Hybrid	Not Started
J1335	NRIS	Northern Indiana Public Service Company	Schahfer - Burr Oak 345kV Line	199.5	Hybrid	Not Started
J1336	NRIS	Northern Indiana Public Service Company	Schahfer - Burr Oak 345kV Line	199.5	Hybrid	Not Started

J1339	NRIS	Northern Indiana Public Service Company	Schahfer - Burr Oak 345kV Line	199.5	Hybrid	Not Started
J1340	NRIS	Northern Indiana Public Service Company	Schahfer - Burr Oak 345kV Line	199.5	Hybrid	Not Started
J1342	NRIS	Northern Indiana Public Service Company	Starke 138kV Substation	99	Solar	Not Started
J1348	NRIS	Duke Energy Indiana	Cayuga - Sugar Creek 345kV Line	200	Solar	Not Started
J1352	NRIS	Ameren Missouri	Spencer Creek - Montgomery 345kV Line	100	Solar	Not Started
J1353	NRIS	Northern Indiana Public Service Company	Green Acres138kV Substation	150	Battery Storage	Not Started
J1354	NRIS	Hoosier Energy	Decatur County 138kV Switching Station	118	Battery Storage	Not Started
J1355	NRIS	Northern Indiana Public Service Company	Stillwell 138kV Substation	131	Battery Storage	Not Started
J1356	NRIS	Duke Energy Indiana	Whitfield 138kV Substation	135	Solar	Not Started
J1357	NRIS	Duke Energy Indiana	Madison 138 KV SUBSTATION	150	Battery Storage	Not Started
J1358	NRIS	Northern Indiana Public Service Company	Luchtman 138kV Substation	125	Battery Storage	Not Started
J1360	NRIS	Ameren Illinois	Goose Creek 345kV Switchyard	300	Wind	Not Started
J1369	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Dubois - Culley 138 kV Line	100	Solar	Not Started
J1378	NRIS	Duke Energy Indiana	Veedersburg West 230 kV Substation	200	Solar	Not Started
J1381	NRIS	Duke Energy Indiana	Greentown 230 kV substation	200	Solar	Not Started
J1382	NRIS	Ameren Illinois	Hutsonville - Neoga 138 kV Line tap	150	Solar	Not Started
J1383	NRIS	Ameren Illinois	Ipava 138 kV Substation	150	Solar	Not Started

J1386	NRIS	Northern Indiana Public Service Company	Green Acres 138 kV Substation	100	Solar	Not Started
J1387	ERIS	Northern Indiana Public Service Company	Circuit 6958 69 kV Line Tap	60	Solar	Not Started
J1388	ERIS	Duke Energy Indiana	Oakland City - Old Ben Coal 138 kV Line Tap	150	Solar	Not Started
J1390	NRIS	Duke Energy Indiana	Gallagher Station - Columbus 230 kV Line Tap	150	Solar	Not Started
J1391	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Duff 138 kV Substation	100	Solar	Not Started
J1392	NRIS	Northern Indiana Public Service Company	Lagrange 138 kV Substation	100	Solar	Not Started
J1393	NRIS	Southern Indiana Gas & Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc.	Cato 138 kV Substation	130	Solar	Not Started
J1396	NRIS	Hoosier Energy	Ratts-Victory 161kV Line	60	Solar	Not Started
J1405	NRIS	Duke Energy Indiana	Sanborn - Linton 138 kV Line Tap	140	Solar	Not Started
J1407	NRIS	Northern Indiana Public Service Company	South Valparaiso 138 kV Substation	100	Solar	Not Started
J1419	NRIS	Duke Energy Indiana	Edwardsport - Amo 345 kV Line Tap	250	Solar	Not Started
J1422	NRIS	Ameren Illinois	Albion - Olney 138 kV Line Tap	150	Hybrid	Not Started
J1447	NRIS	Northern Indiana Public Service Company	Schahfer - Green Acres 345kV Line	250	Solar	Not Started
J1448	NRIS	Big Rivers Electric Corporation	Hopkins - Caldwell County - Barkely 161kV Line	150	Solar	Not Started

J1450	NRIS	Big Rivers Electric Corporation	Hopkins - Reid161kV Line	150	Solar	Not Started
J1453	NRIS	Ameren Illinois	Havana - Shockey 138 kV Line Tap	165	Wind	Not Started
J1454	NRIS	Ameren Illinois	Mason 138 kV Substation	40.9	Wind	In Service (with Provisional GIA)
J1464	NRIS	Ameren Transmission Company of Illinois	Meredosia - Austin 345 kV Line tap	592.8	Solar	Not Started
J1466	NRIS	Big Rivers Electric Corporation	Reid EHV 161 kV Substation	250	Solar	Not Started
J1470	NRIS Only	Duke Energy Indiana	Cayuga CT 345kV Substation	0	Wind	Not Started
J1475	NRIS	Ameren Illinois	Casey West - Sullivan 345 kV Line Tap	75	Solar	Not Started
J1481	NRIS	Duke Energy Indiana	Greentown 230 kV substation	200	Solar	Not Started
J1482	NRIS	Northern Indiana Public Service Company	Monticello - Springboro 138 kV Line Tap	150	Solar	Not Started
J1488	NRIS	Ameren Missouri	McCredie - Montgomery 345 kV Line Tap	500	High Voltage DC	Not Started
J1490	NRIS	Ameren Missouri	McCredie - Montgomery 345 kV Line Tap	1000	High Voltage DC	Not Started

Exhibit A11. { Reserved }

Exhibit A12. { Reserved }

Exhibit A13. Permits, Licenses, Regulatory Approvals and Authorization

Construction of the Transmission Owner's Interconnection Facilities and Network Upgrades is conditioned on receipt by Transmission Owner of approval from any jurisdiction having authority over the construction. No approvals, except approvals for outages, are contemplated.

Exhibit A14. Interconnection and Operating Guidelines

Operating to a Specified Voltage or VAR Schedule
The J1408 Generating Facility will be required to operate to a voltage schedule estimated to be 142 kV to 145 kV (1.029 to 1.05 PU) at the Point of Interconnection. The specific voltage schedule applicable to J1408 will be provided at the time of startup by the Transmission Owner's Transmission Operations group.

Voltage Ride Through
All inverter-based resources must conform to Clause 7.2 of the IEEE 2800 standard to meet the Voltage Ride Through requirements.

Frequency Ride Through
All inverter-based resources must conform to Clause 7.3 of the IEEE 2800 standard to meet the Frequency Ride Through requirements

NERC REPORTING STANDARDS
Complete and accurate modeling data is essential to the planning process. The following items are critical for the accuracy of data and are addressed by these requirements:

- field verifications of modeling parameters
- clear statement of data requirements
- protection system settings that impact system studies

In accordance with the periodicity established within the current NERC standards, the J1408 Generating Facility will ensure that compliance with all applicable NERC Modelling Standards has been met. Applicability of these standards to the J1408 Generating Facility will be determined based on the applicability criteria in the current version of the NERC standards. These standards are subject to change. All inverter-based resources must conform to Clause 10 of the IEEE 2800 to meet the Modeling Requirements. Generation Interconnecting customers with inverter-based resources can only obtain commercial status when the models in Clause 10 of IEEE 2800 are submitted to Ameren Transmission Planning and these models must include the Electromagnetic Transient (EMT) models in PSCAD software format.

For reference, at the time of signing, the current System Modelling Standards that may be applicable to the J1408 Generating Facility include:

- **MOD-025** Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability
- **MOD-026** Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions
- **MOD-027** Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions
- **MOD-032** Data for Power System Modeling and Analysis
- **PRC-024** Generator Frequency and Voltage Protective Relay Settings

Harmonic Requirements
Interconnection Customer's Generating Facility shall be limited to levels which will not cause excessive distortion of Transmission Owner's waveform, telephone interference, carrier interference, or equipment operating problems for Transmission Owner or other users of the transmission system. It shall also conform to IEEE Standard 519 with respect to voltage distortion. Interconnection Customer will, if required by Transmission Owner and/or Good Utility Practice, reduce or eliminate, at Interconnection Customer's expense, the existence of any excessive harmonics caused by the operation of the Interconnection Customer's Generating Facility.

Ameren Reporting Standards
Interconnection Customer is required to install a Phaser Measurement Unit (PMU) to verify Inverter Based Resource (IBR) performance during system disturbances in addition to ensuring compliance with FERC Orders 827 and 842.

Operating Guidelines
If required, to be provided on completion of all Interconnection Studies.

Ameren Generation Connection Procedures
Please visit the link below
https://www.oasis.oati.com/woa/docs/AMRN/AMRNdocs/Generator_Connection_Procedures-Version_7_081420.pdf

Appendix B to GIA
Milestones

1. Selected Option pursuant to Article 5.1: Interconnection Customer selects the Standard Option as described in Article 5.1.1. Articles 5.1.2, 5.1.3 and 5.1.4 shall not apply to this GIA.

2. Milestones: The description and date entries listed in the following tables are provided solely for the convenience of the Parties in establishing their applicable Milestones consistent with the provisions of this GIA and the GIP.

A. Interconnection Customer and Transmission Owner Milestones

NO.	MILESTONES	SCHEDULE DATE	PAYMENT AMOUNT	SECURITY AMOUNT
1.	Anticipated Effective Date of the GIA.	Estimated to be March 30, 2024.		
2.	Transmission Owner to enter Network Upgrade information into Transmission Provider's MOD and MTEP databases.	Within ten (10) Business Days of the Effective Date of the GIA.		
3.	Interconnection Customer to provide to Transmission Provider evidence of continued Site Control after execution of this GIA (GIP 7.2.2).	When requested by Transmission Provider.		
4.	Interconnection Customer to provide to Transmission Provider evidence of one or more of the following milestones being achieved: (a) execution of contract for fuel supply transport, (b) execution of contract for cooling water supply, (c) execution of contract for engineering procurement of major equipment or construction, (d) execution of contract for sale of electric energy or capacity; or (e) documentation of application for air, water	Within one hundred eighty (180) Calendar Days of the Effective Date of the GIA.		

	or land use permits. (GIP Article 11.3).			
5.	Interconnection Customer will coordinate with Transmission Provider to provide an Initial Payment of 20% of the estimated cost of Transmission Owner Interconnection Facilities. Interconnection Customer to provide, to the Transmission Owner, the security for Network Upgrades which will be [redacted]. Transmission Owner will first apply the Initial Payment to the estimated cost of Transmission Owner Interconnection Facilities, any excess will be applied to security for Network Upgrades. (GIA Article 11.5) Security provided will be in the form of cash, letter of credit acceptable to Transmission Owner, or acceptable guarantee from an investment grade guarantor. (GIA Article 11.6) The security may be reduced by theamount of subsequent progress payments for the Transmission Owner Interconnection Facilities at the time the progress payments are made. Coordinate Initial Payment confirmation with Transmission Owner and notify Transmission Provider	Within the later of: (i) forty five (45) Calendar Days of the execution of the GIA by all Parties, or (ii) forty five (45) Calendar Days of acceptance by FERC if the GIA is filed unexecuted and the payment is being protested by Interconnecti on Customer. May 14, 2024.	[redacted]	[redacted]

	via email notice to gifinance@misoenergy.org.			
6.	Interconnection Customer to provide to Transmission Owner relaying design and specifications for the Interconnection Customer's Interconnection Facilities for review.	At least thirty (30) Calendar Days prior to Transmission Owner's start of engineering and design, Milestone 9. April 30, 2024.		
7.	Transmission Owner to review and comment on Interconnection Customer's relaying design and specifications for Interconnection Customer's Interconnection Facilities.	Within twenty (20) Business Days of receipt of the Interconnection Customer's relaying design and specifications, Milestone 6.		
8.	Interconnection Customer to provide to Transmission Owner a progress payment for the engineering and design, drafting, and project support (including associated overheads) of the Transmission Owner Interconnection Facilities to be constructed by Transmission Owner under the GIA.	Upon receipt of an invoice from the Transmission Owner prior to or concurrent with Transmission Owner's start of engineering and design, Milestone 9. May 7, 2024.	[redacted]	
9.	Transmission Owner to begin engineering and design of the facilities to be constructed by Transmission Owner under the GIA.	Upon receipt of the progress payment from the Interconnection Customer, Milestone 8. May 14, 2024.		
10.	Interconnection Customer to provide to Transmission Owner initial design and	At least one hundred eighty (180) Calendar		

	specifications for Interconnection Customer's Interconnection Facilities for comment. (GIA Article 5.10.1).	Days prior to Initial Synchronization Date, Milestone 24.		
11.	Transmission Owner to provide to Interconnection Customer comments on the initial design and specifications for Interconnection Customer's Interconnection Facilities. (GIA Article 5.10.1).	Within thirty (30) Calendar Days after submission of Interconnection Customer's initial design and specifications, Milestone 10.		
12.	Interconnection Customer to provide to Transmission Owner a progress payment for the procurement of long-lead material and equipment (including associated overheads) for the Transmission Owner Interconnection Facilities to be constructed by Transmission Owner under the GIA.	Upon receipt of an invoice from the Transmission Owner prior to or concurrent with Transmission Owner's start of procurement, Milestone 13. June 21, 2024.	[redacted]	[redacted]
13.	Transmission Owner to begin procurement for long-lead material and equipment for the Transmission Owner Interconnection Facilities to be constructed by Transmission Owner under the GIA.	Upon receipt of the progress payment from the Interconnection Customer, Milestone 12. June 28, 2024.		
14.	Interconnection Customer and Transmission Owner to each provide the other with all Certificates of Insurance required by the GIA. (GIA Article 18.4.9).	Initially thirty (30) Calendar Days prior to the start of construction of the facilities to be installed or modified under the GIA, Milestone 19, and thereafter within ninety (90) Calendar Days of end of the fiscal		

		year or insurance renewal date.		
14a.	Interconnection Customer to furnish to Transmission Owner a fully prepared site, the deed to the property, a usable entrance road, permits, and permit approvals for the construction of the J1408 Interconnection Switching Station.	One (1) month prior to Transmission Owner's start of construction.		
15.	Interconnection Customer to provide to Transmission Owner a progress payment for construction (including associated overheads) of the Transmission Owner Interconnection Facilities to be constructed by Transmission Owner under the GIA.	Upon receipt of an invoice from the Transmission Owner prior to or concurrent with Transmission Owner's start of construction in Milestone 16. September 1, 2025.	[redacted]	
16.	Transmission Owner to begin construction of the facilities to be constructed by Transmission Owner under the GIA.	Upon receipt of the progress payment from the Interconnection Customer, Milestone 15. September 8, 2025.		
17.	Interconnection Customer to install its leadline connection to the Virden South Substation arbor.	March 1, 2026.		
18.	Interconnection Customer to provide to Transmission Owner final design and specifications for Interconnection Customer's Interconnection Facilities, protection design, SCADA, and communication equipment for comment. (GIA Article 5.10.1).	Not later than ninety (90) Calendar Days prior to the Initial Synchronization Date, Milestone 24.		
19.	Transmission Owner to	Within thirty (30)		

	provide to Interconnection Customer comments on the final design and specifications for Interconnection Customer's Interconnection Facilities, protection scheme, SCADA, and communication equipment. (GIA Article 5.10.1).	Calendar Days of receipt of Interconnection Customer's final design and specifications, Milestone 21.		
20.	Interconnection Customer to provide to Transmission Owner and Transmission Provider updated Generating Facility information. (GIA Article 24.3).	Not later than one hundred eighty (180) Calendar Days prior to the Trial Operation Date, Milestone 25.		
21.	Interconnection Customer to provide to Transmission Owner and Transmission Provider notification in writing of the Local Balancing Authority where the Generating Facility will be tied. (GIA Article 9.2).	Not later than three (3) months prior to the Initial Synchronization Date, Milestone 24.		
22.	Interconnection Customer to enter into an agreement with the applicable Local Balancing Authority if the Local Balancing Authority is not the Local Balancing Authority where the Generating Facility is physically interconnected.	Not later than one hundred eighty (180) Calendar Days prior to the Commercial Operation Date, Milestone 26. Not applicable if the Local Balancing Authority is AMIL or AMMO.		
23a.	<u>In-Service Date</u> Interconnection Customer's Generating Facility to be ready to receive backfeed from the Transmission System.	June 15, 2026.		

23b.	(GIA Article 1). <u>TO Ready Date</u> Transmission Owner to complete the facilities to be constructed under the GIA that are necessary to be able to provide backfeed to the Interconnection Customer's Generating Facility.	June 1, 2026.		
24.	Initial Synchronization Date.	Not earlier than the TO Ready Date, Milestone 23b. August 15, 2026.		
25.	Trial Operation Date.	Not earlier than the Initial Synchronization Date, Milestone 24. September 15, 2026.		
26.	Commercial Operation Date.	Not earlier than the Trial Operation Date, Milestone 25. October 15, 2026*.		
27.	Interconnection Customer to provide Transmission Owner and Transmission Provider "as built" drawings, information, and documents regarding Interconnection Customer's Interconnection Facilities. (GIA Article 5.10.3).	Not later than one hundred twenty (120) Calendar Days following the Commercial Operation Date, Milestone 26.		
28.	Transmission Owner to provide to Interconnection Customer and Transmission Provider "as built" drawings, information, and documents regarding Transmission	Not later than one hundred twenty (120) Calendar Days following the Commercial		

	Owner's Interconnection Facilities. (GIA Article 5.11).	Operation Date, Milestone 26.		
29.	Transmission Owner to provide to Interconnection Customer final cost invoices. (GIA Article 12.2 *et seq.*).	Not later than six (6) months following the completion of all facilities to be constructed by Transmission Owner under the GIA, Milestone 23b.		
30.	Transmission Owner and Interconnection Customer to enter into a Facilities Service Agreement under which Transmission Owner will recover from Interconnection Customer the Revenue Requirement for its investment in the Network Upgrades to be constructed under this GIA.	No later than sixty (60) days prior to Transmission Owner's anticipated completion of the first of the Network Upgrades to be constructed under this GIA.		
31.	Transmission Owner to release Interconnection Customer's security for the estimated cost of the Network Upgrades to be constructed under this GIA.	Simultaneous with Transmission Owners receipt of security from Interconnection Customer under the Facilities Service Agreement.		
32.	Interconnection Customer shall provide the Parties with notice on the status of the Generating Facility, including COD, under Article 15 of this GIA and shall also send such notice by email to ResourceIntegration@misoenergy.org. Notification shall include Interconnection Customer's name, and as	6 months prior to Initial Synchronization Date.		

	applicable Market Participant(s) name(s), and project number.			
33.	Interconnection Customer shall provide notice to the Parties of a test plan in advance of conducting tests for the Generating Facility. The notice shall be in the form below and should be provided under Article 15 of this GIA, and a copy of such notice should be emailed to ResourceIntegration@misoenergy.org.	5 Business Days prior to testing.		
		TOTAL	[redacted]	[redacted]

* Modified from the original Commercial Operation Date of October 15, 2023, contained in the Interconnection Request.

The schedule:

- is estimated and is not guaranteed.
- may be impacted by poor weather.
- is based on five business days per week instead of seven business days used for the milestone calendar.
- assumes Transmission Provider and Transmission Owner conditions allow transmission outages as required and without delay.
- assumes the Interconnection Customer will provide to the Transmission Owner all necessary funding, security, and information in a timely manner and such that it does not cause delays in the schedule. This information includes, but is not limited to, details concerning the incoming line to the Virden South substation pull off structure, details on the fiber optics and terminations, relay coordination, and other information that maybe necessary.
- assumes material lead times will be similar to recent purchases of similar equipment.
- assumes the Interconnection Customer and the Transmission Owner, as appropriate, have resolved permit, jurisdictional and regulatory issues prior to the scheduled start of construction.

B. Affected System Owner Milestones

Task	**Date Due**
Interconnection Customer is responsible to enter into applicable agreements with the Affected System Owner for the Interconnection Customer's share of following upgrades: • AECI ▪ McCredie – Overton 345 kV Line Rebuild (remote end work).	Prior to Commercial Operation Date.

C. Transmission Provider Milestones

No.	Description	Date
1.	Transmission Provider to determine conditional limit for interconnection service, if applicable.	Prior to Commercial Operation.
2.	Provide initial payment to Transmission Owner (GIA 11.5) in form of cash payment for $ 220,000 using milestone payments.	Within the later of a) 45 Calendar Days of the execution of the GIA by all Parties, or b) 45 Calendar Days of acceptance by FERC if the GIA is filed unexecuted and the payment is being protested by Interconnection Customer, or c) 45 Calendar Days of the filing if the GIA is filed unexecuted and the initial payment is not being protested by Interconnection Customer.

Appendix B-1 to GIA
Pre-Certification Generation Test Notification Form

The following form would need to be submitted to MISO Real Time Operations at least five (5) Business Days prior to the first date of testing.

Project Number:

Project Name:

Point of Interconnection:

Dispatcher Contact Information:

Date	Start Time (in EST)	End Time (in EST)	Expected MW Output	Expected MVAR Output (Only needed if beyond normal power factor)

Appendix C to GIA
Interconnection Details

1. The unique requirements of each generation interconnection will dictate the establishment of mutually agreeable Interconnection and/or Operating Guidelines that further define the requirements of the GIA. The Interconnection and/or Operating Guidelines applicable to this J1408 generator interconnection consist of the following information. Additional detail may be provided through attachment to Appendix C of the GIA or through electronic means via the web address specified.

   (a) System Protection Facilities

   The Transmission Owner along with the Interconnection Customer will construct a protective relaying scheme to protect the Transmission System from faults on the Interconnection Customer's Interconnection Facilities and faults on the Transmission Owner's Interconnection Facilities. The Interconnection Customer will be responsible for providing appropriate System Protection Facilities for the Interconnection Customer's Interconnection Facilities compatible with System Protection Facilities to be provided by the Transmission Owner at the Point of Interconnection. This scheme will be coordinated with and approved by Transmission Owner prior to implementation.

   The 138 kV line position that will be connecting to the Interconnection Customer's leadline will have its own set of line protection relays. The line relay protection will consist of a SEL-411L and a SEL-311C both utilizing fiber optic communications for dual pilot schemes. The implementation of these schemes will be provided by Ameren after additional system configuration is provided by the Interconnection Customer. Breaker failure relaying and reclosing will be accomplished with a SEL-351S.

   The fiber optic cable required for the relaying will need to directly connect from the Transmission Owner's relays in the Virden South Substation to identical Interconnection Customer owned relays at the Interconnection Customer's Generating Facility substation. The Interconnection Customer will supply and install the fiber optic cable between the Interconnection Customer's Generating Facility substation and the Transmission Owner's Virden South Substation.

   One new remote terminal unit (RTU) will be installed to provide the Transmission Owner with supervisory control and remote indication of the Interconnection Customer's Generating Facility substation.

   (b) Communication Requirements

   i. The Interconnection Customer is responsible to install all necessary equipment to transfer all required SCADA points to the Transmission Owner's system control center(s) for equipment installed at the Interconnection Customer's Generating Facility substation upon specification of such communication protocol to the

Interconnection Customer by the Transmission Owner. The Interconnection Customer will be responsible to install all necessary equipment to transfer all required data for the required telemetry information to the Transmission Owner's system control center(s).

ii. The Interconnection Customer is responsible for all operation and maintenance costs of all the required communications equipment located at the Interconnection Customer's Generating Facility substation required to transmit the required data to the Transmission Owner.

(c) Metering Requirements

Interconnection revenue-class metering equipment is installed for the Generation Facility by the Transmission Owner at the Transmission Owner's Virden South Substation. Meter data will be telemetered to the Interconnection Customer, Transmission Owner, and Transmission Provider control centers via the SCADA system.

(d) Grounding Requirements

Not used.

(e) Transmission Line and Substation Connection Configurations

The Parties agree that the connections between the Interconnection Customer's Interconnection Facilities and Transmission Owner's Interconnection Facilities will be made in accordance with Transmission Owner's specifications.

(f) Unit Stability Requirements

To be determined on completion of the Generator Interconnection Process System Impact Studies.

(g) Equipment Ratings

Transmission Owner will determine the individual equipment ratings for specific Transmission Owner Interconnection Facilities. Interconnection Customer shall size the Interconnection Customer's Interconnection Facilities using Applicable Standards, Good Utility Practice, and the information provided in the Transmission Owner's design guide information, Interconnection Evaluation Study, or its equivalent, in order that the Interconnection Customer's Interconnection Facilities appropriately coordinate with the Transmission Owner's Interconnection Facilities.

(h) Short Circuit Requirements

Transmission Owner will determine the required short-circuit ratings for all Transmission Owner's Interconnection Facilities. Interconnection Customer agrees to

provide appropriately sized or short-circuit-rated Interconnection Customer Interconnection Facilities comparable to those required by Transmission Owner using Applicable Standards, Good Utility Practice, and the information provided in the Transmission Owner design guide information document, Interconnection Evaluation Study, or its equivalent.

(i) Synchronizing Requirements

The Interconnection Customer Interconnection Facilities will be backfed from the Transmission Owner Interconnection Facilities utilizing the 138 kV circuit breaker(s) at the Interconnection Customer's Generating Facility substation. Transmission Owner may furnish transmission system bus potentials and bus voltage that may be used by the Interconnection Customer for synchronizing the Generating Facility to the Transmission Owner's Transmission System. These potentials will be provided to the Interconnection Customer at the Transmission Owner's signal demarcation point.

(j) Generation and Operation Control Requirements

The Interconnection Customer will install all necessary potential devices on its system to allow voltage control override to prevent high-voltage conditions from occurring. Voltage control will override power factor in order to maintain safe and proper operation of the Transmission Owner's Transmission System as required by the standards of Transmission Owner, the Applicable Reliability Council, and NERC, Good Utility Practice, and documented in the Transmission Owner design-guide information.

(k) Data Provisions

Interconnection Customer will install all necessary equipment to monitor and send the required telemetry information to the Transmission Owner's and Transmission Provider's system control centers. The required data includes, but is not limited to: metered kW, kVAR, kWh, kVARh, and breaker status. The Transmission Owner will provide detailed specifications to the Interconnection Customer for the appropriate communications protocol in the Transmission Owner's design guide information.

(l) Energization Inspection and Testing Requirements

Interconnection Customer will provide Transmission Owner with checkout records to document that Interconnection Customer has tested all protection systems and equipment for correct operation.

(m) Harmonic Requirements

See Section II, Exhibit A14.

Appendix D to GIA
Security Arrangements Details

Infrastructure security of Transmission or Distribution System equipment and operations, as applicable, and control hardware and software is essential to ensure day-to-day Transmission and Distribution System reliability and operational security. The Commission will expect all Transmission Providers, market participants, and Interconnection Customers interconnected to the Transmission or Distribution System, as applicable, to comply with the recommendations provided by Governmental Authorities regarding Critical Energy Infrastructure Information ("CEII") as that term is defined in 18 C.F.R. Section 388.113(c) and best practice recommendations from the electric reliability authority. All public utilities will be expected to meet basic standards for system infrastructure and operational security, including physical, operational, and cyber-security practices.

Appendix E to GIA
Commercial Operation Date

This Appendix E is a part of this GIA between Transmission Provider, Transmission Owner and Interconnection Customer.

[Date]

Midcontinent Independent System Operator, Inc.
Attn: Director, Transmission Access Planning
720 City Center Drive
Carmel, IN 46032

Re: _____ Generating Facility

Dear _____:

On **[Date] [Interconnection Customer]** has completed Trial Operation of Unit No. ___. This letter confirms that **[Interconnection Customer]** commenced commercial operation of Unit No. ___ at the Generating Facility, effective as of **[Date plus one Calendar Day]**.

Thank you.

[Signature]

[Interconnection Customer Representative]

cc: Transmission Owner

Appendix F to GIA
Addresses for Delivery of Notices and Billings

Notices:

Transmission Provider:

MISO
Attn: Director, Transmission Access Planning
720 City Center Drive
Carmel, IN 46032

Transmission Owner:

President – Transmission
Ameren Services Company
1901 Chouteau Avenue, MC 04
PO Box 66149
St. Louis, MO 63166-6149

Interconnection Customer:

Virden Wind Energy LLC
Managing Director
UKA North America LLC
1002 SE Monterey Commons Boulevard, Suite 300
Stuart, Florida 34996

Billings and Payments:

Transmission Provider:

MISO
Attn: Director, Transmission Access Planning
720 City Center Drive
Carmel, IN 46032

Transmission Owner:

President – Transmission
Ameren Services Company
1901 Chouteau Avenue, MC 04
PO Box 66149
St. Louis, MO 63166-6149

Interconnection Customer:

Virden Wind Energy LLC
Accounting
UKA North America LLC
1002 SE Monterey Commons Boulevard, Suite 300
Stuart, Florida 34996

Alternative Forms of Delivery of Notices (telephone, facsimile or email):

Transmission Provider:

MISO
Phone: (317) 249-5700
Email: misotap@misoenergy.org or
MISOTransmissionAccessPlanning@misoenergy.org

Transmission Owner:

Ameren Services Company
Voice telephone – (314) 554-2981
Facsimile telephone – (314) 554-3066
Email address – SSchukar@ameren.com

Interconnection Customer:

Virden Wind Energy LLC
Voice Telephone: (561) 264-8670
Fax Telephone: (561) 360-1670
Email: office@uka-group.com

Appendix G to GIA
Interconnection Requirements for a Non-synchronous Generating Facility

Appendix G sets forth requirements and provisions specific to a non-synchronous generating facility. All other requirements of this GIA continue to apply to non-synchronous generating facility interconnections.

A. Technical Standards Applicable to a Non-synchronous Generating Facility

i. Abnormal Voltage Ride-Through Capability

A non-synchronous generating facility shall be able to remain online during voltage disturbances up to the time periods and associated voltage levels set forth in the standard below.

1. Non-synchronous generating facilities are required to remain in-service during three-phase faults with normal clearing (which is a time period of approximately 4-9 cycles) and single line to ground faults with delayed clearing, and subsequent post-fault voltage recovery to prefault voltage unless clearing the fault effectively disconnects the generator from the system. The clearing time requirement for a three-phase fault will be specific to the non-synchronous generating facility substation location, as determined by and documented by the transmission provider. The maximum clearing time the non-synchronous generating facility shall be required to withstand for a three-phase fault shall be 9 cycles after which, if the fault remains following the location-specific normal clearing time for three-phase faults, the non-synchronous generating facility may disconnect from the transmission system. A non-synchronous generating facility shall remain interconnected during such a fault on the transmission system for a voltage level as low as zero volts, as measured at the high voltage side of the GSU.

2. This requirement does not apply to faults that would occur between the non-synchronous Generator terminals and the high side of the GSU.

3. Momentary cessation (ceasing to inject current into the transmission grid during a fault without mechanical isolation) is prohibited in North American Electric Reliability Corporation (NERC) reliability standard PRC-024 no trip zone.

4. Non-synchronous generating facility inverters may not trip or cease to inject current for momentary loss of synchronism. Any inverter may trip if the phase lock loop is unable to regain synchronism 150 milliseconds after loss of synchronism.

5. Non-synchronous generating facilities may be tripped after the fault period if this action is intended as part of a Special Protection System.

6. Non-synchronous generating facilities may meet the abnormal voltage ride-through requirements of this standard by the dynamic performance capability of the generators, by installing additional equipment (*e.g.* Static VAr Compensator) within the non-synchronous generating facility or by a combination of generator performance and additional equipment.

7. Existing individual generator units that are, or have been, interconnected to the network at the same location at the effective date of the Appendix G abnormal voltage ride-through Standard are exempt from meeting the Appendix G abnormal voltage ride-through Standard for the remaining life of the existing generation equipment. Existing individual generator units that are replaced are required to meet the Appendix G abnormal voltage ride-through Standard.

ii. Power Factor Design Criteria (Reactive Power)

The following reactive power requirements apply only to a newly interconnecting non-synchronous generating facility that has completed a System Impact Study as of the effective date of the Final Rule establishing the reactive power requirements for non-synchronous generators in section 9.6.1 of this GIA (Order No. 827). A non-synchronous generating facility to which this provision applies shall maintain a factor within the range of 0.95 leading to 0.95 lagging, unless Transmission Provider has established different requirements that apply to all Generating Facilities in the Local Balancing Authority on a comparable basis, measured at the high side of the generator substation. The power factor range standard can be met by using, for example, power electronics designed to supply this level of reactive capability (taking into account any limitations due to voltage level, real power output, etc.) or fixed and switched capacitors if agreed to by Transmission Provider, or a combination of the two. Interconnection Customer shall not disable power factor equipment while the non-synchronous generating facility is in operation. Non-synchronous generating facilities shall also be able to provide sufficient dynamic voltage support in lieu of the power system stabilizer and automatic voltage regulation at the generator excitation system.

iii. Supervisory Control and Data Acquisition (SCADA) Capability

The non-synchronous generating facility shall provide SCADA capability to transmit data and receive instructions from Transmission Provider to protect system reliability. Transmission Provider and Interconnection Customer shall determine what SCADA information is essential for the proposed non-synchronous generating facility, taking into account the size of the plant and its characteristics, location, and importance in maintaining generation resource adequacy and transmission system reliability in its area.

iv. Transient Data Recording Equipment for Facilities above 20 MW

Non-synchronous generating facilities with generating capacities of more than 20 MW must monitor and record data for all frequency ride-through events, transient low-voltage disturbances that initiated reactive current injection, reactive current injection or momentary cessation for transient high-voltage disturbances, and inverter trips. The data may be recorded and stored in a central plant control system. The following data must be recorded:

Plant Level

(1) Plant three-phase voltage, current and power factor
(2) Status of ancillary reactive devices
(3) Status of all plant circuit breakers
(4) Status of plant controller

(5) Plant control set points
(6) Status of main plant transformer no load taps
(7) Status of main plant transformer tap changer (if applicable)
(8) Protective relay trips (relay target data)

Inverter Level Data
(1) Frequency, current, and voltage during frequency ride-through events
(2) Voltage and current during momentary cessation for transient high-voltage events (when used)
(3) Voltage and current during reactive current injection for transient low or high-voltage events
(4) Inverter alarm and fault codes
(5) DC current
(6) DC voltage

The data must be time synchronized to a one millisecond level of resolution. All data except phase angle measuring unit data must be sampled at least every 10 milliseconds.

The non-synchronous generating facility shall store this data for a minimum of 60 calendar days. The non-synchronous generating facility, upon request from MISO or the transmission owner, shall make this data available within 10 calendar days of the request.

v. Protection Settings

A non-synchronous generating facility, while complying with the under-frequency and over-frequency ride through requirements, shall use accurately calculated and filtered frequency measurement over a time window to set frequency protection and should not use an instantaneously calculated value to set frequency protection.

A non-synchronous generating facility, while complying with the under-voltage and over-voltage ride through requirements should use filtered Root-Mean-Squared (RMS) voltage measurement to set voltage protection.

Inverter rate-of-change-of-frequency (ROCOF) protection shall be disabled unless an equipment limitation exists that requires the inverter to trip on high ROCOF.

Appendix H to GIA – Not Applicable
Interconnection Requirements for Provisional GIA

Provisional Agreement

This GIA is being provided in accordance with Section 11.5 of the Transmission Provider's GIP, which provides among other things, that an Interconnection Customer may request that Transmission Provider provide Interconnection Customer with a Provisional Generator Interconnection Agreement that limits the transfer of energy by Interconnection Customer commensurate with that allowed for Energy Resource Interconnection Service. Interconnection Customer requested Transmission Provider to provide a Provisional Generator Interconnection Agreement for limited operation at the discretion of Transmission Provider based upon the results of available studies (by Interconnection Customer and by Transmission Provider).

A Provisional Interconnection Study, the results of which are posted on the confidential portion of the Transmission Provider's internet website, was performed by Transmission Provider in order to confirm the facilities that are required for provisional Interconnection Service and to require them to be in place prior to commencement of service under the GIA.

Interconnection Customer represents that the Interconnection Customer facilities (including Network Upgrades, Interconnection Facilities, Distribution Upgrades, System Protection Upgrades and/or Generator Upgrades) that are necessary to commence provisional Interconnection Service and meet the requirements of NERC, or any applicable regional entity for the interconnection of a new generator are in place prior to the commencement of generation from the Generating Facility and will remain in place during the term of the service. The requisite Interconnection Studies were performed for the Generating Facility. Interconnection Customer shall meet any additional requirements (including reactive power requirements) pursuant to the results of applicable future Interconnection System Impact Studies. Until such time as the applicable Interconnection Studies and any identified facilities are completed, the output of the Generating Facility will operate within the output limit prescribed in a future, if applicable, operating guide.

The maximum permissible output of the Generating Facility under Appendix A will be updated by Transmission Provider on a quarterly basis, determined in accordance with Section 11.5 of the GIP, by finding the transfer limit of energy commensurate with the analysis for Energy Resource Interconnection Service ("ERIS"). This study shall be performed assuming the system topology represented by the base cases used to calculate Available Flowgate Capability, as described in Attachment C of the Tariff, with dispatch and optimization algorithms posted on the MISO internet site and operation above those limits will be deemed as unauthorized use of the Transmission System and subject to provisions in the Tariff surrounding that use.

Use of interim operating guide

Implementation of interim operating guide, if applicable, will constitute an interim solution that will permit Interconnection Customer to operate the Generating Facility under conditional Interconnection Service until planned Network Upgrades are constructed. Any interim operating

guide will be subject to the approval of Transmission Owner and Transmission Provider. Minimum requirements for an interim operating guide are as indicated below.

* Transmission Operator will have control of breaker(s) dedicated to the Generating Facility and will be able to trip the Interconnection Customer's Generating Facility
* Protection schemes must be tested and operative
* Interconnection Customer will provide continuous communication capability with the Generator Operator
* Interconnection Customer and the owner of the Existing Generating Facility will enter into an operating agreement or similar agreement which designates, among other things, the responsibilities and authorities of each of the parties and shall be subject to the acceptance of Transmission Provider and Transmission Owner.
* A termination date consistent with completion of construction of Network Upgrades will be included as part of all operating guides accepted by Transmission Owner and Transmission Provider.

Interconnection Customer assumes all risks and liabilities with respect to changes, which may impact the Generator Interconnection Agreement including, but not limited to, change in output limits and responsibilities for future Network Upgrade and cost responsibilities that have not yet been identified on the direct connect Transmission System as well as all affected Transmission, Distribution or Generation System(s) including non-Transmission Provider Systems. Such upgrades will be determined pursuant to the Tariff and Policies in effect at the time of the Interconnection Studies.

Appendix I to GIA – Not Applicable
Requirements Applicable to Surplus Interconnection Service

Where this GIA provides for Surplus Interconnection Service, Interconnection Customer acknowledges, agrees to, and will be required to operate under the following conditions:

1) The combined Real-Time Offers, including Energy and Operating Reserves, of the Generating Facility and the Existing Generating Facility with which Interconnection Customer has an executed Energy Displacement Agreement must be less than or equal to Interconnection Service limit (MW, MVAR, MVA output) provided in Exhibit I-1 (Monitoring and Consent Agreement) (hereinafter, "Interconnection Service limit"). In the event that the sum of the simultaneous energy output of the Surplus Interconnection Service Generating Facility and the Existing Generating Facility exceeds such Interconnection Service limit, MISO reserves the right to curtail and/or disconnect the Generating Facility immediately.

   In the event that the sum of the emergency and/or economic maximum offer limits of the Generating Facility and the Existing Generating Facility exceeds the Interconnection Service limit, MISO reserves the right to curtail and/or disconnect the Generating Facility immediately.
2) The total MW, MVAR, MVA output at the Point of Interconnection resulting from the combined output of the Generating Facility with Surplus Interconnection Service and the Existing Generating Facility with which Interconnection Customer has an executed Energy Displacement Agreement shall not at any time exceed the Interconnection Service limit.

3) The Existing Generating Facility with which Interconnection Customer has an executed Energy Displacement Agreement is not relieved of any applicable requirements under the RAR of the Tariff.

4) The Interconnection Customer shall submit to the Transmission Provider a report by the seventh Calendar Day of each month showing the prior month's output, by 15 minute increment, the combined real-time offers and cleared energy injection. The Existing Generating Facility and the Interconnection Customer shall cooperate consistent with other provisions in the Tariff to the extent necessary to ensure accuracy of the report. Transmission Provider shall provide a template for this report.

Exhibit I-1 (Completed Monitoring and Consent Agreement - Appendix 11 of the GIP)

Exhibit I-2 (Completed Energy Displacement Agreement - Appendix 12 of the GIP)

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Type Certificate

TÜV SÜD Industrie Service

Subject: **Wind Turbine Nordex N163/6.X 50/60 Hz**
Power Range 3180 kW – 7000 kW
Rotor Blade Type NR81.5-2
(optionally with Trailing Edge Serrations, Vortex Generators and Anti-Icing System)
98 m, 113 m, 118 m, 138 m, 159 m, 164 m Hub Height
IEC WT Class S
(with extended temperature range and altitude of installation)

Registration no.: **014.61.2.01.23.02**

Applicant: **Nordex Energy SE & Co. KG**
Langenhorner Chaussee 600
22419 Hamburg
Germany

Confirmation: It is hereby certified that the above-mentioned subject has been assessed by TÜV SÜD Industrie Service GmbH concerning design, type testing and manufacturing.

The conformity evaluation was carried out according to:
IEC 61400-22:2010 'Wind turbines – Part 22: Conformity testing and certification' in combination with IEC 61400-1:2005 including amendment 1:2010 'Wind turbines – Part 1: Design requirements'.

The evaluation is based on the following reference documents:

Registration no.	Date issued	Conformity Statements / Report
014.61.2.03.23.05	2023-12-14	DECS N163/6.X by TÜV SÜD
014.61.2.04.23.01	2023-06-30	TTCS N163/6.X by TÜV SÜD
014.23.2.05.23.12	2023-09-28	MECS N133/N149/N163 by TÜV SÜD
3451400-220-e rev. 2	2023-12-14	FER N163/6.X by TÜV SÜD

This certificate is valid until: **2028-06-29**

if the validity of the certification of the quality management system is maintained.

Munich, 2023-12-14

DAkkS Deutsche Akkreditierungsstelle D-ZE-14153-01-02

Certification Body for products according to DIN EN ISO/IEC 17065:2013 accredited by DAkkS. The accreditation is only valid for the scope mentioned in the accreditation certificate.

B. Bartels, M.A.

Certification Body Wind Turbines
TÜV SÜD Industrie Service GmbH

version-08-2022

TÜV®

Industrie Service

Design Evaluation
Conformity Statement

Registration no.: 014.61.2.03.23.05

This conformity statement is issued to:

Nordex Energy SE & Co. KG
Langenhorner Chaussee 600
22419 Hamburg
Germany

For the wind turbine:

Nordex N163/6.X 50/60Hz
Power Range 3180 kW – 7000 kW
Rotor Blade NR81.5-2
(optionally with Trailing Edge Serrations, Vortex Generators and Anti-Icing-System)
98 m, 113 m, 118 m, 138 m, 159 m, 164 m Hub Height
(with extended temperature range and altitude of installation)
IEC WT Class S

This conformity statement attests compliance of the above-mentioned wind turbine with the normative reference

IEC 61400-22:2010 'Wind turbines – Part 22: Conformity testing and certification'

in combination with

IEC 61400-1:2005 + A1:2010 'Wind turbines – Part 1: Design requirements'

concerning the design basis and the design. The associated reports and certificate for the quality management system are listed in annex 1. The wind turbine is specified in annex 2.

Changes in design may be implemented if assessed by TÜV SÜD Industrie Service GmbH with an additional report. Modifications without approval render this statement invalid. The validity of the quality management system certificate and integrated certificates (if applicable) shall be maintained.

Munich, 2023-12-14

B. Bartels, M.A.

Certification Body Wind Turbines
TÜV SÜD Industrie Service GmbH

DAkkS Deutsche Akkreditierungsstelle D-ZE-14153-01-02

Certification Body for products according to DIN EN ISO/IEC 17065:2013 accredited by DAkkS. The accreditation is only valid for the scope mentioned in the accreditation certificate.

version-02-2022

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Annex 1

The design basis evaluation and the design evaluation of the wind turbine Nordex N163/6.X with rotor blade type NR81.5-2 (optionally with Trailing Edge Serrations, Vortex Generators and Anti-Icing System), 98 m, 113 m, 118 m, 138 m, 159 m, 164 m hub height for IEC WT class S were carried out by expert engineers of the accredited certification body TÜV SÜD (accred. no. D-ZE-14153-01-02). The results are documented in the following reports:

Report no.	Date issued	Report subject	Cert. body
2740209-1-e-0 Rev. 13	2023-11-08	Design Basis	TÜV SÜD
3831690-2-e-1 Rev. 1	2023-09-18	Tower Loads Hub Height 98 m (TS98-01)	TÜV SÜD
3729663-2-e-1 Rev. 2	2023-06-26	Tower Loads Hub Height 113 m (TS113-00)	TÜV SÜD
3738120-2-e-1 Rev. 2	2023-06-26	Tower Loads Hub Height 118 m (TS118-03)	TÜV SÜD
3451400-10-e-1 Rev. 3	2023-07-24	Tower Loads Hub Height 138 m (TS138-00)	TÜV SÜD
3468350-12-e-1 Rev.1	2023-06-26	Tower Loads Hub Height 159 m (TS159-01)	TÜV SÜD
3451400-11-e-1 Rev. 4	2023-06-26	Tower Loads Hub Height 164 m (TCS164B-03 (N23))	TÜV SÜD
3451400-17-e-1 Rev. 9	2023-12-12	Machinery and Rotor Blade Loads	TÜV SÜD
3451400-15-e-1 Rev. 5	2023-09-06	Load Specification	TÜV SÜD
3451400-230-e-1 Rev. 1	2022-03-15	VPC (Variable Power Curve)	TÜV SÜD
3884293-1-e-1	2023-12-04	Validity of load reports due to VG Update	TÜV SÜD
2740209-8-e-2 Rev. 29	2023-09-26	Personnel Safety, Control and Protection System and Manuals	TÜV SÜD
3114128-222-e Rev. 5	2023-04-17	Extended Lifetime 21-35 years	TÜV SÜD
3114128-40-e-3 Rev. 5	2023-12-05	Rotor Blade NR81.5-2 Structural Verifications	TÜV SÜD
3114128-41-e-3 Rev. 2	2023-04-13	Rotor Blade NR81.5-2 Full-Scale Static and Dynamic Test	TÜV SÜD
2740209-47-e-4 Rev. 26	2023-12-13	Structural Components, Machinery Components	TÜV SÜD
2740209-471-e-4 Rev. 1	2023-12-13	Wind Turbine Housing	TÜV SÜD

TÜV®

2740209-54-e-5 Rev. 14	2023-12-06	Electrical Components and Lightning Protection	TÜV SÜD
3831690-4-e-6	2023-09-18	Tubular Steel Tower Hub Height 98 m (TS98-01) Structural Verification	TÜV SÜD
3831690-5-e-7	2023-09-18	Anchor Cage for Tower TS98-01	TÜV SÜD
3729663-4-e-6 Rev. 1	2023-06-06	Tubular Steel Tower Hub Height 113 m (TS113-00) Structural Verification	TÜV SÜD
3729663-5-e-7	2023-05-16	Anchor Cage for Tower TS113-00	TÜV SÜD
3738120-4-e-6	2023-06-12	Tubular Steel Tower Hub Height 118 m (TS118-03) Structural Verification	TÜV SÜD
3738120-5-e-7	2023-06-13	Anchor Cage for Tower TS118-03	TÜV SÜD
3451400-122-e-6 Rev. 1	2023-07-27	Tubular Steel Tower Hub Height 138 m (TS138-00) Structural Verifications	TÜV SÜD
3451400-140-e-7	2022-02-17	Anchor Cage for Tower TS138-00	TÜV SÜD
3468350-124-e-6	2021-12-13	Tubular Steel Tower Hub Height 159 m (TS159-01) Structural Verifications	TÜV SÜD
3468350-142-e-7	2022-02-17	Anchor Cage for Tower TS159-01	TÜV SÜD
3451400-120-e-6 Rev. 2	2023-11-17	Hybrid Tower Hub Height 164 m (TCS164B-03 (N23)) Structural Verifications	TÜV SÜD
2740209-70-e-8 Rev. 21	2023-09-25	Tower Internals Steel and Hybrid Towers	TÜV SÜD
3451400-110-e-11 Rev. 3	2023-11-22	Tower Top Flange	TÜV SÜD
3482179-1-e-1 Rev. 1	2022-11-02	Controller Function “EGLM”	TÜV SÜD

The quality management system of the applicant is certified according to ISO 9001:2015 as follows:

Cert. no.	Date issued	Company	Cert. body
01 100 120889	2022-09-28	Nordex SE	TÜV Rheinland

End of annex 1

Annex 2

Characteristics Data Nordex N163/6.X

General	Design:	Horizontal axis wind turbine with variable rotor speed, gearbox
	Power regulation:	Electro-mechanical pitch
	Main braking system:	3 independent electro-mechanical pitch systems
	Power range:	3180 kW – 7000 kW
	Rated electrical power:	6800 kW [1]
	Hub heights:	98 m / 113 m / 118 m / 138 m / 159 m / 164 m
	Rated rotor speed (6800 kW):	10 rpm
	Rated wind speed:	12.5 m/s
	Cut-in wind speed:	3 m/s
	Cut-out wind speed:	20 m/s
	Cut-out wind speed with ESCO:	26 m/s[2]
	Design lifetime:	See Table 4 and Table 5
	Altitude of Installation:	max. 2000 m
	Operating temperature CCV:	-30°C - +40°C
	Operating temperature NCV:	-20°C - +40°C
	Survival temperature:	-40°C - +50°C
	IEC wind turbine class:	S
	Reference wind speed v_{ref}:	37.5 m/s (TS98-01, TS113-00, TS118-03, TS159-01 and TCS164B-03 N23) 38.0 m/s (TS138-00)
	Turbulence intensity at v_{ref}:	11 %
	Annual average wind speed:	See Table 4 and Table 5
	Weibull form factor k:	2.4 (2.811 for TS138-00)
	Wind shear exponent:	See Table 2 and Table 3
	Category of turbulence characteristics:	See Table 1
	Vertical flow inclination:	8° (8° (ULS) / 0° (FLS) for TS159-01)
	Air density power production (ultimate loads, CCV):	1.32 kg/m³
	Air density idling / parked (ultimate loads, CCV):	1.29 kg/m³
	Air density all modes (ultimate loads, NCV):	1.225 kg/m³ (1.231 kg/m³ for TS138-00)
	Air density power production (Fatigue loads):	335 days in year: 1.225 kg/m³ (1.228 kg/m³ for TS159-01) (1.231 kg/m³ for tower and foundation loads of TS138-00) 30 days in year: 1.367 kg/m³

[1] The N163/6.X can be operated in additional variants if the conditions described in TÜV SÜD report no. 3451400-230-e-1 Rev. 1 are fulfilled.
[2] For wind turbine variants, equipped with an ESCO mode, the power will be gradually reduced for wind speeds between V_{out} and 26 m/s.

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Earthquake intensity:	TS98-01	TS113-00	TS118-03
	0.08g	0.08g	0.08g
	TS138-00	TS159-01	TCS164B-03 (N23)
	0.08g	0.08g	0.08g

Normal supply voltage and range:	950 V
Normal supply frequency and range:	50 / 60 Hz
Number of electrical network outages:	20 per year

wind speed [m/s]	4	6	8	10	12	14	16	18	20	22	24	26
Nordex specific S2 [%]	28.2	23.3	20.8	19.3	18.3	17.6	17.1	16.7	16.3	16.1	15.8	15.6
Nordex specific S2 (ETM) [%]	59.2	43.9	35.9	30.9	27.5	25.1	23.2	21.7	20.4	19.5	18.6	17.9
Nordex specific S13 [%]	21.1	18.0	17.2	16.9	17.4	16.8	15.9	15.2	14.7	14.3	14.0	13.8
Nordex specific S13 (ETM) [%]	48.9	37.3	33.6	31.6	29.3	23.2	21.3	19.7	18.4	17.4	16.4	15.5
Nordex specific S13 (m = 5) [%]	22.1	18.9	18.1	17.8	17.8	17.0	16.0	15.2	14.7	14.3	14.0	13.8
Nordex specific S13 (m = 10) [%]	23.5	20.2	19.3	19.0	18.5	17.3	16.1	15.3	14.7	14.3	14.0	13.8
Nordex specific S14 (m = 5) [%]	20.2	17.9	16.2	15.2	14.4	13.6	13.2	13.1	12.4	11.4	10.8	10.6
Nordex specific S14 (m = 14) [%]	22.4	21.0	19.6	18.1	16.6	15.0	14.1	13.7	12.8	11.7	11.2	11.0
IEC 3B (ETM) [%]	63.2	44.4	35.0	29.4	25.6	22.9	20.9	19.3	18.1	17.1	16.2	15.5

Table 1: turbulence intensities

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Tower variant	Rated power [kW]	Turbulence category (fatigue loads)	Turbulence category (ultimate loads)	wind shear exponent during operation
TS98-01	6800	Nordex S2	Nordex S2 Nordex S2 (ETM)	0.20
TS113-00		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.20
TS118-03		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.25
TS138-00		Nordex S13 (m = 5) Nordex S13 (m = 10)	Nordex S13 Nordex S13 (ETM)	0.394
TS159-01		Nordex S14 (m=5) Nordex S14 (m=14)	Nordex S14 IEC 3B (ETM)	0.35 (ULS) / 0.296 (FLS)
TCS164B-03 (N23)		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.25

Table 2: rated power, turbulence category and wind shear exponent for tower evaluation

Tower variant	Rated power [kW]	Turbulence category (fatigue loads)	Turbulence category (ultimate loads)	wind shear exponent during operation
TS98-01	6800	Nordex S2	Nordex S2 Nordex S2 (ETM)	0.20
TS113-00		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.20
TS118-03		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.25
TS138-00		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.35
TS159-01		Nordex S14 (m=5) Nordex S14 (m=14)	Nordex S14 IEC 3B (ETM)	0.35 (ULS) / 0.296 (FLS)
TCS164B-03 (N23)		Nordex S2	Nordex S2 Nordex S2 (ETM)	0.25

Table 3: rated power, turbulence category and wind shear exponent for machinery and rotor blade evaluation

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Industrie Service

Tower variant	Rated power [kW]	Annual average wind speed [m/s]	Design Lifetime Tower [years][3]
TS98-01	6800	7.5	25
TS113-00			
TS118-03			
TS138-00		7.027	
TS159-01		7.5	30
TCS164B-03 (N23)			25

Table 4: rated power, annual average wind speed and design lifetime for tower evaluation

Tower variant	Rated power [kW]	Annual average wind speed [m/s]	Annual average wind speed gearbox [m/s]	Design Lifetime Machinery and Rotor Blades [years][3]
TS98-01	6800	7.5	8.2	25
TS113-00				
TS118-03				
TS138-00				30
TS159-01				
TCS164B-03 (N23)				

Table 5: rated power, annual average wind speed and design lifetime for machinery and rotor blade evaluation

[3] The N163/6.X can be operated project-specifically with extended lifetime up to 35 years, if the conditions described in TÜV SÜD report no. 3114128-222-e Rev. 5 are fulfilled.

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Rotor	Diameter:	163 m
	Number of rotor blades:	3
	Orientation:	Upwind
	Cone angle:	-5.5°
	Tilt angle:	5°
	Rotor blade type:	NR81.5-2 with or without Trailing Edge Serrations, Vortex Generators and Anti-Icing System
	Designer:	Nordex Energy
Pitch system	Design:	Electro-mechanical with AC-motors and accumulator backup
	Number of Pitch Drives:	1 drive per blade flange bearing
Pitch drive	Design:	Multi-stage planetary gear
	Designer:	Bonfiglioli
	Type:	709T3F (2T709T3191A01)
	Designer:	Weili
	Type:	B5025A
Blade bearing	Design:	Combined part: ball bearing slewing ring and blade extender
	Designer:	thyssenkrupp Rothe Erde
	Type:	84015940 rev B (MAT-No.) 84015940 rev D (MAT-No.)
	Designer:	Liebherr
	Type:	13824304 rev 5 13824304 rev 10
	Designer:	TMB
	Type:	B033.80.3492K rev 2 B033.80.3492K rev 3
	Designer:	Laulagun
	Type:	F3760M16DTTI125TLA r4 F3760M16DTTI125TLA r7
Pitch converter	Designer:	KEBA Industrial Automation Germany GmbH
	Type:	PitchOne
Hub	Design:	Cast part
	Designer:	Nordex Energy
	Material:	EN-GJS-400-18-LT
	Drawing No.:	02020-E0005390902 Rev. 1

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Main bearing	Design:	Spherical roller bearing
	Designer:	SKF
	Type:	240/1060 CAF/L4BCNLV026, 240/1060 BC/L4BCNLVR6461, 240/1060 BCF/CNLV063
	Designer:	Schaeffler
	Type:	F-623432.03.PRL-WPOS-J30PC-CNL F-623432.03.PRL-WPOS-J48BB-CNL F-623432.03.PRL-AS01-WPOS
Main bearing housing	Design:	Cast part
	Designer:	Nordex Energy
	Material:	EN-GJS-400-18-LT
	Drawing No.	02041-E0005401649 Rev.1
Rotor shaft	Design:	Forged part
	Designer:	Nordex Energy
	Material:	42CrMo4 or 34CrNiMo6
	Drawing No.:	NCV: 02030-E0005461524 Rev. 1 CCV: 02030-E0005406442 Rev. 1
Gearbox (50 Hz)	Design:	Planetary helical gearbox
	Designer:	Flender
	Type / Nominal ratio:	PDAJ 3755 i=122.337 i=122.216
	Designer:	Eickhoff
	Type / Nominal ratio:	EBN 6930 i=122.222 (in-phase) i=122.164 (sequential)
	Designer:	ZF
	Type / Nominal ratio:	EH0945A-001 / i=122.61
Gearbox (60 Hz)	Design:	Planetary helical gearbox
	Designer:	Flender
	Type / Nominal ratio:	PDAJ 3755 / i=146.856
	Designer:	Eickhoff
	Type / Nominal ratio:	EBN 6930 i=146.933 (in-phase) i=147.425 (sequential)
	Designer:	ZF
	Type / Nominal ratio:	EH0945A-002 / i=146.67

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Rotor brake[4]	Design:	Active hydraulic brake
	Designer:	Dellner Bubenzer
	Type:	JHS-RBA-16-90-30-2-2200-2S
	Designer:	KTR
	Type:	KTR-STOP YAW M C-30
	Designer:	ANTEC
	Type:	HE-2-90/109
HSS coupling (brake disc unit + coupling unit)	Designer:	Flender
	Type:	APREX COUPLING ARV-4-SIZE 600
HSS coupling (brake disc unit)	Designer:	KTR
	Type:	RADEX-N 300 NANA 4 Special
	Designer:	Flender
	Type:	ARV-4 K 600-4
HSS coupling (coupling unit)	Designer:	KTR
	Type:	RADEX-N 300
	Designer:	Flender
	Type:	ARPEX ARV-4 ZR 600-4
Shrink disc	Designer:	Rexnord Tollok
	Type:	Y2599
	Designer:	Stüwe
	Type:	HSD-1050-81-1
	Designer:	SIT
	Type:	SIT LOCK 14 1050x1540
	Designer:	Haozhi
	Type:	FN1050-22-0R1
Main frame	Design:	Cast part
	Designer:	Nordex Energy
	Material:	EN-GJS-400-18-LT
	Drawing No.:	02080-E0005410696 Rev. 1
Generator frame	Design:	Welded structure
	Designer:	Nordex Energy
	Material:	S235 / S355
	Drawing No.:	02090-E0005436902 Rev. 2

[4] operation limited to -20°C; only for maintenance reasons required

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Generator support	Design: Type: Drawing No.:	Elastomer bearing ML04_002_05 2013098IN, Rev. 0
Gearbox support	Design: Material: Drawing No.:	Elastomer bearing Natural rubber 2021579EN Rev. 0
Yaw system	**Yaw drive design:**	Planetary gear with permanent magnet synchronous motor and electromechanical brake
	Designer: Type:	Bonfiglioli 714T (Bonfiglioli product code JB00016926) (Bonfiglioli gearbox product code JB00000645) 714T (Bonfiglioli product code JB00020032) 7T 14 W (GEARMOTOR code JB00022352) (Bonfiglioli gearbox product code JB00000645)
	Designer: Type:	Liebherr DAT 450/3450
	Yaw bearing design:	Double row ball bearing slewing ring
	Designer: Type:	thyssenkrupp Rothe Erde 84029340 (Mat. No)
	Designer: Type:	Laulagun F3316M20DTTE125KUF
	Designer: Type:	Liebherr KUD03081-50WA18-001-000 article code 13816820
	Designer: Type:	TMB Y032.45.3086K
Hydraulic system[5]	Design: Designer: Type:	Hydraulic unit HYDAC 4458500 4458500 BR 4699746

[5] operation limited to -20°C, only for maintenance reasons required

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	Designer:	HAWE
	Type:	Aggregat 17-070-H-00-01 Aggregat 21-245-H-00-00
	Designer:	DELLNER HYDRATECH
	Type:	B7183
Nacelle cover	Designer:	Nordex Energy
	Material:	Glass fiber reinforced plastic
	Design wind speed V_{e50}:	65 m/s
Spinner	Designer:	Nordex Energy
	Material:	Glass fiber reinforced plastic
	Design wind speed V_{e50}:	65 m/s
Tower 98 m hub height (TS98-01)	Design:	Tubular steel tower
	Length / No. of sections:	95.292 m / 4
	Tower Drawing No.:	01430-E0005782564, Rev. 1
	Anchor Cage Drawing No.:	01510-E0005785731, Rev. 0
Tower 113 m hub height (TS113-00)	Design:	Tubular steel tower
	Length / No. of sections:	109.792 m / 5
	Tower Drawing No.:	01430-e0005740380, Rev. 3
	Anchor Cage Drawing No.:	01510-e0005741962, Rev. 0
Tower 118 m hub height (TS118-03)	Design:	Tubular steel tower
	Length / No. of sections:	114.792 m / 6
	Tower Drawing No.:	01430-e0005707031, Rev. 2
	Anchor Cage Drawing No.:	01510-e0005753892, Rev. 0
Tower 138 m hub height (TS138-00)	Design:	Tubular steel tower
	Length / No. of sections:	134.798 m / 6
	Tower Drawing No.:	01430-e0005434751, Rev. 3
	Anchor Cage Drawing No.:	01510-e0005436939, Rev. 0
Tower 159 m Hub height (TS159-01)	Design:	Tubular steel tower
	Length / No. of sections:	155.288 m / 7
	Tower Drawing No.:	01430-e0005499489, Rev. 2
	Anchor Cage Drawing No.:	01510-e0005500741, Rev. 0
Tower 164 m hub height (TCS164B-03 (N23))	Design:	Hybrid tower with tubular steel tower part
	Length	159.99 m
	Tower Drawing No.:	2021447IN, Rev. g 01430-e0005478782, Rev. 0
Control and safety system	Designer:	Nordex Energy
SPLC	Designer:	Phoenix Contact
	Type:	NFC480S

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Generator	Design:	Double fed asynchronous slip ring
	Nominal Operation Point:	6800 kW
	Nominal Active Power:	6930 kW
	Nominal Speed (50 Hz):	1224 rpm
	Nominal Speed (60 Hz)	1469 rpm
	Degree of Protection:	IP54 (IP23 for slip ring)
	Designer:	Flender/Winergy
	Type:	JFWA-710MR-06A
	Rated power:	7130 kW (950 V)
	Designer:	ELIN Motoren
	Type:	MRM-071 Z06
	Rated power:	7130 kW (950 V)
Converter	Designer:	Ingeteam
	Type:	PT0163: DFIG 6800LV2LFWC INGECONW
	Rated power:	6835 kW (50 Hz) / 7035 kW (60 Hz)
	Designer:	Vertiv
	Type:	WF1000-09L0680
	Rated power:	7035 kW
Transformer	Designer:	Siemens and SBG
	Design:	Ester-immersed transformer
	Rated power:	7800 kVA
	Rated Voltage HV:	20 kV – 34 kV
	Rated Voltage LV:	0.95 kV
	Frequency:	50/60 Hz

End of annex 2

General documentation

Technical description

Delta4000 - N163/6.X

Rev. 03 / 2022-02-21

Document no.:	2014649EN
Status:	Released
Language:	EN-English
Classification:	Nordex Internal Purpose

- Translation of the original document (2014649DE, rev. 03) -
This is a translation form German. In case of doubt, the German text shall prevail.
Document will be distributed electronically.
Signed original at Nordex Energy SE & Co. KG, Engineering Department.

Manufacturer's address as per Machinery Directive:

Nordex Energy SE & Co. KG

Langenhorner Chaussee 600

22419 Hamburg

Germany

Phone: +49 (0)40 300 30 -1000

Fax: +49 (0)40 300 30 - 1101

info@nordex-online.com

http://www.nordex-online.com

Validity

Turbine generation	Product series	Product
Delta	Delta4000	N163/6.X

1. Structure

The Nordex N163/6.X wind turbine (WT) is a speed-variable wind turbine with a rotor diameter of 163 m and a nominal power of 7000 kW, which can be adapted dependent on location. The wind turbine is designed for class S in accordance with IEC 61400-1 or wind zone S in accordance with DIBt 2012 and is available in 50 Hz and 60 Hz variants.

A Nordex N163/6.X wind turbine consists of the following main components:

- Rotor with rotor hub, three rotor blades and the pitch system
- Nacelle with rotor shaft and bearing, gear, generator, Yaw system, medium voltage transformer and converter
- Tubular steel tower or hybrid tower with medium-voltage switchgear.

1.1 Tower

The wind turbine N163/6.X can be erected on a steel tower or on a hybrid tower. The tubular steel tower consists of several conical or cylindrical sections. This tower is bolted to the anchor cage embedded in the foundation. The bottom part of the hybrid tower consists of a concrete tower and the top part of a tubular steel tower with two sections.

A service lift, the vertical ladder with fall protection system as well as resting and working platforms inside the tower allow for a weather-protected ascent to the nacelle.

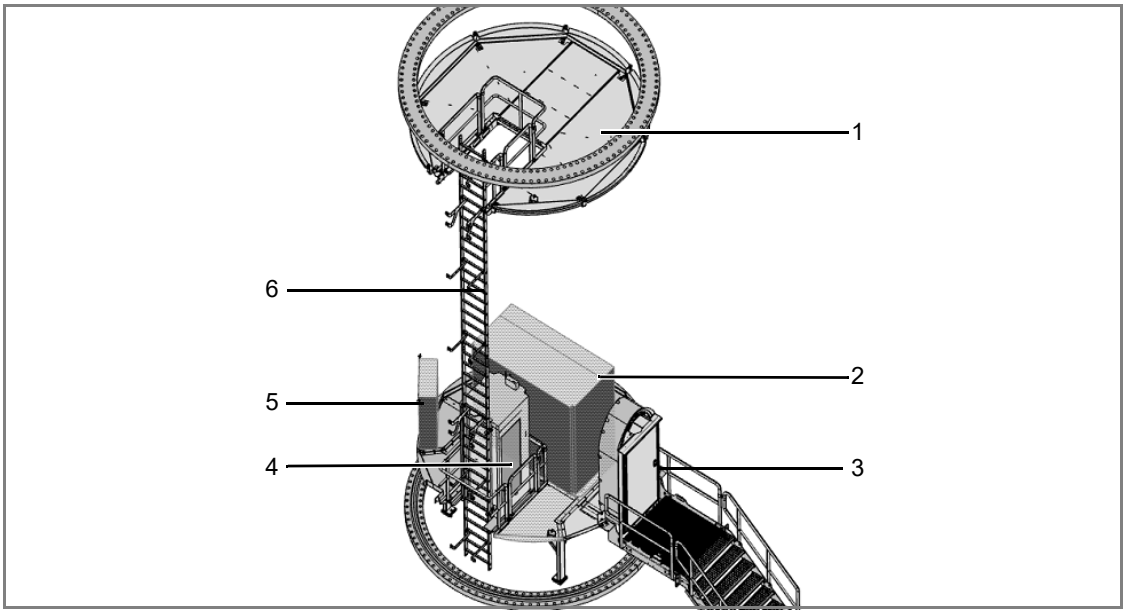


Fig. 1: Overview of installations in the bottom section of the steel tube tower

1 Flange platform
2 MV switchgear
3 Tower access
4 Tower service lift
5 Control cabinet
6 Ladder path

The foundation structure of all towers depends on the soil conditions at the intended location.

1.2 Rotor

The rotor consists of the rotor hub with three slewing bearings, the pitch system for blade adjustment and three rotor blades.

The **rotor hub** consists of a base element with support system and spinner. The base element consists of a stiff cast structure, on which the pitch bearings and the rotor blades are assembled. The rotor hub is covered with the spinner which enables the direct access from the nacelle into the rotor hub.

The **rotor blades** are made from high quality fiber glass- and carbon-fiber reinforced plastic. The rotor blade is tested statically and dynamically in accordance with the guidelines IEC 61400-23 and DNVGL-ST-0376.

The **pitch system** serves to adjust the pitch angle of the rotor blades set by the control system. For each individual rotor blade the pitch system comprises an electromechanical drive with rotary current motor, planetary gear and drive pinion, as well as a control unit with frequency converter and emergency power supply. Power supply and signal transfer are realized through a slip ring in the nacelle.

1.3 Nacelle

The nacelle contains essential mechanical and electric components of the wind turbine.

The **rotor shaft** transmits the rotary motion of the rotor to the gearbox and is mounted in the **rotor bearing** in the nacelle. A rotor lock is integrated in the rotor bearing housing, with which the rotor can be reliably locked in place mechanically.

With the mechanical **rotor brake** the rotor is locked during maintenance work. For this, a sufficient oil pressure is generated by the hydraulic pump.

The **gearbox** increases the rotor speed until it reaches the speed required for the generator. The bearings and gearings are continuously lubricated with oil. A combination filter element with coarse, fine and ultrafine filter retains solid particles. The control system monitors the contamination of the filter element. The gear oil used for lubrication also cools the gearbox. The temperatures of the gearbox bearings and the oil are continuously monitored. If the optimum operating temperature is not yet reached, a thermal bypass directs the gear oil directly back to the gearbox. Only when the gear oil temperature reaches a predetermined value is the transmission oil cooled by an oil / water cooler, which is located directly on the gearbox. As a result, the gear oil temperature is kept in a narrow temperature range during operation.

The **coupling** acts as force-transmitting connection between the gearbox and the generator.

The **generator** is a 6-pole doubly-fed induction machine. The generator has a built-on air-water heat exchanger and is connected to the cooling circuit.

The **converter** connects the electrical grid to the generator which means the generator can be operated with variable rotational speeds.

The **transformer** converts the low voltage of the generator-converter system into medium voltage of the wind farm grid. The transformer is cooled by the connection to the cooling circuit.

In the **switch cabinet**, all electrical components required for the control and supply of the turbine are located.

The cooling water is re-cooled by a **passive cooler** on the nacelle roof.

The **yaw drives** optimally rotate the nacelle into the wind. The yaw drives are located on the machine frame in the nacelle. A yaw drive consists of an electric

motor, multi-stage planetary gear, and a drive pinion. The drive pinions mesh with the external teeth of the yaw bearing. In the aligned position the nacelle is held with the yaw drives.

All nacelle assemblies are protected against wind and weather conditions by means of a **nacelle housing**.

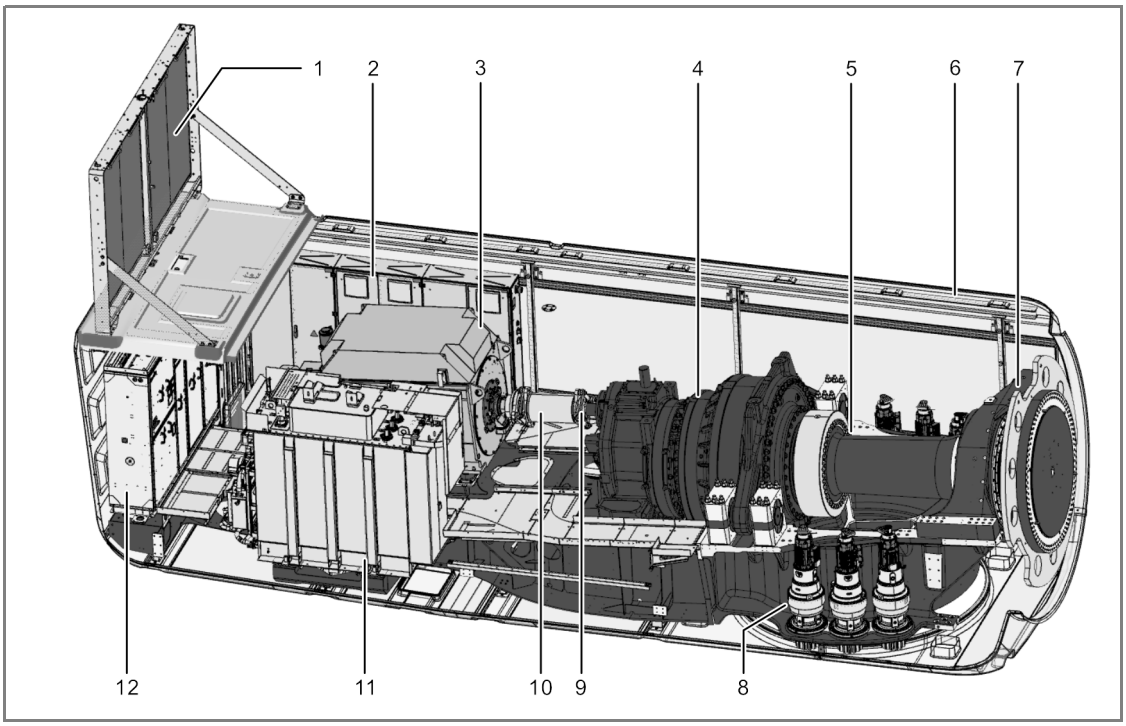


Abb. 2: Schematic diagram of the nacelle

1	*Passive cooler*	*7*	*Rotor bearing*
2	*Switch cabinet*	*8*	*Yaw drives*
3	*Generator*	*9*	*Rotor brake*
4	*Gearbox*	*10*	*Coupling*
5	*Rotor shaft*	*11*	*Transformer*
6	*Nacelle housing*	*12*	*Converter*

1.4 Auxiliary systems

1.4.1 Automatic lubrication system

Generator bearing, gearing of the pitch bearings, rotor bearing and gearing of the yaw bearing are each equipped with an **automatic lubrication system**.

1.4.2 Heaters

Gearbox, generator, cooling circuit and all relevant switch cabinets are equipped with **heaters**.

1.4.3 E-chain hoist and crossbeam

An electric **chain hoist** is installed in the nacelle which is used for lifting tools, components and other work materials from the ground into the nacelle.

A crossbeam including a sliding trolley is prepared for the use of a manual chain hoist to move the materials within the nacelle.

1.4.4 Cooling system

Two separate cooling circuits ensure cooling of the large components. Converter and gearbox are cooled in one cooling circuit and generator and transformer in the other.

Both cooling circuits are connected to passive coolers on the nacelle roof, in which the water is recooled.

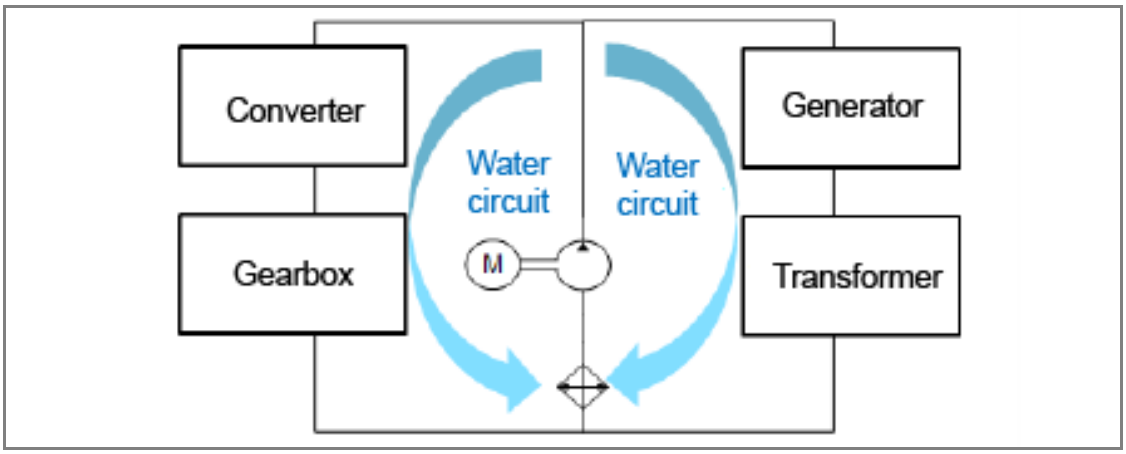


Abb. 3: Schematic representation of the cooling circuit

2. Control and electrical system

The WT operates automatically. A programmable logic controller (PLC) continuously monitors the operating parameters using various sensors, compares the actual values with the corresponding setpoints and issues the required control signals to the WT components. The operating parameters are specified by Nordex and are adapted to the individual location. The controller is located in a control cabinet in the tower base.

When there is no wind the WT remains in idle mode. Only various auxiliary systems are operational or activated as required: e.g., heaters, gear lubrication or PLC, which monitors the data from the wind measuring system. All other systems are switched off and do not use any energy. The rotor idles. When the cut-in wind speed is reached, the WT changes to the "ready for operation" condition. Now all systems are tested, the nacelle turns into the wind and the rotor blades turn into the wind. When a certain speed is reached, the generator is connected to the grid and the WT produces electrical energy.

At low wind speeds the WT operates at part load. The rotor blade remain turned into wind to the maximum extent. The power produced by the WT depends on the wind speed.

When the nominal wind speed is reached, the WT switches over to the nominal load range. If the wind speed continues to increase, the speed control changes the rotor blade angle so that the rotor speed and thus the power output of the WT remain constant.

The yaw system ensures that the nacelle is always optimally aligned to the wind. To this end two separate wind measuring systems on the nacelle measure the wind direction. Only one wind measuring system is used for the control system, while the second system monitors the first and takes over in case the first system fails. If the wind direction measured deviates too much from the nacelle alignment, the nacelle is yawed into the wind.

The wind energy absorbed from the rotor is converted into electrical energy using a doubly-fed induction machine with slip ring rotor. Its stator is connected directly, and the rotor via a specially controlled frequency converter, to the MV transformer which connects the turbine to the grid. Only part of the power needs to be routed via the converter, permitting low electrical system losses.

2.1 Safety systems

Nordex wind turbines are equipped with technical equipment and devices that protect people and systems and ensure permanent operation. The entire turbine is designed in accordance with the Machinery Directive 2006/42/EC and certified as per IEC 61400.

Safety-relevant parameters in the system control are monitored continuously. Here, the sensor data of the safe sensors are transmitted via a safe bus system to the safe controller for evaluation. If specified parameters are exceeded, the system is stopped via actuators and set to a safe state.

Depending on the cut-out cause, different brake programs are triggered. In event of external causes, such as excessive wind speeds or below operating temperatures, the wind turbine is gently braked by means of rotor blade adjustment. Other safety functions are used to stop drives safely for maintenance work.

2.2 Lightning/overvoltage protection, electromagnetic compatibility (EMC)

The lightning/surge protection of the wind turbine is based on the EMC-compliant lightning protection zone concept, which comprises the implementation of internal and external lightning/surge protection measures under consideration of the standard IEC 61400-24. The wind turbine is designed according to lightning protection class I.

The wind turbine with the electrical equipment, consumers, the measurement, control, protection, information and telecommunication technology meets the EMC requirements according to IEC 61400-1.

2.3 Medium-voltage system

The medium voltage components are used to connect a WT to the wind farm medium-voltage grid or the local grid operator. The tower base contains the **MV switchgear**. It consists of a transformer field with circuit breakers and at least one ring cable field as default and up to three ring cable fields as an option (dependent on the wind farm configuration). The transformer panel consists of a vacuum circuit breaker and the disconnector with ground switch. The ring cable panel consist of a switch disconnector with a ground switch. The entire MV switchgear is assembled on a support/adapter frame.

Further characteristics of the MV switchgear:

- Routine tests of each switchgear in compliance with IEC 62271-200
- Type tested, SF6 insulation
- Internal switchgear for self-contained electrical systems (min. IP2X)
- SF6 tank: metal-clad, metal-enclosed (min. IP65), independent of environmental influences
- Switch positions shown "On - Off - Grounded"
- Test terminal strip for secondary test
- Low-maintenance in accordance with class E2 (IEC 62271-100)

The system protection of the MV switchgear is achieved by the following items:

- Improved personal safety and system protection in case of arcing by type testing in compliance with IEC 62271-200
- Protection device supplied with converter current and stabilized for inrush current as DMT protection relay (independent maximum current protection)
- Actuating openings for switchgear are interlocked to preclude operation of more than one simultaneously, and can be locked as an option
- Corrosion protection of the switchgear cells through hot-dip galvanization and painted surfaces
- Pressure relief by pressure absorber duct in case of arcing. Alternatively, for the USA, an arc suppressor can be installed in the tank and in the cable connection compartment.

Transformer and **converter** are located in the nacelle. The transformer has been specified in accordance with IEC 60076-16.

The steel components at the transformer are dimensioned for corrosion protection class C3 (H).

Additional protection measures:

- Grounded tank (Ester transformer)
- Overtemperature protection with temperature sensor and relay
- Hermetic protection (leakage) and overpressure protection for ester transformer

2.4 Low-voltage grid types

The **950 V low voltage grid** is the primary wind turbine low voltage energy system. It is insulated from the ground as an IT grid and three phase AC network. The elements of the electrical operating and measuring devices of this network are grounded directly or via separate protective equipotential bonding cables. A central insulation monitor has been installed as another protective measure for personal and turbine safety in the 950-V-IT system.

The **400 V/230 V low voltage grid** is the auxiliary wind turbine low voltage system. It has its neutral point grounded directly in the supplying grid transformers as a TN system and three-phase system. The equipment grounding conductor PE and the neutral conductor are available separately. The bodies of electrical equipment and consumers, including the additional protective equipotential bonding, are connected directly, through protective earthing conductor connections, straight to the neutral points of the supply grid transformers.

2.5 Auxiliary power of the wind turbine

The auxiliary low voltage required by the wind turbine in stand-by mode and feed-in mode is requested by the following consumers:

- System control including main converter control
- 400 V/230 V auxiliary power of the main converter
- 230 V AC UPS supply including 24 V DC supply
- Yaw system
- Pitch system
- Auxiliary drives such as pumps, fans and lubrication units
- Heating and lighting
- Auxiliary systems such as service lift, obstacle lights

Long-term measurements show that the average annual base load of the low-voltage auxiliary power plant in WT feed-in operation is approx. 15 kW in the average 10 min mean value and the maximum 10-min average value can reach up to 25 kW/32kVA. These values are already included in the power curves.
For locations with an average annual wind speed of 6.5 m/s approx. 10 MWh auxiliary consumption arise, however, this value is greatly dependent on location.

Auxiliary consumption is defines as the energy consumption of the WT from the grid for a period during which the WT does not supply current to the grid.

3. Options

Various options are available upon request as additional equipment for Nordex wind turbines.

The option of optional equipment must be coordinated with Nordex in advance.

4. Technical data

4.1 Technical design

Technical design	
Survival temperature	-40 °C to +50 °C
Operating temperature range of the Normal Climate Version	-20 °C to +40 °C[1)]
Operating temperature range of the Cold Climate Version	-30 °C to +40 °C[1)]
Stop	Standard: -20 °C, restart at -18 °C CCV: -30 °C, restart at -28 °C
Max. height above MSL	2000 m[1)]
Certificate	In accordance with IEC 61400-22 and DIBt 2012
Type	3-blade rotor with horizontal axis, up-wind turbine
Output control	Active single blade adjustment
Nominal power	up to 7000 kW[1)]
Rated power at wind speed (at an air density of 1.225 kg/m3)	Approx. 13.5 m/s
Operating speed range of the rotor	6.0 min^{-1} to 11.6 min^{-1}
Nominal speed	approx. 10.0 min^{-1}
Cut-in wind speed	3 m/s
Cut-out wind speed	26 m/s[2)]
Cut-back-in wind speed	25.5 m/s[2)]
Calculated service life	≥ 25 years

[1)] Nominal output is achieved depending on the power factor and the installation altitude up to defined temperature ranges.

[2)] Depending on the project, the cut-out wind speed can be decreased to safeguard the structural stability.

4.2 Towers

Towers	TS118-03	TS138	TS148-01	TS159-01	TCS164
Hub height*	118.0 m	138.0 m	148.0 m	158.5 m	164.0 m
Tower type	Tubular steel tower				Hybrid tower
Wind class	IEC S DIBt S	IEC S	IEC S	IEC S	IEC S DIBt S
Surface finish	Color system coating				**

* Includes foundation height above ground level

** Steel section: Color system coating; Concrete part: Fair-faced concrete

4.3 Rotor and rotor blades

Rotor	
Rotor diameter	163.0 m
Swept area	20867 m^2
Nominal power/area	326 W/m^2
Rotor shaft inclination angle	5 °
Blade cone angle	5.5 °

Rotor blade	
Material	fiber glass and carbon fiber reinforced plastic
Total length	79.7 m

Rotor hub	
Material of the rotor hub body	Casting
Material spinner	glass-fiber reinforced plastic

4.4 Nacelle

Nacelle	
Support structure	welded steel structure
Cladding	glass-fiber reinforced plastic
Machine frame	Casting
Generator frame	welded steel construction

4.4.1 Rotor shaft

Rotor shaft/rotor bearing	
Type	Forged hollow shaft
Material	42CrMo4 or 34CrNiMo6
Bearing type	Spherical roller bearing
Lubrication	Regularly using lubricating grease

4.4.2 Brake and gearbox

Mechanical brake	
Type	Actively actuated disk brake
Location	On the high-speed shaft
Number of brake calipers	1
Brake pad material	Organic pad material

Gearbox	
Type	Multi-stage planetary gear + spur gear stage
Gear ratio	50 Hz: i = 122.4 60 Hz: i = 146.9
Lubrication	Forced-feed lubrication
Oil quantity including cooling circuit	max. 800 l
Oil type	VG 320
Max. oil temperature	Approx. 77 °C
Oil change	Change, if required

4.4.3 E-chain hoist and crossbeam

E-chain hoist and lifting beam	
Electrical chain hoist max load	Min. 850 kg
Crossbeam max load	Sliding trolley to accommodate a manual chain hoist 1000 kg

4.5 Electrical system

Electrical system *	
Nominal power P_{nG}	7000
Nominal voltage	3 x AC 950 V ± 10 % (specific to grid code)
Nominal current during full reactive current feed-in I_{nG} at S_{nG}	4727 A
Nominal apparent power S_{nG} at P_{nG}	7778 kVA
Frequency	50 and 60 Hz

*) All data are maximum values. The values may deviate depending on the rated voltage, rated apparent power and WT active power.

4.5.1 Transformer

Transformer*	50 Hz	60 Hz
Total weight	approx. 10 t	
Insulation medium	Ester	
Rated voltage OV, U_r	950 V	
Maximum rated voltage OS, dependent on MV grid, U_r	20 kV/30 kV/34 kV	
Taps, overvoltage side	20 kV and 30 kV: + 4 x 2.5 % 34 kV: + 4 x 0.5 kV	
Grid voltage OS	20; 20.5; 21; 21.5; 22 kV 30; 30.75; 31.5; 32.25; 33 kV 34; 34.5; 35; 35.5; 36 kV	
Rated frequency, f_r	50 Hz	60 Hz
Vector group	Dy5	
Installation altitude (above MSL)	Up to 2000 m	
Rated apparent power, S_r	7800 kVA	
Impedance voltage, U_z	9 % ± 10 % tolerance	
Minimum peak efficiency index, η, (EU) 2019/1783, 548/2014	99.590%	–
Inrush current	≤ 5.5 x I_N (peak value)	
Power loss[1)] No-load losses Short circuit losses	 3050 W 80000 W	 4300 W 80700 W

*) The values are, if not specified otherwise, maximum values. The values may deviate depending on the rated voltage, rated apparent power and WT active power.

1) Guide values

4.5.2 Medium-voltage switchgear

Medium-voltage switchgear	
Rated voltage (dependent on MV grid)	24; 36; 38 or 40.5 kV
Rated current	50 Hz: 630 A 60 Hz: 600 A
Rated short-circuit duration	1 s
Rated short circuit current	24 kV: 16 kA (20 kA optional) 36/38/40.5 kV: 20 kA (25 kA optional)

Medium-voltage switchgear	
Minimum/maximum ambient temperature during operation	NCV: -25 °C to +40 °C
	CCV: -30 °C to +40 °C
Connection type	External cone type C according to EN 50181 USA: External cone type E according to IEEE 386
Circuit breaker	
Number of switching cycles with rated current	E2
Number of switching cycles with short-circuit breaking current	E2
Number of mechanical switching cycles	M1
Switching of capacitive currents	Min. C1 - low
Switch disconnector	
Number of switching cycles with rated current	E3
Number of switching cycles with short-circuit breaking current	E3
Number of mechanical switching cycles	M1
Disconnector	
Number of mechanical switching cycles	M0
Ground switch	
Switching number with rated short-circuit inrush current	E2
Number of mechanical switching cycles	≥ 1000

4.5.3 Generator

Generator	
Type	6-pole doubly-fed induction machine
Degree of protection	IP 54 (slip ring box IP 23)
Nominal voltage	950 V
Frequency	50 and 60 Hz
Speed range	50 Hz: 650 to 1500 min^{-1} 60 Hz: 780 to 1800 min^{-1}
Poles	6
Weight	approx. 13.5 t

4.6 Cooling system

Cooling system	
Gearbox	
Type	Oil circuit with oil/water heat exchanger and thermal bypass
Filters	Coarse filter 50 µm / fine filter 10 µm / ultrafine filter <5 µm
Generator	
Type	Water circuit with water/air heat exchanger and thermal bypass
Coolant	Water/glycol-based coolant
Converter	
Type	Water circuit with water/air heat exchanger and thermal bypass
Coolant	Water/glycol-based coolant
Transformer	
Coolant	Water/glycol-based coolant
Cooling circuit	Ester circuit with ester/water heat exchanger

4.7 Pitch system

Pitch system	
Pitch bearing	Double-row four-point contact bearing
Gearing/raceway lubrication	Regular lubrication with grease
Drive	Electric motors incl. spring-loaded brake and multi-stage planetary gear
Emergency power supply	Batteries

4.8 Yaw system

Yaw system	
Yaw bearing	Double-row four-point contact bearing
Gearing/raceway lubrication	Regular lubrication with grease
Drive	Electric motors incl. spring-loaded brake and four-stage planetary gear
Number of drives	5-6
Yaw speed	Approx. 0.4 °/s

4.9 Corrosion protection

Corrosion protection*	Inside	Outside
Nacelle	C3	C4
Hub, including material spinner	C3	C4
Tower Steel sections Concrete components	C3 Color system coating Fair-faced concrete	C4 Color system coating Fair-faced concrete

* Categories of corrosion protection according to ISO 12944-2

4.10 Automation systems

Automation system	
Field bus system	Profinet
Safe fieldbus system	Profisafe via Profinet
Turbine control	Profinet system control
Safety control	Integrated safety control

Virden Wind Lighting Plan

In accordance with Section VII.I. of the Montgomery County WECS Ordinance, Virden Wind, LLC ("Virden Wind") prepared this Lighting Plan for each WECS Tower and the Aircraft Detection Lighting System ("ADLS") within the Virden Wind Project ("Project"). This Lighting Plan, outlines the steps Virden Wind will take to secure FAA approval of lighting and marking for the Project, demonstrate compliance with the WECS Ordinance requirements for lighting, and minimize the visual impact of the WECS Towers.

I. FAA Approval of ADLS

Virden Wind will submit the proposed location of the ADLS tower to the FAA for approval once known.

II. FAA Approval of Lighting and Marking

Any tall structure over 200 feet above ground level, including wind turbines, requires lighting and approval by the FAA for aircraft safety (14 C.F.R. 77.9). Virden Wind will request a marking and lighting recommendation from the FAA for each turbine.

The FAA Code of Federal Regulations (CFR) Part 77 requires synchronized red obstruction lighting to be installed on each of the Virden Wind Project's WECS turbines. Once the turbines reach 200' tall and until the ADLS is installed, calibrated, and fully functional, red flashing lights are required. The table below describes the lighting that will be used for each turbine, light color, and whether they will be synchronized. FAA marking & lighting recommendations for each turbine will be provided in the Pre-Construction Submittal.

Structure	Permanent Y/N	Lighting Type	Color
WECS Turbine #1	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #2	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #3	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #4	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #5	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #6	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #7	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #8	Y	FAA Required WECS Obstruction Lighting	Red synchronized

WECS Turbine #9	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #10	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #11	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #12	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #13	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #14	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #15	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #16	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #17	Y	FAA Required WECS Obstruction Lighting	Red synchronized
WECS Turbine #18	Y	FAA Required WECS Obstruction Lighting	Red synchronized
Operations Building	Y	Night security lighting, downshielded	White, continuous
WECS Collector Substation	Y	Night security lighting, downshielded	White, continuous
Laydown Yard	N	Night security lighting, downshielded	White, continuous

III. Additional Marking and Lighting

In addition, the FAA's advisory circular, Advisory Circular 70/7460-1M, Obstruction Marking and Lighting, Chapters 4, 13, and 15 addresses the lighting and marking of wind turbines. Virden Wind agrees to follow all of the applicable specifications from the FAA Advisory Circular and minimize the visual impact of the Project.

Virden Wind

EMERGENCY MANAGEMENT PLAN

Turbine Shutdown During Emergencies

Throughout each turbine and the substation there are automated systems in place that shut down the equipment when a fault condition is detected.

UKA North America will have a Remote Operation Control Center operating 24 hours per day seven days per week. The Remote Operation Control Center is connected to the facility though the SCADA network that also has control capabilities for each turbine, or a group of turbines, along with the substation, which also has authority to isolate such during an emergency. Virden Wind will also have day time on-site technicians completing preventive maintenance, scheduled maintenance, and monitoring of the wind farm throughout the life of the Virden Wind Project ("Project").

Emergency, Fire, and Explosive Hazards

Wind power plants pose minimal explosions or fire potentials, as there is not a need for combustible fuels to generate the power, this is accomplished by either an underground collection installation or overhead collection installation connection to the turbines and the substation.

The project will adhere to the National Electric Code (NEC), National Electric Safety Code (NESC), and the National Fire Protection Agency (NFPA) requirements. The turbines are also equipped with smoke sensors which will automatically shut down the turbine if smoke is detected.

Emergency Preparedness Training

Virden Wind will hold a pre-construction coordination meeting with local fire officials, along with project contractors for discussions related to preventative measures prior to start of construction.

After the COD, Virden Wind will check in with Montgomery County Emergency Management annually to determine what form of emergency drills (in-person, on-line, or other options that may become available over the life of the Project) are appropriate to train and coordinate efforts with local emergency responders. Some of these exercises could include:

- Alert and notification (Montgomery County 9-1-1 and local fire response agencies)
- Response times (for company officials)
- Hazard communication (what has happened to the structure and what is the danger - including blade detachment and structural collapse)
- Rescue and EMS Care
- Potential collapse due to extremely high winds or ground failure
- Turbine failure and unsecured blades

Virden Wind will also hold at a minimum one emergency drill during construction and will coordinate efforts with local emergency responders.

Fire Mitigation Measures

In the rare event of a fire attributable to the Project or impacting the project, employees and contractors shall notify the Plant Management immediately upon discovery. Plant Management shall designate an Emergency Coordinator to manage the incident. During construction this would be the EPC manager. During operations it will be a UKA employee). These distinct types of fire events shall require several types of response. For high angle rescue, UKA trained personnel will be on call during both construction and operations.

- *Grass, Brush, and Forest Fires*
  - In the event of grass and brush fires attributable to a component of the Project, employees and contractors shall notify Plant Management.
  - Plant Management shall designate an Emergency Coordinator to manage the incident.
  - The Emergency Coordinator shall obtain details of the exact location and size of the fire from the notifier.
  - The Emergency Coordinator shall contact 911 and coordinate with the notifier to lead fire-fighting equipment to the scene. The designated responder shall be notified by the Emergency Coordinator by radio of the location at which to meet with the fire brigade.
  - The Emergency Coordinator shall contact any landowners in the area with the location and size of the fire. Employees may be directed by the Emergency Coordinator to visit any buildings/dwellings that may be in the anticipated path of a fire.
- *Turbine – No Personnel Present*
  - In a turbine fire that occurs when it is unoccupied, the turbine will automatically fault out and shut down. The turbine can also be shut down locally (at WTG location), within the Operations building through the SCADA network, and even remotely through Remote Operations Center.
  - Plant Management shall designate an Emergency Coordinator to manage the incident.

  - The Emergency Coordinator shall obtain details of the exact location and size of the fire from the notifier.
  - The Emergency Coordinator shall contact 911 and coordinate with the notifier to lead fire-fighting equipment to the scene. The designated responder shall be notified by the Emergency Coordinator by radio of the location at which to meet with the fire department.
  - The responder shall then proceed to the designated meeting point and be available to direct fire-fighting equipment to the scene.
  - Employees or contractors shall at no time attempt to go up the tower to extinguish or "fight" a turbine fire. The employee/contractor role is to notify Plant Management, liaise with the Emergency Coordinator, and lead fire-fighting equipment to the scene.

- *Turbine Fire – People in Nacelle, Fire in Down Tower Control Cabinet*
  - If a fire occurs in the down tower control cabinet while employees or contractors are working in the nacelle, all nacelle hatches shall be opened immediately.
  - The turbine will shut down automatically and the worker discovering the fire shall contact Plant Management. If necessary, the worker will use the emergency descent device located in each wind turbine.
  - The Plant Management shall designate an Emergency Coordinator to manage the incident.
  - The Emergency Coordinator shall obtain details of the exact location and size of the fire from the notifier.
  - The Emergency Coordinator shall contact 911 and request fire and medical assistance.
  - The Emergency Coordinator shall nominate a designated responder to meet at the Emergency Responder Meeting Point and lead fire-fighting equipment and medical resources to the scene. The designated responder shall be notified by the Emergency Coordinator by radio of the location at which to meet with the fire department and medical resources.
  - The designated responder shall then proceed to a designated meeting point and be available to direct fire-fighting equipment and medical resources to the scene.
  - The employees and contractors in the nacelle shall follow all normal fall safe procedures and attempt to remain in smoke free air until directed by fire-fighting personnel climb down.
  - If a smoke free environment cannot be maintained or the fire is not extinguished, employees shall communicate with the designated responder to determine if emergency descent on the outside of the tower is feasible and appropriate.
  - At no time shall workers attempt to climb down until directed.

- *Turbine Fire – People in Nacelle, Fire in Nacelle*
  - The worker discovering the fire shall contact Plant Management. If necessary, the worker will use the emergency descent device located in each wind turbine.
  - The Plant Management shall designate an Emergency Coordinator to manage the incident.
  - The Emergency Coordinator shall obtain details of the exact location and size of the fire from the notifier.
  - The Emergency Coordinator shall contact 911 and request fire and medical assistance.
  - The Emergency Coordinator shall nominate a designated responder to meet at the Emergency Responder Meeting Point and lead fire-fighting equipment and medical resources to the scene. The designated responder shall be notified by the Emergency Coordinator by radio of the location at which to meet with the fire department and medical resources
  - The designated responder shall then proceed to a designated meeting point and be available to direct fire-fighting equipment and medical resources to the scene.
  - The employees and contractors in the nacelle shall follow all normal fall safe procedures and attempt to remain in smoke free air until directed by fire-fighting personnel climb down.
  - If a smoke free environment cannot be maintained or the fire is not extinguished within 30 minutes, employees shall communicate with the designated responder to determine if emergency descent on the outside of the tower is feasible and appropriate.
  - At no time shall workers attempt to climb down until directed.
- *Fire at Operations Facilities*
  - In the event of a fire in the operations facilities, the worker discovering the fire shall activate the building fire alarm.
  - At the alarm, Plant Management shall designate an Emergency Coordinator who shall immediately notify 911 and request the fire department and medical assistance.
  - The General Emergency Response and Evacuation Procedures shall then be followed.
  - All employees, contractors and visitors shall remain clear of buildings and structures until an all-clear notice is received from fire-fighting personnel.
- *Fire at Electrical Facilities*
  - In the event of a fire inside a substation, the worker discovering the fire shall contact Plant Management.
  - Plant Management shall designate an Emergency Coordinator to manage the incident.

- The Emergency Coordinator shall obtain details of the exact location and size of the fire from the notifier.
- The Emergency Coordinator shall contact 911 and coordinate with the notifier to lead fire-fighting equipment to the scene. The designated responder shall be notified by the Emergency Coordinator by radio of the location at which to meet with the fire department
- The worker shall then proceed to the designated meeting point and be available to direct fire-fighting equipment to the substation.
- Employees or contractors shall at no time attempt to extinguish or "fight" a fire.

Handling and Storage of Hazardous Materials during Construction and Operation

Construction

Diesel fuel or gas for vehicles and equipment is the only potentially hazardous materials utilized in any significant quantity during construction of the Project. During the Construction phase of the project hazardous waste will not generate in quantities that would be regulated by State and Federal law. During the Construction phase of the project the primary wastes generated consists of scrap metal, cable, wire, wood cribbing, wood pallets, plastic packaging material and cardboard. This waste will stay onsite in dumpsters and hauled offsite to a licensed transfer station or landfill.

Operations

During Operations the Project will not generate regular quantities of hazardous wastes. The primary type of waste generated during Operations consists of typical office waste (paper, cardboard, plastic packing material and cardboard) which is stored in a dumpster and collected by a local solid waste collection vendor. There are periodic changing of lubricating oils and hydraulic fluids used in individual wind turbines that will result in the generation of small quantities of wastes. These waste fluids will also be stored for a short period of time in appropriate containers at the O&M facility for collection by a licensed service for recycling and/or disposal.

On-Site Emergency Plans

Emergency plans will be prepared to protect the public health, safety, and environment on and off the Project site. Prior to Construction the Project shall prepare the plans and be responsible for implementing the plan with the Construction and Operations teams, in coordination with the local emergency response agencies. These plans will be updated throughout the Project to conform to turbine manufacturer and vendor safety information relevant to the specialty equipment being installed.

Different Events Covered By Emergency Plans

- Construction Emergencies
- Fire or explosion
- Floods
- Personnel injury
- Extreme Weather such as lighting, heat, cold, wind, and tornados
- Evacuations

Site Signage

Signage regulations are to be consistent with ANSI and AWEA standards. Signs warning of high voltage shall be posted at the base of all pad-mounted transformers and at substations.

Virden and its contractors will use temporary and permanent warning signs during construction and operation of the Project to prevent unauthorized access to equipment and spaces.

Additional signs will be placed on the tower at the height of five feet warning of electrical shock or high voltage, harm from revolving machinery, and the hazard of falling ice. The signs will be mounted adjacent to the turbine door as specified and will include the Project name and a contact phone number.

Other external electrical equipment will be clearly marked with appropriate warning signs. Temporary signage during construction of the Project will be removed upon commercial operation.

Local Emergency Responder Lists:

County:

- 911 Coordinator, 140 North Main Street, Hillsboro, Il 62049
- Emergency Management Agency, 120 North Main Street, Hillsboro, IL 62049
- Highway Department, 11159 IL Route 185, Hillsboro, IL 62049
- Sheriff, 140 North Main Street, Hillsboro, IL 62049

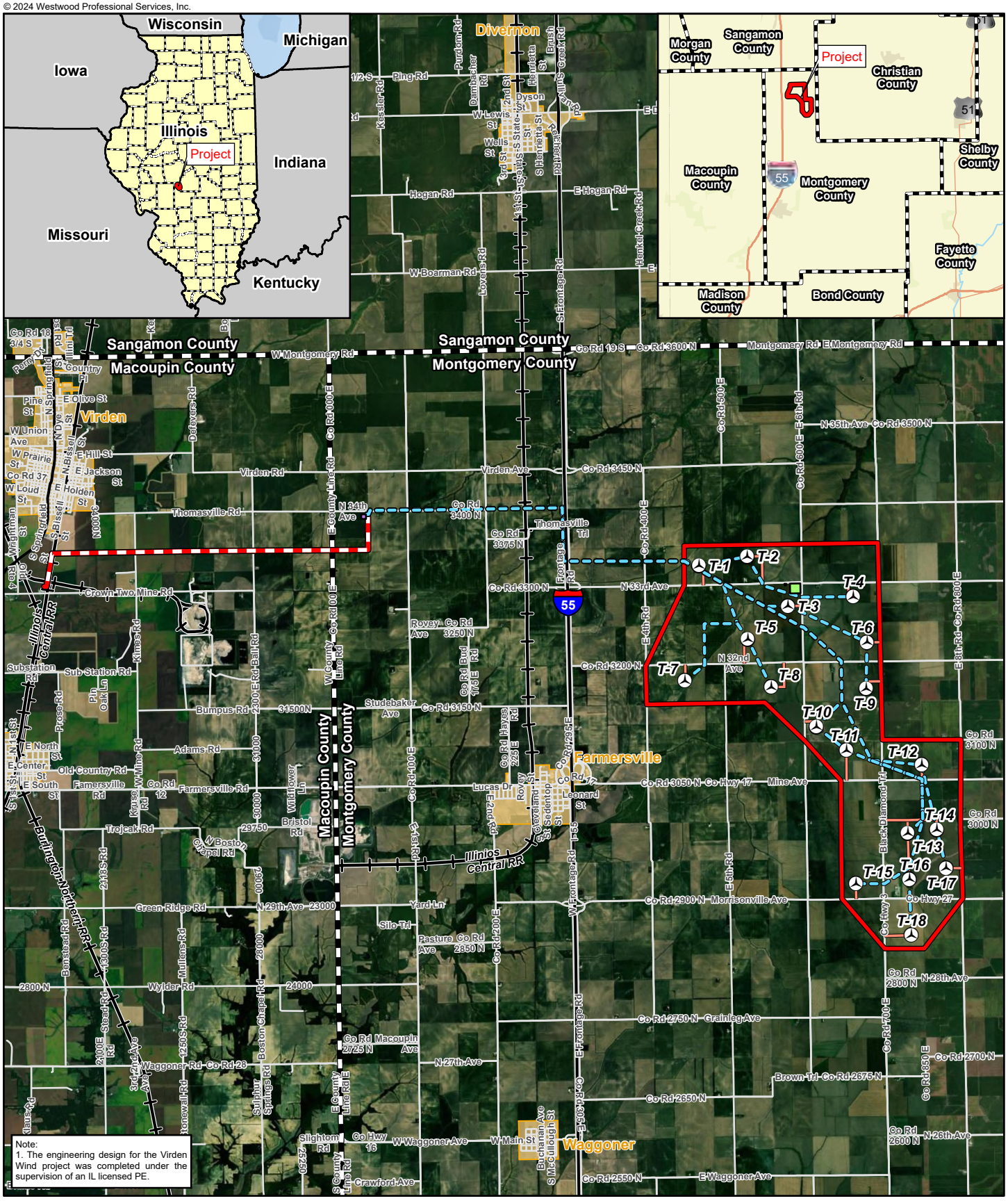
Villages:

Farmersville

- Police – County 911
- Farmersville Fire Department - 504 Nobbe St, Farmersville, IL 62533
- Farmersville Ambulance/EMT –504 Nobbe St, Farmersville, IL 62533
- Farmersville Highway Dept - Montgomery County, Hillsboro, IL

Waggoner

- Waggoner Police – County 911
- Waggoner Fire Department – E. Main St. Waggoner, IL 62572
- Waggoner Ambulance/EMT – 504 Nobbe St, Farmersville, IL 62533
- Waggoner Highway Dept - Montgomery County, Hillsboro, IL



Data Source(s): Westwood (2024); NAIP (2021); PLSS (2023); U.S. Census Bureau (2021 & 2022).

Feet
0
9,000
N

Legend

- Turbine
- Collection Line
- Access Road
- Transmission Line
- Substation
- O&M Area
- Laydown Yard
- State Boundary
- County Boundary
- Municipal Boundary
- Major Road
- Road
- Railroad

Virden Wind Project

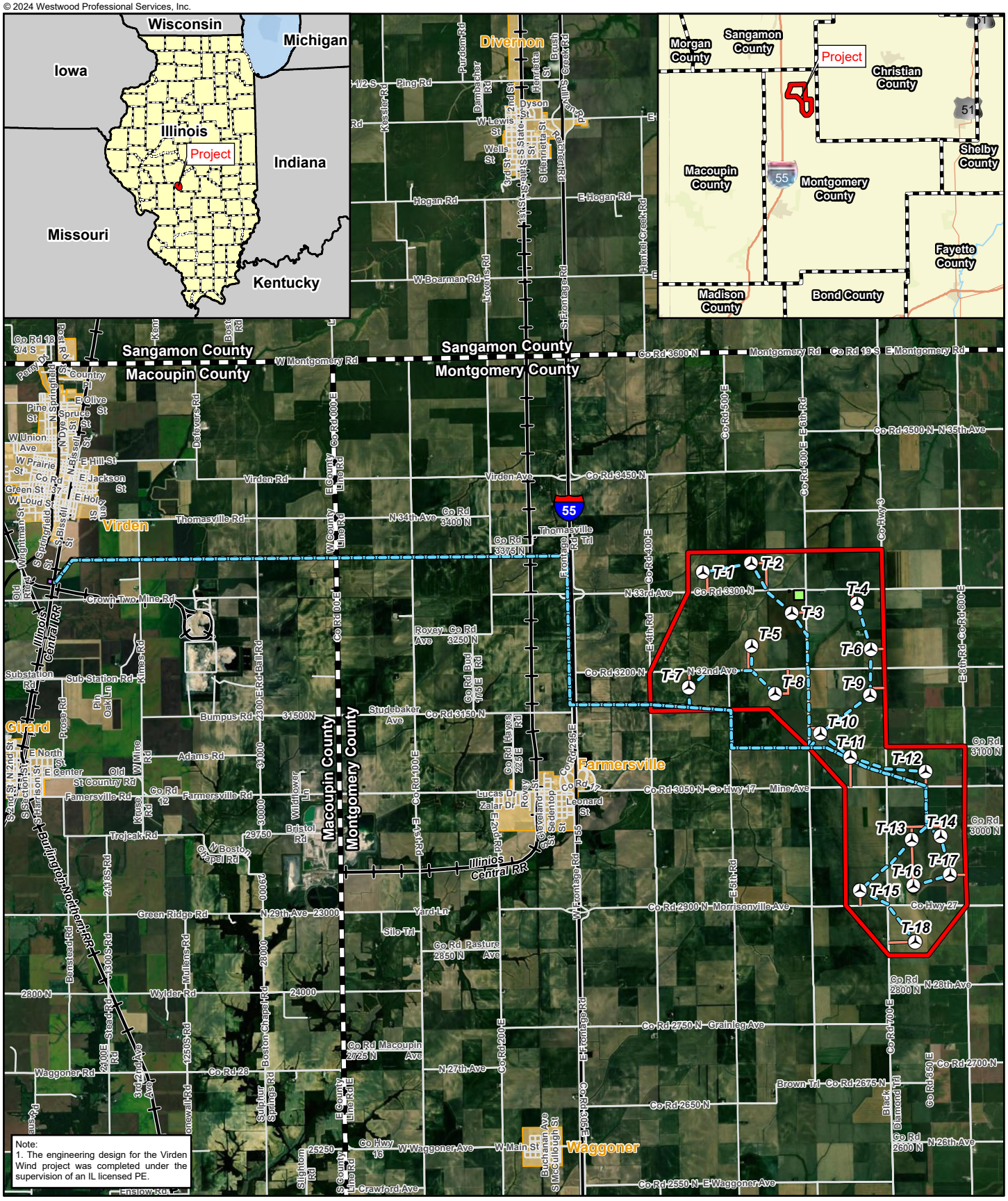
Montgomery County, Illinois

Site Overview

EXHIBIT 1A

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/21/2024 2:43 PM AMalloy



Data Source(s): Westwood (2024); ESRI World Imagery Basemap (Accessed 2024); PLSS (2023); U.S. Census Bureau (2021 & 2022).

0 9,000 Feet

N

Legend

- Project Area
- Turbine
- Collection Line
- Access Road
- Transmission Line
- Substation
- O&M Area
- Laydown Yard
- State Boundary
- County Boundary
- Municipal Boundary
- Major Road
- Road
- Railroad

Virden Wind Project

Montgomery County, Illinois

Site Overview

EXHIBIT 1B

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Map Document: N:\0043725.00_GIS_ArcPro\R0043725_040_PermitExhibits_240320\R0043725_040_PermitExhibits_240320.aprx 3/22/2024 12:54 PM AMalloy

Virden Wind Energy Project
Shadow Flicker Study
Montgomery County, Illinois

March 15, 2024

Prepared for:

Virden Wind Energy LLC
1002 SE Monterey Commons Blvd,
Suite 300
Stuart, FL 34996

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, Wisconsin 54115

Project No: 193709934

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LIST OF APPENDICES

March 15, 2024

1.0 INTRODUCTION

Virden Wind Energy LLC (Virden Wind) is proposing to construct the Virden Wind Energy Project (the "Project") in Montgomery County, Illinois. The Project will have a total nameplate generating capacity of approximately 122.4 megawatts (MW) and will be located south of the City of Springfield, Illinois. Virden Wind is planning to use up to eighteen (18) Nordex N163 wind turbine generators (WTG or turbine) to be constructed on privately leased land.

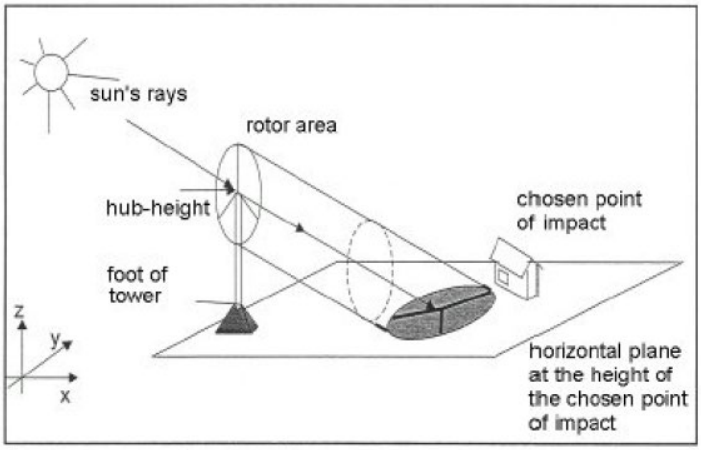
Virden Wind retained Stantec Consulting Services Inc. (Stantec) to conduct an analysis of potential shadow flicker from the proposed Project turbines. Since the final turbine locations have not been selected, Virden requested that Stantec conservatively include the 18 potential locations in the assessment. The modeling analysis was completed assuming the Nordex N163 6.8-MW wind turbine generators will be installed and operational for the Project. The potential shadow flicker within approximately 1.25 miles of proposed Project turbine sites was assessed and is summarized herein.

2.0 SHADOW FLICKER AND REGULATIONS

2.1 DESCRIPTION OF SHADOW FLICKER

Shadow flicker is a term used to describe the intermittent change in the intensity of light cast on a structure resulting from the rotation of an operating wind turbine's blades. The presence and intensity of shadow flicker are dependent on many factors, including but not limited to the position of the sun in relation to the turbine and receptor, distance of receptor from turbine, physical characteristics of the turbine and blades, time of day, season of year and topography of the Project area. Shadow flicker will only occur during the daytime, when skies are not overcast or cloudy. Turbines must be operational, as the flicker effect is caused by rotation of the blades as they intercept the sunlight cast on a receptor. When a turbine is not operating it may cast a stationary shadow, similar to other objects such as trees or utility poles.

The amount of shadow flicker received in an area is dependent on the alignment of the rotor blades in relation to the sun and receptor. Maximum shadow flicker is received when both the sun and rotor plane are perpendicular to the receptor. This alignment occurs when the wind is blowing directly from a source turbine towards a receptor. At times when the wind is blowing from other directions, the shadow cast on the target receptor is diminished and the shadow flicker effect passes more quickly.



Shadow flicker also diminishes as the distance between the source turbine and receptor increases. Shadow flicker becomes less pronounced with distance, due to atmospheric diffusion and the relative ratio of the turbine blade to the sun disk area.

2.2 REGULATIONS WITHIN THE PROJECT AREA

Illinois State Statutes Chapter 55 (55 ILCS 5/5-12020) states that standards established by counties in Illinois may not include the more restrictive requirements than those specified in the State regulations. The Montgomery County Wind Energy Conversion Systems Ordinance revision dated February 13, 2024, complies with this requirement and states that the facility is "to be sited so that industry standard computer modeling indicates that any occupied community building or nonparticipating residence will not experience more than 30 hours per year of shadow flicker under planned operating conditions" (Section IX.B). Virden Wind has designed the Project to limit the amount of expected shadow flicker that may fall on occupied community buildings and non-participating residences (also referred to as sensitive receptors in this report) to 30 hours or less.

3.0 SHADOW FLICKER ANALYSIS

The potential amount of shadow flicker on sensitive receptors within the Project area can be modeled using software such as EMD's WindPro, an application that considers the attributes and positions of the wind turbines in relation to receptors within the area. The model also considers the sun position as it passes through each day, 365 days per year and regional climatological information.

Virden Wind is proposing to construct up to 18 Nordex N163 6.8-MW with a 163-meter rotor diameter and 118-meter hub height for a total Project nameplate generating capacity of approximately 122.4 MW. The results summarized in this report include expected shadow flicker based on 18 turbines, which will be greater than the shadow flicker expected if less than 18 turbines are constructed for the final Project.

3.1 SHADOW FLICKER ANALYSIS METHODS

The potential total annual time of shadow flicker on each receptor was estimated for the Project area using the Shadow module of WindPRO Version 3.6 software. WindPRO is an agency and industry-accepted modeling program that calculates the number of hours per year that a given receptor would potentially receive shadow flicker from the source turbines.

A modeling analysis was completed to assess the expected shadow levels at sensitive receptors given the climatological conditions of the area. The shadow flicker calculation considers the percentage of sunshine based on local regional sunshine statistics; the alignment of the blades in relation to the receptor due to wind direction; and the amount of time that the blades would not be rotating due to wind speeds outside of the turbines operating parameters. The results of the analysis provide the number of annual hours that shadow flicker is expected to occur at the defined receptor. The analysis also provides an estimate of the maximum amount of time that a receptor may receive shadow flicker on any given day. The shadow flicker

analysis uses a conservative 90% operational time for purposes of calculating the expected hours of shadow flicker.

The results provided in this report include the expected amount of shadow flicker annually on each receptor, given the climatological conditions of the area as previously described. Climatological information was acquired from the National Climatic Data Center (NCDC) regional meteorological stations. The percentage of sunshine probability was estimated from an analysis of average sunshine statistics for the Project region. Wind frequency and direction was provided by Virden Wind.

The climatologically based expected hours of sunshine for the Project area are presented in Table 1. The frequency of wind (hours per year) expected in 24 compass directions is summarized in Table 2. The total number of hours that turbines are able to cause shadow flicker takes into account non-operational time due to low or high wind speeds. The turbine type Virden Wind proposes to use will generally operate when winds at hub-height are between 3 and 26 meters per second (m/s).

Table 1 Sunshine Probability (sun hours/possible sun hours)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.50	0.53	0.51	0.54	0.61	0.68	0.71	0.67	0.66	0.61	0.45	0.40

Table 2 Turbine Operation Time per Sector (hours per year)

0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°
266	288	267	167	33	22	107	289	311	356	400	533
180°	**195°**	**210°**	**225°**	**240°**	**255°**	**270°**	**285°**	**300°**	**315°**	**330°**	**345°**
778	711	422	278	267	244	344	378	367	389	378	289
									TOTAL	**7,884**	

The effect of shadow flicker is also dependent on the physical characteristics of the turbine model and the distance between the source turbine and shadow receptor. Virden Wind has indicated it will utilize Nordex N163 turbines for the Project. The proposed turbines will have a 118-meter (387-foot) hub height and a 163-meter (535-foot) rotor diameter. The individual locations of the wind turbines are based on the current layout of the Project provided by Virden Wind. Elevations for turbines and receptors located within approximately 1.25 miles (2,012 meters) of the turbines were calculated using the National Elevation Dataset digitally acquired from the U.S. Geological Survey.

A total of 50 potential receptors within the surrounding area were identified by Virden Wind and Stantec utilizing aerial imagery. Receptors included in the analysis include occupied residences and community buildings within approximately 1.25 miles of the proposed turbine locations. Project participants (landowners with land under Project leases/agreements) and non-participants (landowners without Project leases/agreements) were included in the assessment, and the participation status at the time of this report is provided. The coordinates (UTM Zone 16) of turbine and receptor locations are included in Appendix A and Appendix B, respectively.

The model utilizes a “greenhouse” approach which defines each receptor as a one-meter glass cube, representing a window able to receive shadow from all directions. Vegetation surrounding receptors will block or diminish the effect of shadow flicker. A conservative approach assuming that no vegetation is present was used in the model analysis.

Stantec conservatively assessed the impact at a distance of up to 1.1 miles from the proposed turbine sites. Shadow flicker does not occur when the sun-angle is less than three degrees above the horizon, due to atmospheric diffusion.

3.2 SHADOW FLICKER ANALYSIS RESULTS

The amount of shadow flicker on receptors within the Project area was modeled based on the Nordex N163 6.8-MW turbine with a 118-meter hub height and the climatological history of wind speed, wind direction and percentage of sunshine.

Results of the analysis (Table 3) indicate that 25 of the 50 potential receptors assessed within approximately 1.25 miles of turbines are expected to receive less than 10 hours of shadow flicker annually. The current modeling assessment, assuming eighteen (18) turbine sites, indicates that seven (7) receptors could experience more than 30 annual hours of shadow flicker; however, two (2) of these receptors are owned by participants in the Project.

Virden Wind will reassess the shadow flicker potential upon finalization of the Project design. If at that time, modeling indicates that a nonparticipating residence or community building will receive more than 30 annual hours of shadow flicker, a turbine curtailment schedule will be provided to the County. The curtailment schedule will demonstrate how the operation of specific turbines would be paused (i.e., curtailed) to limit the total shadow flicker on the affected buildings to 30 annual hours in compliance with the Montgomery County ordinance requirement.

A detailed table of receptor locations and expected annual shadow flicker results is included in Appendix B. Figure 1 presents a map of the Project area along with the expected shadow flicker hours per year if turbines were constructed and operational at all 18 proposed turbine locations.

Table 3 Shadow Flicker Analysis Summary of Results (expected hours per year with 18 potential turbine sites)

Annual Shadow Flicker Hours	Non-Participating Receptors	Participating Receptors
Less than 10	25	0
10 – 20	8	1
20 – 30	7	2
Greater than 30	5	2

4.0 CONCLUSION

Potential shadow flicker from the Virden Wind Energy Project on occupied community buildings and non-participating residences within approximately 1.25 miles (2,012 meters) of turbine locations was assessed using the Shadow Module of WindPRO's Version 3.6 software. The shadow flicker results indicate approximately 25 receptors are expected to receive less than 10 hours of shadow flicker per year, 9 receptors are expected to receive between 10 and 20 hours of shadow flicker per year, 9 receptors are expected to receive between 20 and 30 hours of shadow flicker per year, and 7 receptors (5 non-participants) could receive greater than 30 hours per year, prior to mitigation. Virden Wind will curtail the operation of select turbines to limit annual shadow flicker on occupied community buildings and non-participating residences to 30 annual hours or less.

Based on the results of this modeling analysis, utilizing conservative input parameters, and assuming all 18 turbines are constructed and operational, 5 nonparticipating residences within Montgomery County are modeled to receive greater than 30 hours of shadow flicker per year prior to turbine curtailment. Vegetation and obstacles such as barns, garages or silos may further reduce the effect of shadow flicker on individual receptors. Based on the results of this analysis, and the mitigation measures described, no identified receptors within Montgomery County are expected to receive greater than 30 hours of shadow flicker per year.

FIGURES

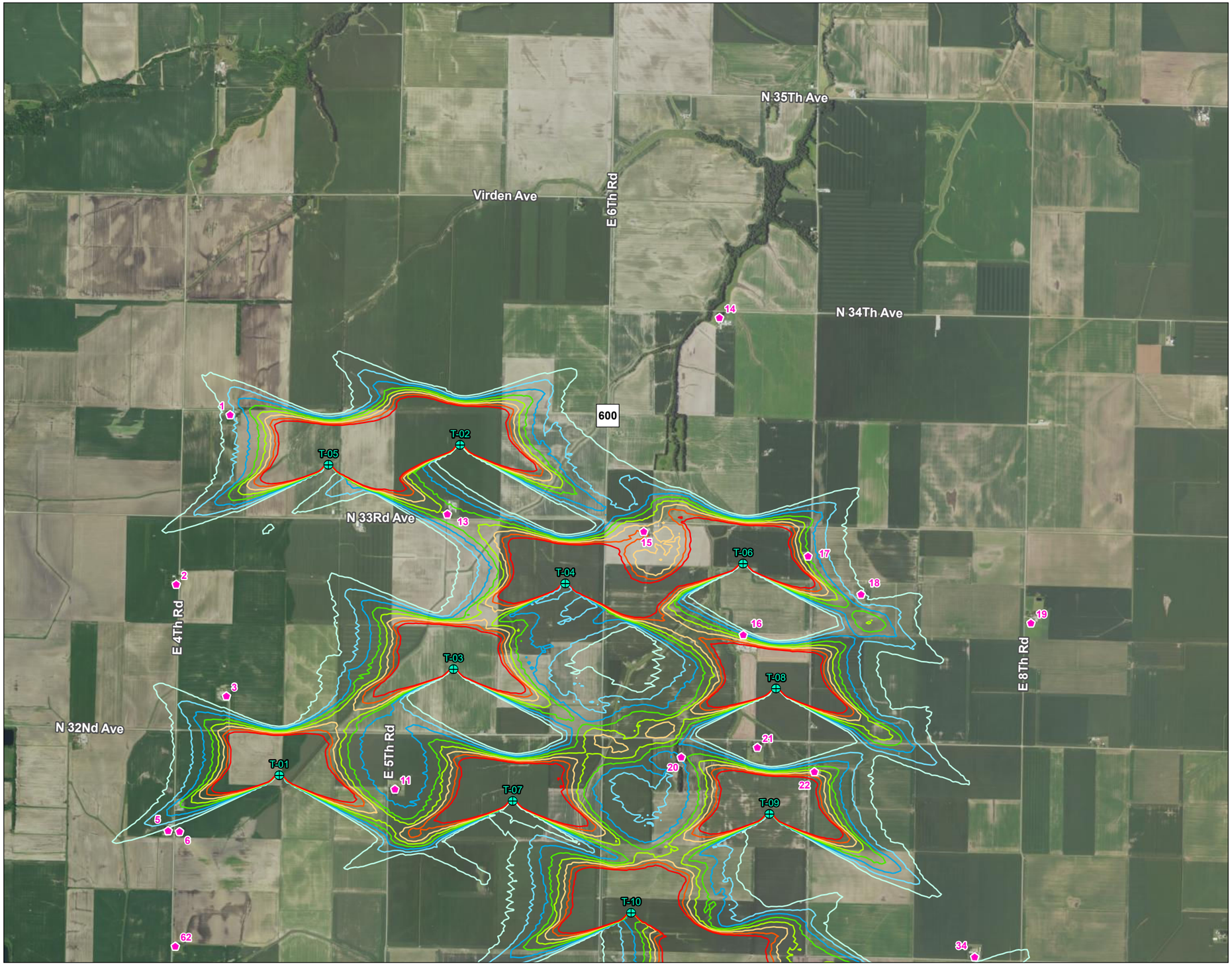


Figure No.

1

Title

Shadow Flicker Results

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

Prepared by RA on 2024-01-29
TR by DP on 2024-01-29
IR by JB on 2024-03-13

N

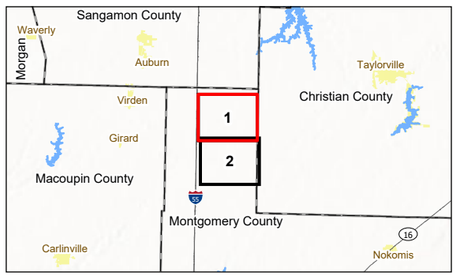
0 1,250 2,500 Feet
(At original document size of 11x17)
1:30,000

Legend

- Proposed Turbine Location
- Human Occupied Dwelling within 1.25 miles of Proposed Turbine Location

Expected Annual Shadow Flicker Hours

- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Virden Wind Energy Project LLC, USGS, NADS
3. Background: NAIP 2021

Stantec

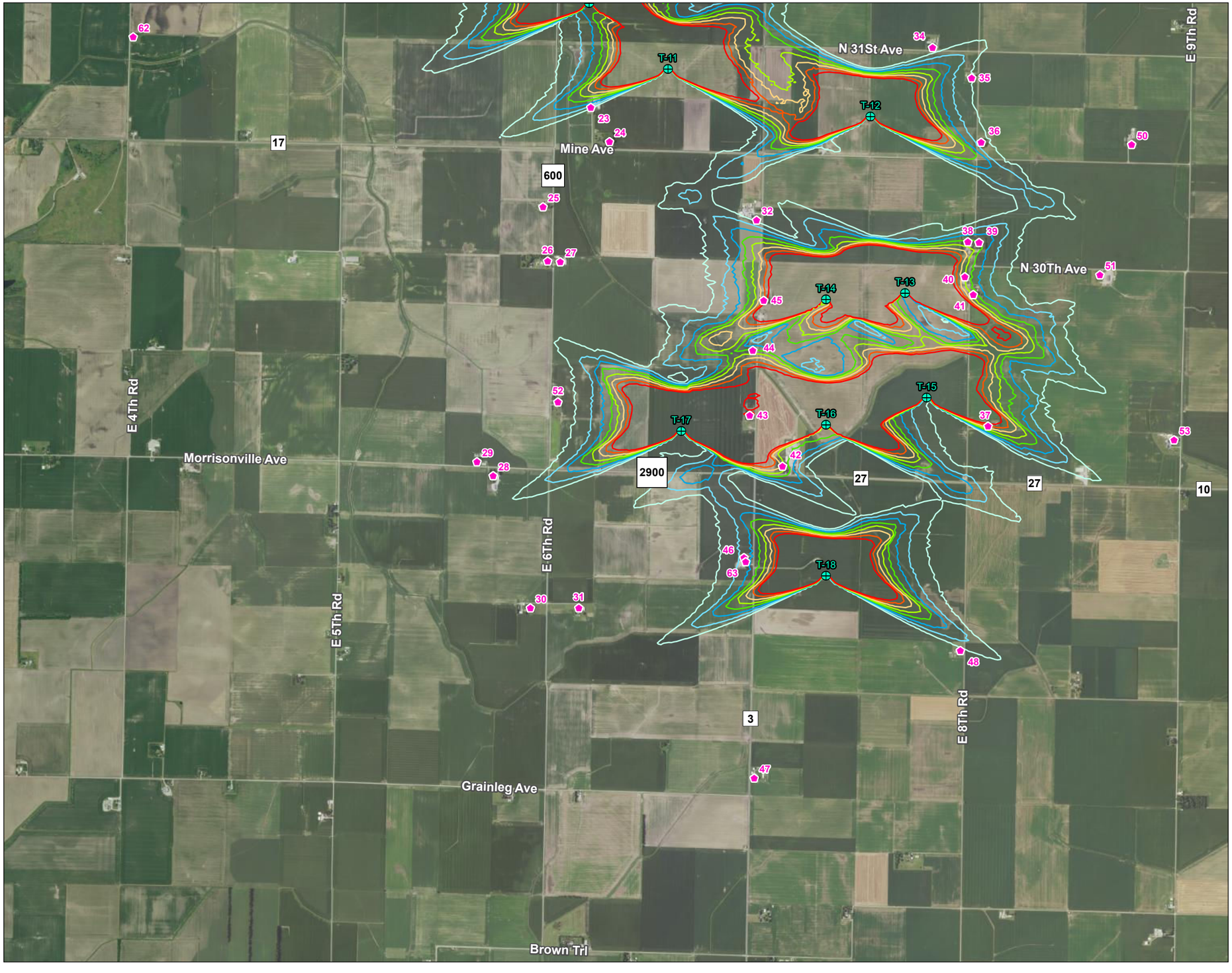


Figure No.
1

Title
Shadow Flicker Results

Client/Project 193709934
Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

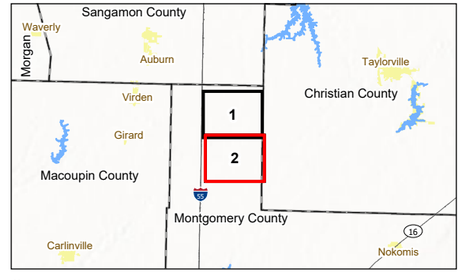
Prepared by RA on 2024-01-29
TR by DP on 2024-01-29
IR by JB on 2024-03-13

N

0 1,250 2,500 Feet
(At original document size of 11x17)
1:30,000

Legend
- Proposed Turbine Location
- Human Occupied Dwelling within 1.25 miles of Proposed Turbine Location

Expected Annual Shadow Flicker Hours
- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
- 50



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Virden Wind Energy Project LLC, USGS, NADS
3. Background: NAIP 2021

Stantec

APPENDICES

Appendix A TURBINE COORDINATES

Appendix A Virden Wind Energy Project - Turbine Coordinates

Turbine Identification	X (UTM 16)	Y (UTM 16)
T-01	274,862	4,371,365
T-02	276,235	4,373,870
T-03	276,186	4,372,170
T-04	277,036	4,372,820
T-05	275,236	4,373,720
T-06	278,386	4,372,970
T-07	276,636	4,371,170
T-08	278,636	4,372,020
T-09	278,586	4,371,070
T-10	277,536	4,370,320
T-11	278,136	4,369,820
T-12	279,673	4,369,462
T-13	279,936	4,368,120
T-14	279,336	4,368,070
T-15	280,100	4,367,324
T-16	279,336	4,367,120
T-17	278,236	4,367,070
T-18	279,336	4,365,970

Appendix B RECEPTOR COORDINATES AND EXPECTED ANNUAL SHADOW HOURS

Appendix B - Virden Wind Energy Project
Receptor Coordinates and Expected Annual Shadow Hours

Receptor ID	X (UTM 16)	Y (UTM 16)	Expected Shadow (Annual Hours)
R-01	274,488	4,374,101	13:48
R-02	274,079	4,372,814	0:00
R-03	274,460	4,371,966	1:41
R-04-P	274,130	4,371,117	25:11
R-05	274,017	4,370,943	7:30
R-06	274,104	4,370,937	0:52
R-11	275,740	4,371,259	17:50
R-12	275,465	4,373,274	2:05
R-13	276,138	4,373,347	29:48
R-14	278,205	4,374,838	0:00
R-15	277,630	4,373,215	40:03
R-16-P	278,386	4,372,431	21:27
R-17	278,878	4,373,028	26:02
R-18	279,281	4,372,738	11:36
R-19	280,571	4,372,520	0:00
R-20	277,915	4,371,502	21:50
R-21	278,493	4,371,576	0:00
R-22	278,926	4,371,391	32:27
R-23	277,548	4,369,530	12:47
R-24	277,690	4,369,270	0:00
R-25	277,185	4,368,775	0:00
R-26	277,221	4,368,363	0:00
R-27	277,316	4,368,357	0:00
R-28	276,806	4,366,732	3:28
R-29	276,683	4,366,838	2:26
R-30	277,089	4,365,728	0:00
R-31	277,457	4,365,728	0:00
R-32	278,807	4,368,674	8:24
R-33-P	279,347	4,369,213	10:50
R-34	280,144	4,369,985	4:07
R-35	280,441	4,369,754	10:20
R-36	280,513	4,369,265	13:06
R-37	280,566	4,367,109	40:09
R-38	280,412	4,368,509	26:23
R-39	280,497	4,368,504	25:17
R-40	280,389	4,368,243	31:06
R-41	280,453	4,368,108	28:38
R-42-P	279,004	4,366,804	33:34
R-43-P	278,755	4,367,191	46:01
R-44	278,778	4,367,684	26:32

Receptor ID	X (UTM 16)	Y (UTM 16)	Expected Shadow (Annual Hours)
R-45	278,861	4,368,064	41:15
R-46	278,711	4,366,110	17:04
R-47	278,789	4,364,436	0:00
R-48	280,355	4,365,404	8:11
R-50	281,656	4,369,248	0:00
R-51	281,415	4,368,258	4:57
R-52	277,298	4,367,292	7:18
R-53	281,978	4,367,004	0:00
R-62	274,072	4,370,066	0:00
R-63	278,725	4,366,079	17:57

Virden Wind Energy Project
Pre-Construction Sound Study

Prepared for:
Virden Wind Energy LLC
1002 SE Monterey Commons Blvd
Stuart, FL 34996

Prepared by:
Stantec Consulting Services Inc.
733 Marquette Avenue, Suite 1000
Minneapolis, MN 55402

Project No: 193709934

April 25, 2024

Table of Contents

Abbreviations

County	Montgomery County
dB	Decibel
dBA	Decibel (A-weighted)
Hz	Hertz
IPCB	Illinois Pollution Control Board
L_{eq}	Equivalent continuous sound level
MVA	Megavolt-ampere
MW	Megawatt
NRO	Noise reduced operation
Project	Virden Wind Energy Project
PWL	Sound power level
SPL	Sound pressure level
Virden Wind	Virden Wind Energy LLC
WTG	Wind turbine generator

Executive Summary

Virden Wind Energy LLC (Virden Wind) is proposing to construct the Virden Wind Energy Project (the "Project") in Montgomery County, Illinois. The Project will have a total nameplate generating capacity of approximately 122.4 megawatts (MW) and will be located south of the City of Springfield, Illinois. Virden Wind is planning to use up to 18 Nordex N163 wind turbine generators (WTG or turbine) to be constructed on privately leased land. Virden Wind retained Stantec Consulting Services Inc. (Stantec) to conduct a pre-construction sound study for the Project.

The sound study was completed to assess Project operational compliance with the Illinois Pollution Control Board (IPCB) and Montgomery County (County) noise regulations. Operational sound modeling was completed to estimate sound levels generated by Project equipment. Sound levels were estimated using the CadnaA acoustical modeling software, configured to implement ISO 9613-2 environmental sound propagation algorithms. The modeling accounted for sound from the proposed wind turbine generators and the Project substation power transformer.

The sound modeling results demonstrate that the Project will be operated in compliance with applicable IPCB and County sound limits by using turbines with serrated trailing edge blades, which generate less sound than standard blades, and operation of several turbines in a reduced noise mode during nighttime periods, as described further in this report. Project-generated sound levels are expected to comply with the IPCB sound limits in all octave bands.

This sound assessment was based on the equipment and preliminary Project layout provided by Virden Wind. If during final design the project layout is modified, it is recommended that the sound assessment be updated.

1.0 Project Description

Virden Wind Energy LLC (Virden Wind) is proposing to construct the Virden Wind Energy Project (the "Project") in Montgomery County, Illinois. The Project will have a total nameplate generating capacity of approximately 122.4 megawatts (MW) and will be located south of the City of Springfield, Illinois. Virden Wind is planning to use up to 18 Nordex N163 wind turbine generators (WTG or turbine) to be constructed on privately leased land. The Project site layout is shown on Figure 1.

The turbines will be constructed on multiple agricultural parcels roughly bounded by N 34th Avenue to the north, E 8th Road to the east, Morrisonville Avenue to the south, and E 4th Road to the west. Land uses surrounding the Site are predominantly agricultural with dispersed residences near the Project boundaries. Figure 1 displays the Project components and surrounding area.

The operational sound sources from the Project include wind turbine generators and a substation transformer. This study assumes that 18 wind turbines will be installed within the Project area. The Project will include one step-up power transformer located within the substation footprint. The turbines and substation transformer will operate during both daytime and nighttime periods.

2.0 Terminology

Sound is caused by vibrations that generate waves of minute pressure fluctuations in the surrounding air. Sound levels are measured using a logarithmic decibel (dB) scale.

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hertz (Hz) and is least sensitive to sound frequencies below 400 Hz or above 12,500 Hz. Consequently, several different frequency weighting schemes have been used to approximate the way the human ear responds to sound levels. The A-weighted decibel, or dBA, scale is the most widely used for regulatory requirements, as it discriminates against low frequency sound similar to the response of the human ear at the low to moderate sound levels typical of environmental sources. Sound levels without a frequency weighting applied, referred to as unweighted or linear, are generally reported as dB.

The sound power level (PWL) of a noise source is related to the acoustic energy that the source emits regardless of the environment in which it is placed (i.e., similar to the wattage of a light bulb). Sound power is a property of the source, and therefore is independent of distance. The radiating sound power then produces a sound pressure level (SPL) at a point of which human beings can perceive as audible sound. The sound pressure level is dependent on the acoustical environment (e.g., indoor, outdoor, absorption, reflections) and the distance from the noise source. Unless otherwise stated, sound levels in this report refer to sound pressure levels.

A variety of metrics and indices have been developed to quantify the temporal characteristics (changes over time) of community noise. A common metric for assessing community noise is the equivalent continuous sound level (L_{eq}). The L_{eq} is a metric that defines the level of a hypothetical steady sound that

would have the same acoustic energy as the fluctuating sound level over a defined period of time. The L_{eq} represents the time average of the fluctuating sound pressure level.

Broadband (overall) sound levels which are expressed as a single number in decibels, account for acoustical energy across the frequency spectrum, including energy at low, middle, and high frequencies. To assess how much acoustical energy is present in different ranges of the frequency spectrum, sound can be separated into spectral (frequency) components using octave band filters. For environmental noise assessments, octave band sound levels are often expressed in unweighted decibels (dB) at octave band center frequencies from 31.5 to 8,000 Hz.

A change in sound levels of three (3) decibels is generally considered to be the threshold of perception, whereas a change of five (5) decibels is clearly perceptible, and a change of ten (10) decibels is perceived as a doubling or halving of loudness.

3.0 Regulatory Environment

Illinois Statutes Chapter 55 (55 ILCS 5/5-12020) states that standards established by counties in Illinois may not include more restrictive requirements than those specified in the State regulations. The Montgomery County Wind Energy Conversion Systems Ordinance dated February 13, 2024, complies with this requirement and states that “sounds for wind towers in commercial wind energy facilities shall not exceed the sound limitations established by the Illinois Pollution Control Board under 35 Ill. Adm. Code Parts 900, 901, and 910” (Section IX.C).

The sound limits established by the Illinois Pollution Control Board (IPCB) are applicable to operational sound generated by the Project. The IPCB sound regulation is found in Title 35 of the Illinois Administrative Code: Environmental Protection, Subtitle H: Noise, Chapter I: Pollution Control Board Parts 900 and 901. The above referenced code establishes sound limits that apply to sound generated on an “emitting parcel” at the property line of a “receiving parcel”. The IPCB sound limits vary depending on the land use class of the emitting and receiving parcels and whether the sound occurs during the daytime (7:00 a.m. to 10:00 p.m.) or nighttime (10:00 p.m. to 7:00 a.m.) period. The sound limits are expressed as unweighted sound levels in octave bands with center frequencies from 31.5 to 8,000 Hz and project-generated sound levels must not exceed the sound limit in any of the octave bands to comply with the regulation. The IPCB sound limits apply to sound generated during Project operation; however, sound from equipment used for construction is excluded from the regulation under Section 901.107.

The Project is located on land use Class C parcels, which includes agriculture and alternative energy use. Noise-sensitive receptors surrounding the Project are residences (land use Class A). Therefore, the sound limits established for Class A receiving parcels from Class C emitting parcels apply at each residence, and the land around residences subject to residential use, whether the residence is participating in the Project or not. This assessment evaluated Project-generated sound levels during nighttime periods to evaluate compliance with the most restrictive applicable limits. The IPCB sound limits that are applicable to the Project are presented in Table 3.1 below. It should be noted that these sound limits only apply to operational sound generated by the Project, not sound generated by construction activities.

Table 3.1. IPCB Sound Limits for Residences (Class A from Class C Land)

Period	Sound Limit (dB)								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Daytime	75	74	69	64	58	52	47	43	40
Nighttime	69	67	62	54	47	41	36	32	32

Source: Illinois Administrative Code Title 35, Subtitle H, Chapter I, Section 901.102 for sound emitted from Class C land (agricultural) to Class A land (residential).

4.0 Sensitive Receptor Locations

Publicly available aerial imagery and land ownership records were utilized to identify noise-sensitive receptors (also referred to as sensitive receptors), which could include residences, schools, churches, hospitals, and other occupied buildings located near the wind facility. A total of 55 residential receptors (Class A land use) were identified within 1.25 miles of the Project limits. Locations of sensitive receptors are shown on Figures 1, 2, and 3. A tabulated summary of sensitive receptors along with estimated sound levels and participation status is provided in Appendix B.

5.0 Sound Modeling Methodology

The Project, as currently proposed, includes eighteen (18) wind turbines and one (1) substation transformer, as shown on Figure 1. These are the primary operational sound sources associated with the Project.

Virden Wind has indicated that Nordex N163 wind turbine generators are planned to be used for the Project. The WTGs will have a hub height of 118 meters (387 feet). Virden Wind is planning to implement WTGs with serrated trailing edge blades, which generate less sound than standard blades. To conservatively account for potential variation due to turbine noise emissions or other project-specific conditions, a 1.5 dB uncertainty factor was applied to the manufacturer WTG sound power levels. The WTGs were modeled as operating in normal mode (operating Mode 1) during daytime periods. During nighttime periods, six WTGs were modeled as operating in a noise reduced operation (NRO) mode (operating Mode 2 or higher) as shown in Table 5.1. Operating in a NRO mode results in a lower turbine power output and lower noise emission level than normal mode operations because the WTG maximum rotor speed is reduced by the turbine control system. Manufacturer-provided octave band sound power level data at the hub height wind speed of 10 m/s, which results in the highest sound levels, were utilized.

The Project substation is expected to include one 110 megavolt-ampere (MVA) step-up power transformer with a basic insulation level of 650 kilovolts. The NEMA TR-1 standard[1] was used to estimate a transformer NEMA noise rating of 82 dBA SPL for the forced-air cooling (ONAF2) condition with fans

[1] National Electrical Manufacturers Association (NEMA) Standards Publication TR 1-2013 (R2019). Transformers, Step Voltage Regulators and Reactors.

operating. Methods from the Electric Power Plant Environmental Noise Guide[2] were then used to estimate the overall sound power level of 102 dBA and the octave band spectra.

The equipment sound power levels used for the assessment are presented in Table 5.2. As explained in Section 2.0, sound power level is a property of a sound source that is independent of distance, as opposed to sound pressure levels generated by a source which decrease as the distance from a source increases.

Table 5.1. Modeled Turbine Operating Modes (Nordex N163)

WTG	Day Operating Mode	Night Operating Mode	WTG	Day Operating Mode	Night Operating Mode
T-01	1	1	T-10	1	1
T-02	1	1	T-11	1	1
T-03	1	1	T-12	1	3
T-04	1	1	T-13	1	2
T-05	1	1	T-14	1	1
T-06	1	1	T-15	1	5
T-07	1	1	T-16	1	4
T-08	1	4	T-17	1	1
T-09	1	5	T-18	1	1

Table 5.2. Equipment Sound Power Levels

Equipment*	Octave Band Sound Power Level (dB)									Broadband Sound Power Level, dBA
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
WTG, Nordex N163 Normal Mode 1	120.4	114.6	112.1	106.7	102.5	101.1	100.6	95.2	82.9	107.2
WTG, Nordex N163 NRO Mode 2	120.0	114.2	111.7	106.3	102.1	100.7	100.2	94.8	82.5	106.8
WTG, Nordex N163 NRO Mode 3	119.5	113.7	111.2	105.8	101.6	100.2	99.7	94.3	82.0	106.3
WTG, Nordex N163 NRO Mode 4	119.0	113.2	110.7	105.3	101.1	99.7	99.2	93.8	81.5	105.8
WTG, Nordex N163 NRO Mode 5	118.5	112.7	110.2	104.8	100.6	99.2	98.7	93.3	81.0	105.3
Substation Transformer	98.1	104.1	106.1	101.1	101.1	95.1	90.1	85.1	78.1	101.5

Note: * Sound power level of WTGs with serrated trailing edge blades at 10 m/s hub height wind speed and an uncertainty factor of 1.5 dB added.

[2] Edison Electric Institute. Electric Power Plant Environmental Noise Guide. Volume 1 2nd Edition.

Sound attenuates between a source and receptor location due to a variety of factors, including but not limited to, distance between source and receptor, atmospheric absorption, ground type, topography, shielding from solid structures, vegetation, and meteorological conditions. Operational sound levels from the proposed Project equipment were estimated using the CadnaA model by Datakustik, which utilizes the ISO 9613-2 standard[3] algorithms for outdoor sound propagation and is a widely used modeling tool to estimate outdoor sound propagation.

A CadnaA Project base model was first developed by importing topographic data from the U.S. Geological Survey National Elevation Dataset and aerial imagery. The WTG and substation transformer sound sources were modeled as point sources within CadnaA based on the Project layout provided by Virden Wind. Receptor points were added for the identified sensitive receptor locations at five feet above ground. Additional assumptions that were used to estimate worst-case operational sound levels included the following:

- A ground absorption value of 0.5 (on a scale of 0.0 representing hard ground or water bodies to 1.0 representing porous ground) was used.
- No sound attenuation from vegetation (foliage) to simulate a worst-case condition when leaves have fallen off trees.
- Meteorological conditions are conducive to sound propagation with all receptors located downwind of all noise sources.

6.0 Predicted Operational Sound Results

An operational sound analysis was completed for the Project WTGs and substation transformer. The modeled operational condition represents the sound sources operating at maximum capacity, which would occur during daytime or nighttime when wind speeds are approximately 10 meters per second or greater at turbine hub height.

The noise model assumed that the turbines have serrated trailing edge blades. During daytime all turbines were modeled as operating in normal mode (Mode 1) and during nighttime six turbines were modeled as operating in a reduced noise mode (Mode 2 or higher), as shown in Table 5.1. Estimated daytime and nighttime sound levels at each sensitive receptor location are provided in tabular format in Appendix B. To demonstrate compliance at surrounding property lines, Figure 2 presents the 36 dB at 2 kHz sound level contour line, which corresponds to the most restrictive IPCB nighttime octave-band sound limit for the Project. The sound level contours do not include the contribution of ambient sound levels.

The modeling results show that sound levels generated by the Project are not expected to exceed 46 dBA Leq during daytime and 44 dBA Leq during nighttime at the property line of nearby residences. For the majority of the identified receptors, Project-generated sound levels are expected to be 40 dBA Leq or less.

[3] ISO 9613-2: 1996. Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation.

Table 6.1 compares the estimated octave band sound levels to the applicable daytime sound limits for receptors R-21, R-37, and R-42. Estimated sound levels at the parcel property line locations nearest to the wind turbines are presented in the table.

Table 6.2 compares the estimated octave band sound levels to the applicable nighttime sound limits for receptors R-21, R-16, R-40, R-37, and R-42. Estimated sound levels at the parcel property line locations nearest to the wind turbines are presented in the table.

The sound assessment results in Tables 6.1 and 6.2 demonstrate that the expected sound levels comply with the IPCB daytime and nighttime sound limits in all octave bands. The results tables in Appendix B and sound contour lines shown on Figure 2 further demonstrates that estimated sound levels at each identified receptor are expected to comply with the daytime and nighttime sound limits.

7.0 Conclusion

This pre-construction sound assessment was completed to evaluate operational compliance of the Virden Wind Energy Project with the IPCB and Montgomery County noise regulations. An operational sound model was developed and utilized to estimate the sound levels generated by Project equipment, including sound from the proposed wind turbine generators and substation transformer. The sound modeling results demonstrate that the Project will be operated in compliance with applicable IPCB and County noise limits by using turbines with serrated trailing edge blades and operating several turbines in a reduced noise mode during nighttime periods. Project-generated sound levels are expected to comply with the IPCB sound limits in all octave bands.

This sound assessment was based on the equipment and preliminary Project layout provided by Virden Wind. If during final design the project layout is modified, it is recommended that the sound assessment be updated.

Table 6.1 Daytime Compliance Assessment at Receptor Locations with Highest Estimated Sound Levels

Receptor			Description	Octave Band Sound Level (dB)									Broadband Leq Sound Level (dBA)
ID	Land Use	Location		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
R-21-PL1-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	64	59	53	45	41	41	38	22	0	46
			Daytime Limit	***75***	***74***	***69***	***64***	***58***	***52***	***47***	***43***	***40***	***N/A****
R-21-PL2-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	64	58	53	45	41	41	37	21	0	46
			Daytime Limit	***75***	***74***	***69***	***64***	***58***	***52***	***47***	***43***	***40***	***N/A****
R-37-PL-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	64	58	52	44	41	41	38	23	0	45
			Daytime Limit	***75***	***74***	***69***	***64***	***58***	***52***	***47***	***43***	***40***	**N/A***
R-42-PL-P	Residential (Class A)	Property Line	Estimated Project Sound Level	64	58	52	45	41	40	37	21	0	45
			Daytime Limit	***75***	***74***	***69***	***64***	***58***	***52***	***47***	***43***	***40***	**N/A***

* IPCB regulations do not include broadband sound limits.

Table 6.2 Nighttime Compliance Assessment at Receptor Locations with Highest Estimated Sound Levels

Receptor			Description	Octave Band Sound Level (dB)									Broadband Leq Sound Level (dBA)
ID	Land Use	Location		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
R-21-PL1-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	63	57	51	44	40	39	36	20	0	44
			Nighttime Limit	***69***	***67***	***62***	***54***	***47***	***41***	***36***	***32***	***32***	***N/A****
R-21-PL2-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	63	57	51	44	40	39	36	20	0	44
			Nighttime Limit	***69***	***67***	***62***	***54***	***47***	***41***	***36***	***32***	***32***	***N/A****
R-16-PL-P	Residential (Class A)	Property Line	Estimated Project Sound Level	63	57	51	44	40	39	36	19	0	44
			Nighttime Limit	***69***	***67***	***62***	***54***	***47***	***41***	***36***	***32***	***32***	***N/A****
R-40-PL-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	63	57	51	43	40	39	36	20	0	44
			Nighttime Limit	***69***	***67***	***62***	***54***	***47***	***41***	***36***	***32***	***32***	***N/A****
R-37-PL-NP	Residential (Class A)	Property Line	Estimated Project Sound Level	62	57	51	43	39	39	36	21	0	44
			Nighttime Limit	**69**	**67**	**62**	**54**	**47**	**41**	**36**	**32**	**32**	**N/A***
R-42-PL-P	Residential (Class A)	Property Line	Estimated Project Sound Level	63	57	51	44	40	39	36	20	0	44
			Nighttime Limit	***69***	***67***	***62***	***54***	***47***	***41***	***36***	***32***	***32***	***N/A****

* IPCB regulations do not include broadband sound limits.

Figures

Figure 1

Project Site Layout

Figure No.

1

Title

Project Site Layout

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

Prepared by RA on 2024-01-30
TR by DG on 2024-01-30
IR by JP on 2024-04-24

N

0 2,000 4,000 Feet
(At original document size of 11x17)
1:48,000

Legend

- Proposed Turbine Location
- Proposed Substation Location
- Sensitive Receptor - Leased / Participating
- Sensitive Receptor - Non-participating
- Sensitive Receptor - Property Line

Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Virden Wind Energy Project LLC, USGS, NADS
3. Background: NAIP 2021

Stantec

Figure 2

Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Figure No.

2

Title

Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

Prepared by RA on 2024-01-30
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3. Background: NAIP 2021

Stantec

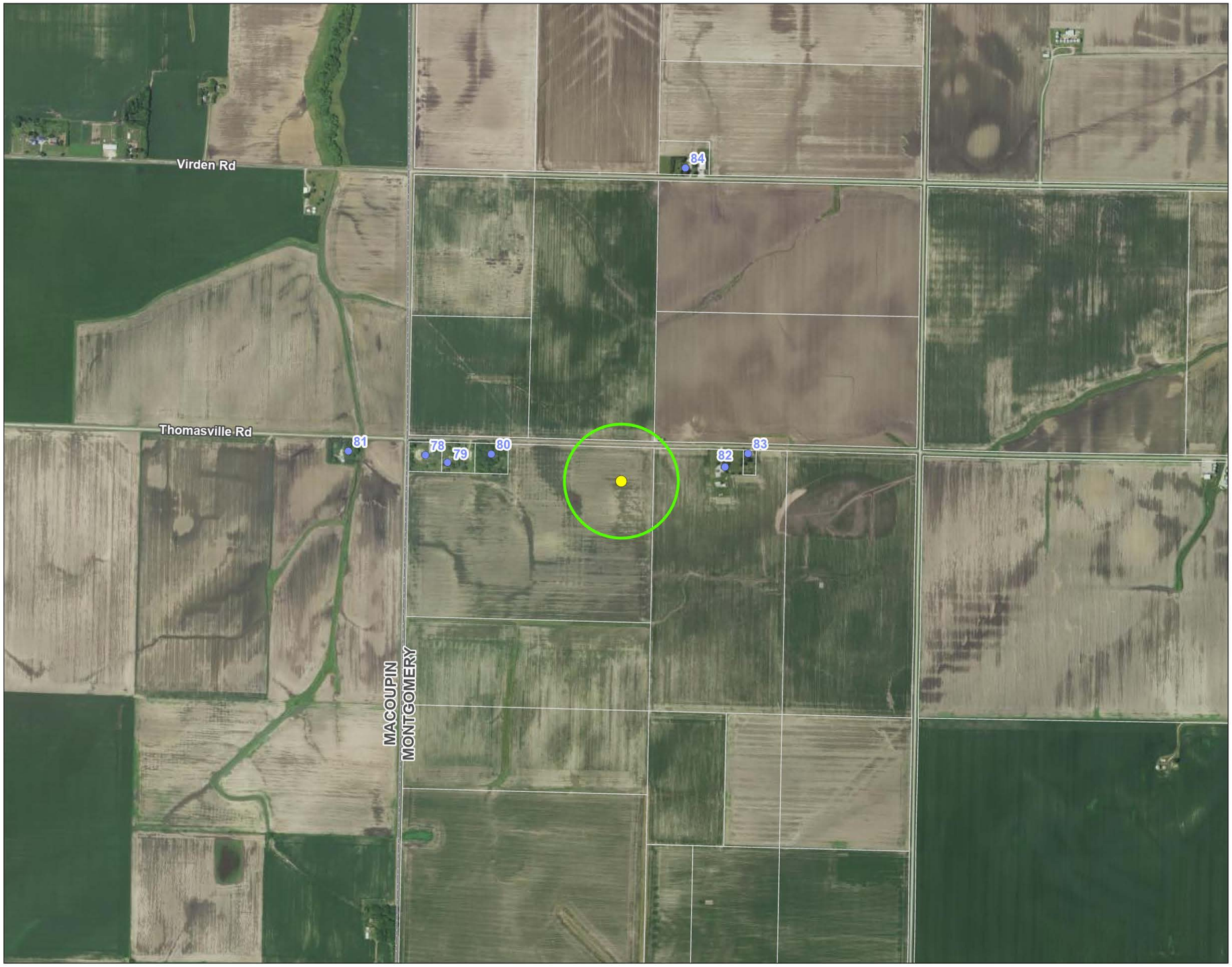

Figure No.

2

Title

Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

Prepared by RA on 2024-01-30
TR by DG on 2024-01-30
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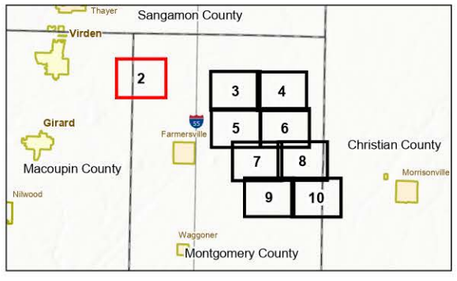
- Sensitive Receptor - Non-participating
- Sensitive Receptor - Property Line
- 36 dB at 2 kHz Nighttime Sound Contour
- Parcel Boundary



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Virden Wind Energy Project

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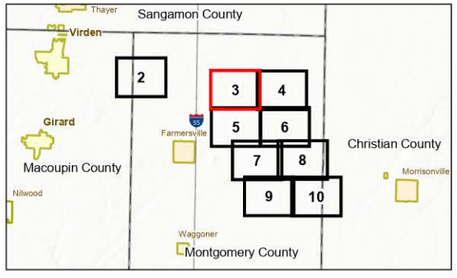

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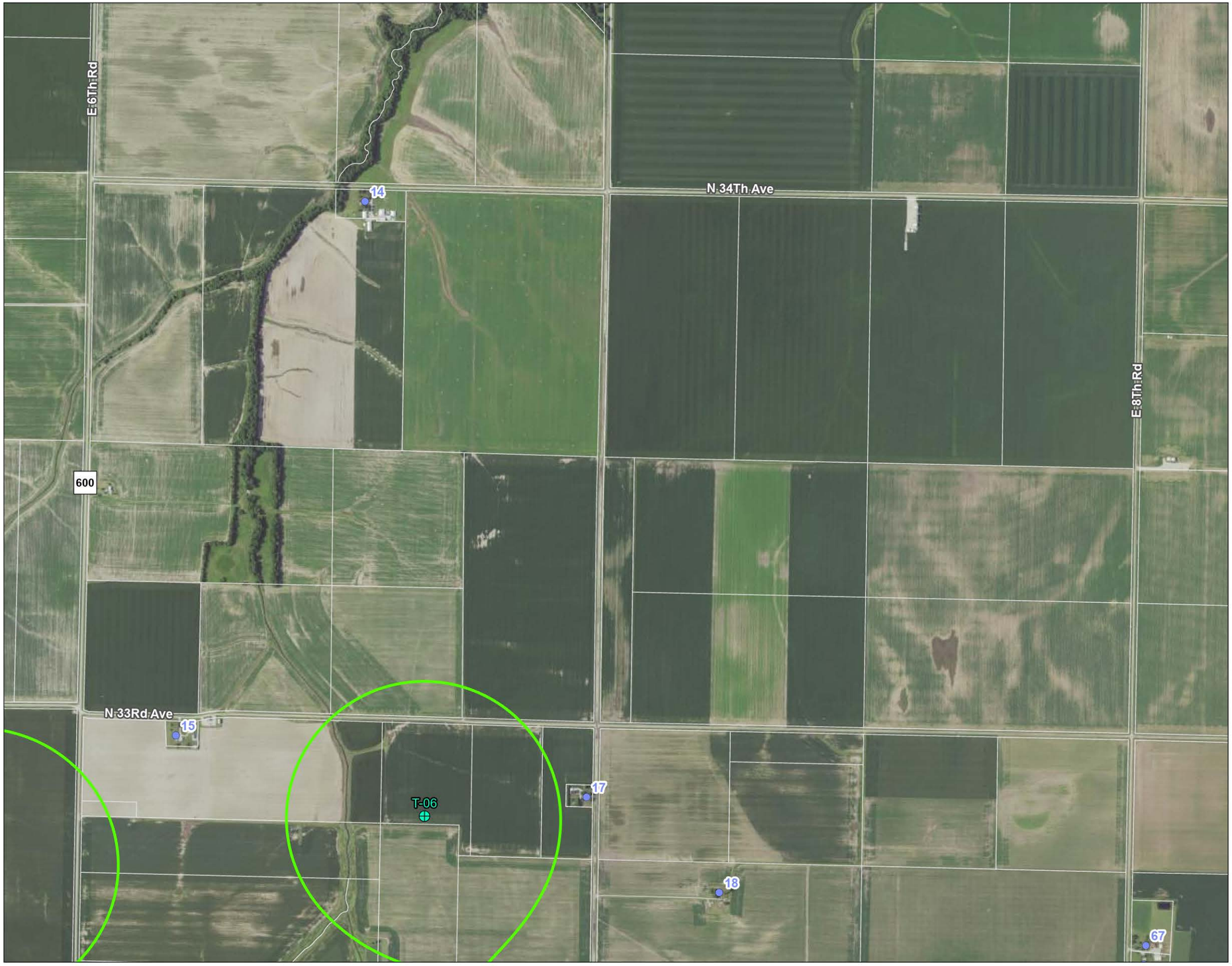

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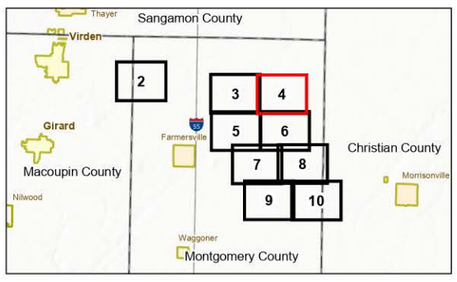

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Stantec

Figure No.

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Client/Project 193709934

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Virden Wind Energy Project

Project Location
Montgomery County, Illinois

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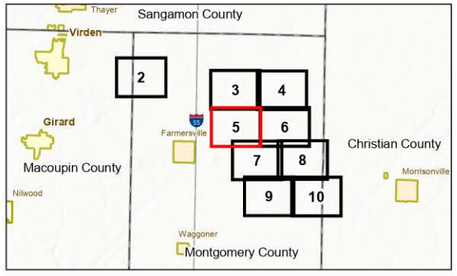

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Stantec

Figure No.

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Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934

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Virden Wind Energy Project

Project Location
Montgomery County, Illinois

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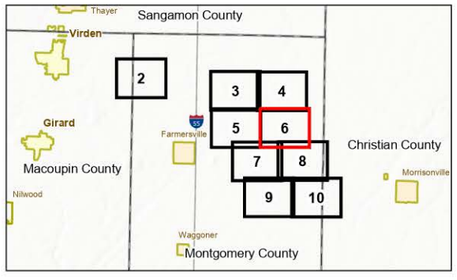

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Stantec

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Figure No.

2

Title

Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

Prepared by RA on 2024-01-30
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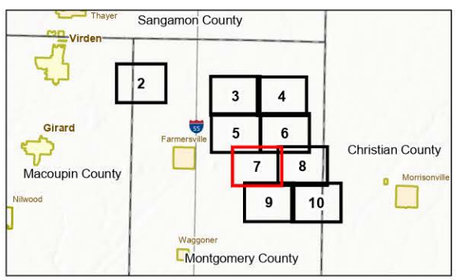

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Stantec

Figure No.

2

Title

Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

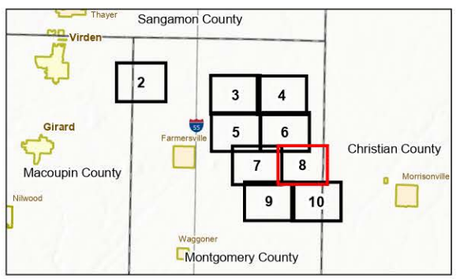
Prepared by RA on 2024-01-30
TR by DG on 2024-01-30
IR by JP on 2024-04-24

N

0 500 1,000 Feet
(At original document size of 11x17)
1:12,000

Legend

- Proposed Turbine Location
- Proposed Substation Location
- Sensitive Receptor - Leased / Participating
- Sensitive Receptor - Non-participating
- Sensitive Receptor - Property Line
- 36 dB at 2 kHz Nighttime Sound Contour
- Parcel Boundary



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Virden Wind Energy Project LLC, USGS, NADS
3. Background: NAIP 2021

Stantec

Figure No.

2

Title

Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934

Virden Wind Energy Project LLC
Virden Wind Energy Project

Project Location
Montgomery County, Illinois

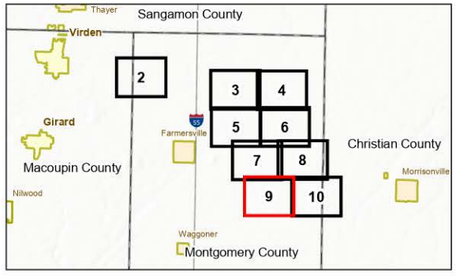
Prepared by RA on 2024-01-30
TR by DG on 2024-01-30
IR by JP on 2024-04-24

N

0 500 1,000 Feet
(At original document size of 11x17)
1:12,000

Legend

- Proposed Turbine Location
- Proposed Substation Location
- Sensitive Receptor - Leased / Participating
- Sensitive Receptor - Non-participating
- Sensitive Receptor - Property Line
- 36 dB at 2 kHz Nighttime Sound Contour
- Parcel Boundary



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Virden Wind Energy Project LLC, USGS, NADS
3. Background: NAIP 2021

Stantec

Figure No.
2

Title
Estimated Nighttime Operational Sound Contours (36 dB at 2 kHz)

Client/Project 193709934
Virden Wind Energy Project LLC
Virden Wind Energy Project

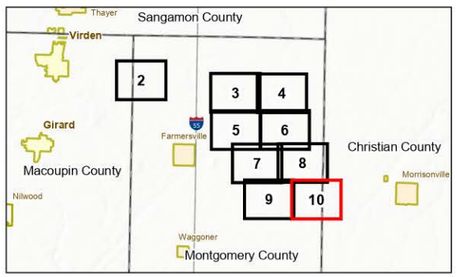
Project Location
Montgomery County, Illinois

Prepared by RA on 2024-01-30
TR by DG on 2024-01-30
IR by JP on 2024-04-24

N

0 500 1,000 Feet
(At original document size of 11x17)
1:12,000

Legend
- Proposed Turbine Location
- Proposed Substation Location
- Sensitive Receptor - Leased / Participating
- Sensitive Receptor - Non-participating
- Sensitive Receptor - Property Line
- 36 dB at 2 kHz Nighttime Sound Contour
- Parcel Boundary



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Virden Wind Energy Project LLC, USGS, NADS
3. Background: NAIP 2021

Stantec

Appendix A

Project Equipment Locations

Appendix A Virden Wind Project - Project Equipment Locations

Source ID	Description	X (UTM 17N)	Y (UTM 17N)	Z Ground	Height
		m	m	m	m
S-01	Substation transformer	268,378	4,374,966	202	3.0
T-01	Wind turbine generator	274,862	4,371,365	193	118.0
T-02	Wind turbine generator	276,236	4,373,870	192	118.0
T-03	Wind turbine generator	276,186	4,372,170	194	118.0
T-04	Wind turbine generator	277,036	4,372,820	194	118.0
T-05	Wind turbine generator	275,236	4,373,720	194	118.0
T-06	Wind turbine generator	278,386	4,372,970	192	118.0
T-07	Wind turbine generator	276,636	4,371,170	194	118.0
T-08	Wind turbine generator	278,636	4,372,020	194	118.0
T-09	Wind turbine generator	278,586	4,371,070	195	118.0
T-10	Wind turbine generator	277,536	4,370,320	194	118.0
T-11	Wind turbine generator	278,136	4,369,820	196	118.0
T-12	Wind turbine generator	279,673	4,369,462	196	118.0
T-13	Wind turbine generator	279,936	4,368,120	196	118.0
T-14	Wind turbine generator	279,336	4,368,070	196	118.0
T-15	Wind turbine generator	280,100	4,367,324	196	118.0
T-16	Wind turbine generator	279,336	4,367,120	196	118.0
T-17	Wind turbine generator	278,236	4,367,070	196	118.0
T-18	Wind turbine generator	279,336	4,365,970	198	118.0

Appendix B

Receptor Locations and Operational Sound Results

Appendix B - Virden Wind Project

Table B.1 - Receptor Locations and Daytime Operational Sound Results

Receptor ID	Participation Status[1]	Octave Band Leq Sound Level (dB)									Broadband Leq Sound Level (dBA)	X (UTM 17N)	Y (UTM 17N)	Z ground	Height
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz		m	m	m	m
R-01	NP	58	52	45	37	33	32	26	1	0	37	274,488	4,374,101	198	1.5
R-02	NP	56	50	43	35	30	28	17	0	0	34	274,079	4,372,814	198	1.5
R-03	NP	59	53	46	39	35	34	28	6	0	39	274,460	4,371,966	198	1.5
R-04	P	58	52	45	38	33	32	27	4	0	38	274,131	4,371,117	196	1.5
R-05	NP	57	51	44	36	32	30	24	0	0	36	274,017	4,370,943	194	1.5
R-06	NP	57	51	44	37	32	31	25	0	0	36	274,104	4,370,937	194	1.5
R-11	NP	61	55	48	41	36	35	29	2	0	40	275,740	4,371,259	196	1.5
R-12	NP	62	56	50	42	38	38	34	16	0	43	275,465	4,373,274	195	1.5
R-13	NP	62	56	50	43	39	38	34	15	0	43	276,138	4,373,347	192	1.5
R-13-PL-NP	NP	62	56	50	43	39	38	34	15	0	43	276,155	4,373,356	192	1.5
R-14	NP	55	49	41	33	28	24	11	0	0	32	278,205	4,374,838	190	1.5
R-15	NP	61	55	49	41	37	36	31	8	0	41	277,630	4,373,215	194	1.5
R-16	P	64	58	52	44	40	40	36	19	0	45	278,386	4,372,431	194	1.5
R-16-PL-P	P	64	58	52	44	41	40	37	20	0	45	278,399	4,372,397	193	1.5
R-17	NP	62	56	50	42	38	38	34	16	0	43	278,878	4,373,028	194	1.5
R-18	NP	59	53	46	39	35	33	27	0	0	38	279,281	4,372,738	194	1.5
R-19	NP	55	49	41	33	27	24	10	0	0	31	280,571	4,372,520	194	1.5
R-20	NP	62	56	49	42	37	36	30	4	0	41	277,915	4,371,502	194	1.5
R-21	NP	64	58	52	45	41	40	37	20	0	45	278,493	4,371,576	194	1.5
R-21-PL1-NP	NP	64	59	53	45	41	41	38	22	0	46	278,544	4,371,467	194	1.5
R-21-PL2-NP	NP	64	58	53	45	41	41	37	21	0	46	278,546	4,371,614	193	1.5
R-22	NP	63	57	51	44	40	39	35	18	0	44	278,926	4,371,391	194	1.5
R-23	NP	62	56	49	42	37	36	32	10	0	42	277,548	4,369,530	196	1.5
R-24	NP	61	55	48	41	36	35	29	7	0	40	277,690	4,369,270	196	1.5
R-25	NP	58	52	45	37	32	29	19	0	0	35	277,185	4,368,775	196	1.5
R-26	NP	58	52	44	36	31	28	16	0	0	35	277,221	4,368,363	196	1.5
R-27	NP	58	52	44	37	31	29	17	0	0	35	277,316	4,368,357	196	1.5
R-28	NP	55	49	42	34	29	26	15	0	0	32	276,806	4,366,732	196	1.5
R-29	NP	55	49	42	34	28	25	14	0	0	32	276,683	4,366,838	196	1.5

Appendix B - Virden Wind Project

Table B.1 - Receptor Locations and Daytime Operational Sound Results

Receptor ID	Participation Status[1]	Octave Band Leq Sound Level (dB)									Broadband Leq Sound Level (dBA)	X (UTM 17N)	Y (UTM 17N)	Z ground	Height
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz		m	m	m	m
R-30	NP	54	48	41	33	27	24	12	0	0	31	277,089	4,365,728	196	1.5
R-31	NP	55	49	42	34	29	26	15	0	0	33	277,457	4,365,728	198	1.5
R-32	NP	61	55	48	41	37	35	29	3	0	40	278,807	4,368,674	197	1.5
R-33	P	63	58	52	44	40	40	36	21	0	44	279,347	4,369,213	198	1.5
R-34	NP	60	54	47	40	35	34	29	7	0	39	280,144	4,369,985	196	1.5
R-35	NP	59	53	46	39	34	33	26	2	0	38	280,441	4,369,754	196	1.5
R-36	NP	59	53	46	39	35	33	26	0	0	38	280,513	4,369,265	196	1.5
R-37	NP	62	56	50	42	38	38	34	16	0	43	280,566	4,367,109	196	1.5
R-37-PL-NP	NP	64	58	52	44	41	41	38	23	0	45	280,422	4,367,154	196	1.5
R-38	NP	61	56	49	42	37	37	32	11	0	42	280,412	4,368,509	196	1.5
R-39	NP	61	55	48	41	37	36	30	8	0	41	280,497	4,368,504	196	1.5
R-40	NP	63	57	51	43	39	39	35	18	0	44	280,389	4,368,243	196	1.5
R-40-PL-NP	NP	64	58	52	44	40	40	36	20	0	45	280,336	4,368,230	196	1.5
R-41	NP	62	57	50	43	39	38	34	15	0	43	280,453	4,368,108	196	1.5
R-42	P	64	58	52	44	40	40	36	18	0	44	279,004	4,366,804	197	1.5
R-42-PL-P	P	64	58	52	45	41	40	37	21	0	45	279,028	4,366,859	197	1.5
R-43	P	63	58	51	44	40	39	35	17	0	44	278,755	4,367,191	197	1.5
R-44	NP	63	57	50	43	39	38	33	10	0	43	278,778	4,367,684	196	1.5
R-45	NP	63	57	51	43	40	39	35	17	0	44	278,861	4,368,064	196	1.5
R-46	NP	61	55	48	41	37	36	31	10	0	41	278,711	4,366,110	198	1.5
R-47	NP	53	47	40	32	27	24	13	0	0	31	278,789	4,364,435	197	1.5
R-48	NP	56	50	43	36	31	29	20	0	0	35	280,355	4,365,404	196	1.5
R-50	NP	55	49	42	34	28	24	11	0	0	32	281,656	4,369,248	196	1.5
R-51	NP	57	51	43	36	31	28	18	0	0	34	281,415	4,368,258	198	1.5
R-52	NP	58	52	45	37	33	31	24	0	0	36	277,298	4,367,292	196	1.5
R-53	NP	54	48	41	33	27	24	10	0	0	31	281,978	4,367,004	196	1.5
R-62	NP	54	48	41	33	28	25	14	0	0	31	274,072	4,370,066	192	1.5
R-63	NP	61	55	48	41	37	36	31	11	0	41	278,725	4,366,079	198	1.5
R-78	NP	38	44	40	33	35	30	22	3	0	35	267,783	4,375,046	200	1.5

Appendix B - Virden Wind Project

Table B.1 - Receptor Locations and Daytime Operational Sound Results

Receptor ID	Participation Status[1]	Octave Band Leq Sound Level (dB)									Broadband Leq Sound Level (dBA)	X (UTM 17N)	Y (UTM 17N)	Z ground	Height
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz		m	m	m	m
R-79	NP	39	45	41	34	36	31	24	6	0	36	267,850	4,375,023	200	1.5
R-80	NP	41	47	44	36	39	34	27	13	0	39	267,983	4,375,049	200	1.5
R-82	NP	43	49	47	38	41	36	30	18	0	41	268,693	4,375,009	201	1.5
R-83	NP	42	48	44	36	39	34	27	13	0	39	268,763	4,375,050	201	1.5

Notes: [1] P = Participating, NP = Non-Participating

Appendix B - Virden Wind Project

Table B.2 - Receptor Locations and Nighttime Operational Sound Results

Receptor ID	Participation Status[1]	Octave Band Leq Sound Level (dB)									Broadband Leq Sound Level (dBA)	X (UTM 17N)	Y (UTM 17N)	Z ground	Height
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz		m	m	m	m
R-01	NP	58	52	45	37	33	32	26	1	0	37	274,488	4,374,101	198	1.5
R-02	NP	56	50	43	35	30	28	17	0	0	34	274,079	4,372,814	198	1.5
R-03	NP	59	53	46	39	35	34	28	6	0	39	274,460	4,371,966	198	1.5
R-04	P	58	52	45	38	33	32	27	4	0	38	274,131	4,371,117	196	1.5
R-05	NP	57	51	44	36	32	30	24	0	0	36	274,017	4,370,943	194	1.5
R-06	NP	57	51	44	37	32	31	25	0	0	36	274,104	4,370,937	194	1.5
R-11	NP	61	55	48	41	36	35	29	2	0	40	275,740	4,371,259	196	1.5
R-12	NP	62	56	50	42	38	38	34	16	0	43	275,465	4,373,274	195	1.5
R-13	NP	62	56	50	43	39	38	34	15	0	43	276,138	4,373,347	192	1.5
R-13-PL-NP	NP	62	56	50	43	39	38	34	15	0	43	276,155	4,373,356	192	1.5
R-14	NP	54	48	41	33	28	24	11	0	0	31	278,205	4,374,838	190	1.5
R-15	NP	61	55	49	41	37	36	31	8	0	41	277,630	4,373,215	194	1.5
R-16	P	63	57	51	43	40	39	36	18	0	44	278,386	4,372,431	194	1.5
R-16-PL-P	P	63	57	51	44	40	39	36	19	0	44	278,399	4,372,397	193	1.5
R-17	NP	61	56	49	42	38	37	34	16	0	42	278,878	4,373,028	194	1.5
R-18	NP	59	53	46	38	34	33	26	0	0	38	279,281	4,372,738	194	1.5
R-19	NP	54	48	40	32	27	23	9	0	0	30	280,571	4,372,520	194	1.5
R-20	NP	61	55	48	41	37	35	29	3	0	40	277,915	4,371,502	194	1.5
R-21	NP	63	57	51	43	39	39	35	18	0	44	278,493	4,371,576	194	1.5
R-21-PL1-NP	NP	63	57	51	44	40	39	36	20	0	44	278,544	4,371,467	194	1.5
R-21-PL2-NP	NP	63	57	51	44	40	39	36	20	0	44	278,546	4,371,614	193	1.5
R-22	NP	62	56	50	42	38	38	34	16	0	43	278,926	4,371,391	194	1.5
R-23	NP	61	56	49	41	37	36	32	10	0	41	277,548	4,369,530	196	1.5
R-24	NP	61	55	48	40	36	35	29	7	0	40	277,690	4,369,270	196	1.5
R-25	NP	58	52	44	37	32	29	18	0	0	35	277,185	4,368,775	196	1.5
R-26	NP	57	51	44	36	31	28	16	0	0	35	277,221	4,368,363	196	1.5
R-27	NP	57	51	44	36	31	28	17	0	0	35	277,316	4,368,357	196	1.5
R-28	NP	55	49	41	34	28	26	15	0	0	32	276,806	4,366,732	196	1.5
R-29	NP	55	49	41	33	28	25	14	0	0	32	276,683	4,366,838	196	1.5

Appendix B - Virden Wind Project

Table B.2 - Receptor Locations and Nighttime Operational Sound Results

Receptor ID	Participation Status[1]	Octave Band Leq Sound Level (dB)									Broadband Leq Sound Level (dBA)	X (UTM 17N)	Y (UTM 17N)	Z ground	Height
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz		m	m	m	m
R-30	NP	54	48	40	32	27	24	12	0	0	31	277,089	4,365,728	196	1.5
R-31	NP	55	49	41	34	29	26	15	0	0	32	277,457	4,365,728	198	1.5
R-32	NP	61	55	48	41	36	35	28	3	0	40	278,807	4,368,674	197	1.5
R-33	P	63	57	51	43	39	39	35	20	0	44	279,347	4,369,213	198	1.5
R-34	NP	59	53	46	39	34	33	28	6	0	38	280,144	4,369,985	196	1.5
R-35	NP	58	52	45	38	33	32	26	1	0	37	280,441	4,369,754	196	1.5
R-36	NP	59	53	46	38	34	32	26	0	0	38	280,513	4,369,265	196	1.5
R-37	NP	61	55	48	41	37	36	32	14	0	41	280,566	4,367,109	196	1.5
R-37-PL-NP	NP	62	57	51	43	39	39	36	21	0	44	280,422	4,367,154	196	1.5
R-38	NP	61	55	48	41	37	36	31	10	0	41	280,412	4,368,509	196	1.5
R-39	NP	60	54	48	40	36	35	30	7	0	40	280,497	4,368,504	196	1.5
R-40	NP	62	56	50	43	39	38	34	17	0	43	280,389	4,368,243	196	1.5
R-40-PL-NP	NP	63	57	51	43	40	39	36	20	0	44	280,336	4,368,230	196	1.5
R-41	NP	62	56	50	42	38	38	33	15	0	42	280,453	4,368,108	196	1.5
R-42	P	63	57	51	43	39	39	35	17	0	44	279,004	4,366,804	197	1.5
R-42-PL-P	P	63	57	51	44	40	39	36	20	0	44	279,028	4,366,859	197	1.5
R-43	P	63	57	51	43	39	39	35	16	0	44	278,755	4,367,191	197	1.5
R-44	NP	62	56	50	42	38	37	32	10	0	42	278,778	4,367,684	196	1.5
R-45	NP	63	57	51	43	39	39	35	17	0	44	278,861	4,368,064	196	1.5
R-46	NP	60	55	48	41	37	36	31	10	0	41	278,711	4,366,110	198	1.5
R-47	NP	53	47	40	32	27	24	13	0	0	30	278,789	4,364,435	197	1.5
R-48	NP	56	50	43	35	30	29	20	0	0	34	280,355	4,365,404	196	1.5
R-50	NP	54	48	41	33	27	24	10	0	0	31	281,656	4,369,248	196	1.5
R-51	NP	56	50	43	35	30	27	17	0	0	34	281,415	4,368,258	198	1.5
R-52	NP	58	52	44	37	32	31	24	0	0	36	277,298	4,367,292	196	1.5
R-53	NP	53	47	40	32	26	23	9	0	0	30	281,978	4,367,004	196	1.5
R-62	NP	54	48	41	33	27	25	14	0	0	31	274,072	4,370,066	192	1.5
R-63	NP	61	55	48	41	37	36	31	11	0	41	278,725	4,366,079	198	1.5
R-78	NP	38	44	40	33	35	30	22	3	0	35	267,783	4,375,046	200	1.5

Appendix B - Virden Wind Project

Table B.2 - Receptor Locations and Nighttime Operational Sound Results

Receptor ID	Participation Status[1]	Octave Band Leq Sound Level (dB)									Broadband Leq Sound Level (dBA)	X (UTM 17N)	Y (UTM 17N)	Z ground	Height
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz		m	m	m	m
R-79	NP	39	45	41	34	36	31	24	6	0	36	267,850	4,375,023	200	1.5
R-80	NP	41	47	44	36	39	34	27	13	0	39	267,983	4,375,049	200	1.5
R-82	NP	43	49	47	38	41	36	30	18	0	41	268,693	4,375,009	201	1.5
R-83	NP	42	48	44	36	39	34	27	13	0	39	268,763	4,375,050	201	1.5

Notes: [1] P = Participating, NP = Non-Participating

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Illinois Sub-Office
Southern Illinois Sub-office
8588 Route 148
Marion, IL 62959-5822
Phone: (618) 998-5945
Email Address: Marion@fws.gov
https://www.fws.gov/office/illinois-iowa-ecological-services

In Reply Refer To: January 31, 2024
Project Code: 2024-0043205
Project Name: Virden Wind Energy Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat, if present, within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Under 50 CFR 402.12(e) (the regulations that implement Section 7 of the Endangered Species Act) **the accuracy of this species list should be verified after 90 days**. This verification can be completed formally or informally. You may verify the list by visiting the Information for Planning and Consultation (IPaC) website https://ipac.ecosphere.fws.gov at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

Section 7 Consultation

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the U.S. Fish and Wildlife Service (Service) if they determine their project “may affect” listed species or designated critical habitat. Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action may affect endangered, threatened, or

proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service to make "no effect" determinations. If you determine that your proposed action will have no effect on threatened or endangered species or their respective designated critical habitat, you do not need to seek concurrence with the Service.

Note: For some species or projects, IPaC will present you with *Determination Keys*. You may be able to use one or more Determination Keys to conclude consultation on your action for species covered by those keys.

Technical Assistance for Listed Species

1. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain information on the species life history, species status, current range, and other documents by selecting the species from the thumbnails or list view and visiting the species profile page.???????

No Effect Determinations for Listed Species

1. If there are *no* species or designated critical habitats on the Endangered Species portion of the species list: conclude "no species and no critical habitat present" and document your finding in your project records. No consultation under ESA section 7(a)(2) is required if the action would result in no effects to listed species or critical habitat. Maintain a copy of this letter and IPaC official species list for your records.
2. If any species or designated critical habitat are listed as potentially present in the **action area** of the proposed project the project proponents are responsible for determining if the proposed action will have “no effect” on any federally listed species or critical habitat. No effect, with respect to species, means that no individuals of a species will be exposed to any consequence of a federal action or that they will not respond to such exposure.
3. If the species habitat is not present within the action area or current data (surveys) for the species in the action area are negative: conclude “no species habitat or species present” and document your finding in your project records. For example, if the project area is located entirely within a “developed area” (an area that is already graveled/paved or supports structures and the only vegetation is limited to frequently mowed grass or conventional landscaping, is located within an existing maintained facility yard, or is in cultivated cropland conclude no species habitat present. Be careful when assessing actions that affect: 1) rights-of-ways that contains natural or semi-natural vegetation despite periodic mowing or other management; structures that have been known to support listed species (example: bridges), and 2) surface water or groundwater. Several species inhabit rights-of-ways, and you should carefully consider effects to surface water or groundwater, which often extend outside of a project’s immediate footprint.
4. Adequacy of Information & Surveys - Agencies may base their determinations on the best evidence that is available or can be developed during consultation. Agencies must give the benefit of any doubt to the species when there are any inadequacies in the

information. Inadequacies may include uncertainty in any step of the analysis. To provide adequate information on which to base a determination, it may be appropriate to conduct surveys to determine whether listed species or their habitats are present in the action area. Please contact our office for more information or see the survey guidelines that the Service has made available in IPaC.

May Effect Determinations for Listed Species

1. If the species habitat is present within the action area and survey data is unavailable or inconclusive: assume the species is present or plan and implement surveys and interpret results in coordination with our office. If assuming species present or surveys for the species are positive continue with the may affect determination process. May affect, with respect to a species, is the appropriate conclusion when a species might be exposed to a consequence of a federal action and could respond to that exposure. For critical habitat, ‘may affect’ is the appropriate conclusion if the action area overlaps with mapped areas of critical habitat and an essential physical or biological feature may be exposed to a consequence of a federal action and could change in response to that exposure.
2. Identify stressors or effects to the species and to the essential physical and biological features of critical habitat that overlaps with the action area. Consider all consequences of the action and assess the potential for each life stage of the species that occurs in the action area to be exposed to the stressors. Deconstruct the action into its component parts to be sure that you do not miss any part of the action that could cause effects to the species or physical and biological features of critical habitat. Stressors that affect species’ resources may have consequences even if the species is not present when the project is implemented.
3. If no listed or proposed species will be exposed to stressors caused by the action, a ‘no effect’ determination may be appropriate – be sure to separately assess effects to critical habitat, if any overlaps with the action area. If you determined that the proposed action or other activities that are caused by the proposed action may affect a species or critical habitat, the next step is to describe the manner in which they will respond or be altered. Specifically, to assess whether the species/critical habitat is "not likely to be adversely affected" or "likely to be adversely affected."
4. Determine how the habitat or the resource will respond to the proposed action (for example, changes in habitat quality, quantity, availability, or distribution), and assess how the species is expected to respond to the effects to its habitat or other resources. Critical habitat analyses focus on how the proposed action will affect the physical and biological features of the critical habitat in the action area. If there will be only beneficial effects or the effects of the action are expected to be insignificant or discountable, conclude "may affect, not likely to adversely affect" and submit your finding and supporting rationale to our office and request concurrence.
5. If you cannot conclude that the effects of the action will be wholly beneficial, insignificant, or discountable, check IPaC for species-specific Section 7 guidance and conservation measures to determine whether there are any measures that may be implemented to avoid or minimize the negative effects. If you modify your proposed action to include conservation measures, assess how inclusion of those measures will likely change the

effects of the action. If you cannot conclude that the effects of the action will be wholly beneficial, insignificant, or discountable, contact our office for assistance.

6. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

For additional information on completing Section 7 Consultation including a Glossary of Terms used in the Section 7 Process, information requirements for completing Section 7, and example letters visit the Midwest Region Section 7 Consultations website at: https://www.fws.gov/library/collections/midwest-region-section-7-consultations.
You may find more specific information on completing Section 7 on communication towers and transmission lines on the following websites:

- Incidental Take Beneficial Practices: Power Lines - https://www.fws.gov/story/incidental-take-beneficial-practices-power-lines
- Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning. - https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation

Tricolored Bat Update

On September 14, 2022, the Service published a proposal in the Federal Register to list the tricolored bat (Perimyotis subflavus) as endangered under the Endangered Species Act (ESA). The Service has up to 12-months from the date the proposal published to make a final determination, either to list the tricolored bat under the Act or to withdraw the proposal. The Service determined the bat faces extinction primarily due to the rangewide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across North America. Because tricolored bat populations have been greatly reduced due to WNS, surviving bat populations are now more vulnerable to other stressors such as human disturbance and habitat loss. Species proposed for listing are not afforded protection under the ESA; however, as soon as a listing becomes effective (typically 30 days after publication of the final rule in the Federal Register), the prohibitions against jeopardizing its continued existence and “take” will apply. Therefore, if your future or existing project has the potential to adversely affect tricolored bats after the potential new listing goes into effect, we recommend that the effects of the project on tricolored bat and their habitat be analyzed to determine whether authorization under ESA section 7 or 10 is necessary. Projects with an existing section 7 biological opinion may require reinitiation of consultation, and projects with an existing section 10 incidental take permit may require an amendment to provide uninterrupted authorization for covered activities. Contact our office for assistance.

Bald and Golden Eagles

Although no longer protected under the Endangered Species Act, be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, as are golden eagles. Projects affecting these species may require measures to avoid harming eagles

or may require a permit. If your project is near an eagle nest or winter roost area, please contact our office for further coordination. For more information on permits and other eagle information visit our website https://www.fws.gov/library/collections/bald-and-golden-eagle-management.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Southern Illinois Sub-Office
Southern Illinois Sub-office
8588 Route 148
Marion, IL 62959-5822
(618) 998-5945

PROJECT SUMMARY

Project Code: 2024-0043205
Project Name: Virden Wind Energy Project
Project Type: Power Gen - Wind
Project Description: Proposed wind energy project in Montgomery County, Illinois consisting of up to 18 turbines with associated project infrastructure, including access roads, collection routes, operations and maintenance building and a proposed laydown yard.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.4375261,-89.56897325817158,14z

Counties: Montgomery County, Illinois

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Stacey Parks
Address: 2300 Swan Lake Boulevard, Suite 202
City: Independence
State: IA
Zip: 50644
Email stacey.parks@stantec.com
Phone: 3193343755

AGRICULTURAL IMPACT MITIGATION AGREEMENT
between
VIRDEN WIND ENERGY LLC
and the
ILLINOIS DEPARTMENT OF AGRICULTURE
Pertaining to the Construction of a Commercial Wind Energy Facility
in
Montgomery **County, Illinois**

The following standards and policies are required by the Illinois Department of Agriculture (IDOA) to help preserve the integrity of any agricultural land that is impacted by the Construction and Deconstruction of a wind energy facility in accordance with the Renewable Energy Facilities Agricultural Impact Mitigation Act (Act), Public Act 100-0598. They were developed with the cooperation of agricultural agencies, organizations, Landowners, Tenants, drainage contractors, and wind energy companies to comprise this Agricultural Impact Mitigation Agreement (AIMA). This AIMA is made and entered into between the Commercial Wind Energy Facility Owner and the IDOA.

Virden Wind ENergy, LLC, an Delaware limited liability company authorized to transact business in Illinois, hereafter referred to as "Commercial Wind Energy Facility Owner or Facility Owner", plans to develop an approximately 100 MW Commercial Wind Energy Facility or "Facility" in Montgomery County, which will consist of approximately eighteen (18) turbines, access roads, an underground collection line, a switchyard, a substation, and an operation and maintenance building site.

If construction does not commence within four years after this AIMA has been fully executed, this AIMA will be revised, with the Facility Owner's input, to reflect the IDOA's most current Wind Farm Construction and Deconstruction Standards and Policies. This AIMA, and any updated AIMA, will be filed with the Montgomery County Board by the Facility Owner.

This AIMA is applicable to Construction and Deconstruction activities occurring partially or wholly on privately owned agricultural land.

Conditions of the AIMA

The actions set forth in this AIMA shall be implemented in accordance with the conditions listed below:

A. All Construction or Deconstruction activities may be subject to County or other local requirements. However, the specifications outlined in this AIMA shall be the minimum standards applied to all Construction or Deconstruction activities.

B. Except for Section 21(B-F), all actions set forth in this AIMA are subject to modification through negotiation by Landowners and a representative of the Facility Owner, provided such changes are negotiated in advance of any respective Construction or Deconstruction activities.

C. The Facility Owner may negotiate with Landowners to carry out the mitigative actions that Landowners wish to perform themselves. In such instances, the Facility Owner will offer Landowners the area commercial rate for their machinery and labor costs.

D. All mitigative actions will extend to associated future Construction, maintenance, repairs, and Deconstruction of the Commercial Wind Energy Facility.

E. The Facility Owner will exercise Best Efforts to determine all Landowners and Tenants affected by the Construction and Deconstruction of a Facility. The Facility Owner shall keep the Landowners and Tenants informed of the project's status, meetings, and other factors that may have an impact upon their farming operations.

F. The Facility Owner agrees to include a statement of its adherence to this AIMA in any environmental assessment and/or environmental impact statement that may be prepared in connection with the Project.

G. Execution of this AIMA shall be made a condition of any Conditional/Special Use Permit. A copy of this AIMA shall be mailed to each Landowner. Within 30 days of execution of this AIMA, the Facility Owner shall provide postage and mailing labels to the IDOA for mailing to all Landowners. If the Facility Owner becomes aware that a Landowner was not included on the list of Landowners to which a copy of this AIMA was mailed, the Facility Owner shall notify the Department and provide postage and a mailing label as soon as possible.

In the case of a new Underlying Agreement with a Landowner, the Facility Owner shall incorporate this AIMA into such Underlying Agreement.

H. The Facility Owner will implement all mitigative actions to the extent that they do not conflict with the requirements of any applicable federal, state and local rules and regulations and other permits and approvals that are obtained by the Facility Owner for the Project.

I. If any mitigative action(s) is held to be unenforceable, no other provision shall be affected by that holding, and the remainder of the mitigative actions shall be interpreted as if they did not contain the unenforceable provision.

J. No later than 45 days prior to the Construction and/or Deconstruction of a Commercial Wind Energy Facility, the Facility Owner will provide the Landowner(s) with a toll-free number the Landowner can call to alert the Facility Owner should the Landowner(s) have questions or concerns with the work which is being done or has been carried out on his/her property.

K. If the Facility is sold or transferred, the Facility Owner assuming ownership of the facility shall provide notice of such sale or transfer within ninety (90) days to the County and to Landowners, and the existing Financial Assurance requirements, plus the other terms of this AIMA, shall apply to the new Facility Owner.

L. After construction, the Facility Owner will provide the IDOA with "as built" drawings (strip maps) showing the location of all tiles lines damaged in the construction of the Wind Farm. The drawings and GPS tile lines repair coordinates will be provided on a county-by-county basis for distribution by the IDOA to the respective local Soil and Water Conservation District (SWCD) for the purpose of assisting Landowners with future drainage needs.

M. In addition, after all construction is complete, all affected Landowners will receive a copy of the tile repairs location map with GPS coordinates identified as the electric cable crosses their property.

N. The Facility Owner shall comply with all local, state and federal laws and regulations, specifically including the worker protection standards to protect workers from pesticide exposure.

Definitions

Abandonment -	Occurs when Deconstruction has not been completed within 18 months after the wind energy facility reaches the end of its Useful Life.
Aboveground Cable -	Electrical power lines installed above grade to be utilized for conveyance of power from the Wind Turbine(s) to the Wind Facility substation.
Agricultural Impact Mitigation Agreement (AIMA) -	The Agreement between the Commercial Wind Energy Facility Owner and the Illinois Department of Agriculture described herein.
Agricultural Land -	Land used for Cropland, hayland, pasture land, managed woodlands, truck gardens, farmsteads, commercial ag-related facilities, feedlots, livestock confinement systems, land on which farm buildings are located, and land in government set-aside programs used for purposes as set forth above.
Best Efforts -	Diligent, good faith, and commercially reasonable efforts to achieve a given objective or obligation.
Commercial Operation Date -	The calendar date on which the Commercial Wind Energy Facility produces power for commercial sale, not including test power. Within ten (10) calendar days of the Commercial Operation Date, the Commercial Wind Energy Facility Owner shall notify the County and the Department of the Commercial Operation Date in writing.
Commercial Wind Energy Facility (Facility) -	A wind energy conversion facility of equal or greater than 500 kilowatts in total nameplate generating capacity. "Commercial Wind Energy Facility" includes a wind energy conversion facility seeking an extension of a permit to construct granted by a county or municipality before the effective date of this Act. "Commercial Wind Energy Facility" does not include a wind energy conversion facility: (1) that has submitted a complete permit application to a county or municipality and for which the hearing on the completed application has commenced on the date provided in the public hearing notice, which must be before the effective date of this Act; (2) for which a permit to construct has been issued before the effective date of this Act; or (3) that was constructed before the effective date of this Act.
Commercial Wind Energy Facility Owner (Facility Owner) -	A commercial enterprise that owns or operates a Wind Energy Facility of equal to or greater than 500 kilowatts in total nameplate capacity.
County -	The County where the Commercial Wind Energy Facility is located.

Construction - The installation, preparation for installation and/or repair of a Commercial Wind Energy Facility.

Cropland - Land used for growing row crops, small grains, or hay; includes land which was formerly used as cropland, but is currently in a government set-aside program and pastureland comprised of Prime Farmland.

Deconstruction - The removal of a Commercial Wind Energy Facility from the property of a Landowner and the restoration of that property as provided in the Agricultural Impact Mitigation Agreement. The terms "Deconstruction" and "Decommissioning" have the same meaning and, therefore, may be interchanged with each other.

Deconstruction Plan - A plan prepared by a Professional Engineer, at the Commercial Wind Energy Facility Owner expense, that includes:

(1) the estimated Deconstruction cost per turbine, in current dollars at the time of filing, for the Commercial Wind Energy Facility, taking into account, among other things:

- i the number of Wind Turbines and related Commercial Wind Energy Facilities involved,
- ii the original Construction costs of the Commercial Wind Energy Facilities,
- iii the size and capacity of the Wind Turbines,
- iv the salvage value of the Commercial Wind Energy Facilities,
- v the Construction method and techniques for the Wind Turbines and other Commercial Wind Energy Facilities, and

(2) a comprehensive detailed description of how the Commercial Wind Energy Facility Owner plans to pay for the Deconstruction of the Commercial Wind Energy Facility.

Department - The Illinois Department of Agriculture (IDOA).

Financial Assurance - A reclamation bond or other commercially available financial assurance that is acceptable to the County, with the County as primary beneficiary and the Landowners as secondary beneficiaries.

Landowner - Any person with an ownership interest in property that is used for agricultural purposes and that is party to an Underlying Agreement.

Prime Farmland - Agricultural Land comprised of soils that are defined by the USDA Natural Resources Conservation Service (NRCS) as being "prime" soils (generally considered the most productive soils with the least input of nutrients and management).

Professional Engineer -	An engineer licensed to practice engineering in the State of Illinois, and who is determined to be qualified to perform the work described herein by mutual agreement of the County and the Commercial Wind Energy Facility Owner.
Soil and Water Conservation District - (SWCD)	A local unit of government that provides technical and financial assistance to eligible landowners for the conservation of soil and water resources.
Tenant -	Any person lawfully residing or leasing/renting land that is subject to an Underlying Agreement.
Topsoil -	The uppermost layer of the soil that has the darkest color or the highest content of organic matter; more specifically, it is defined as the "A" horizon.
Underlying Agreement -	The written agreement with a Landowner(s) including, but not limited to, an easement, option, lease, or license under the terms of which another person has constructed, constructs, or intends to construct a Commercial Wind Energy Facility on the property of the Landowner.
Underground Cable -	Electrical power lines installed below grade to be utilized for conveyance of power from the Wind Turbine(s) to the Wind Facility substation.
USDA Natural Resources Conservation Service (NRCS) -	NRCS provides America's farmers with financial and technical assistance to voluntarily put conservation on the ground, not only helping the environment but agricultural operations too.
Useful Life -	A Commercial Wind Energy Facility will be presumed to have no remaining Useful Life if: (1) no electricity is generated for a continuous period of twelve (12) months and (2) the Commercial Wind Energy Facility Owner fails, for a period of 6 consecutive months, to pay the Landowner amounts owed in accordance with the Underlying Agreement.
Wind Turbine -	A wind energy conversion unit equal to or greater than 500 kilowatts in total nameplate generating capacity.

Construction and Deconstruction Requirements

1. Support Structures

A. On Agricultural Land, only single pole support structures will be used for overland transmission not located adjacent to the Commercial Wind Energy Facility substation.

B. Where the electric line is adjacent and parallel to highway and/or railroad right-of-way, but on privately owned property, the support structures will be placed as close as reasonably practicable and allowable by the applicable County Engineer or other applicable authorities to the highway or railroad right-of-way. The only exceptions may be at jogs or weaves on the highway alignment or along highways or railroads where transmission and distribution lines are already present.

C. The highest priority will be given to locating the electric line parallel and adjacent to highway and/or railroad right-of-way. When this is not possible, Best Efforts will be expended to place all support poles in such a manner so as to minimize their placement on Cropland (i.e., longer than normal spans will be utilized when traversing Cropland).

2. Aboveground Facilities

Locations for Facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural activities occurring on the land that contains the facilities. The Facility Owner's compliance with applicable local, county, state, and federal statutes, rules, regulations, and ordinances, and its securing any variations or waivers to such statutes, rules, regulations, and ordinances in accordance with applicable law, in selecting such locations shall constitute compliance with this provision.

3. Guy Wires and Anchors

A. Best Efforts will be made to place guy wires and their anchors out of cropland, pastureland and hayland, placing them instead along existing utilization lines and on land not used for row crops, pasture or hay. Where this is not feasible, Best Efforts will be made to minimize guy wire impact on Cropland.

B. All guy wires will be shielded with highly visible guards.

4. Underground Cabling Depth

A. Underground electrical cables will be buried with:

1. a minimum of 5 feet of top cover where it crosses Cropland.
2. a minimum of 5 feet of top cover where it crosses pasture land or other Agricultural Land comprised of soils that are classified by the USDA as being prime soils.
3. a minimum of 3 feet of top cover where it crosses pasture land and other Agricultural Land not comprised of prime soils.
4. a minimum of 3 feet of top cover where it crosses wooded/brushy land.

B. Notwithstanding the foregoing, in those areas where (i) rock in its natural formation and/or (ii) a continuous strata of gravel exceeding 200 feet in length are encountered, the minimum top cover will be 30 inches.

5. Topsoil Removal and Replacement

A. Any excavation shall be performed in a manner to preserve topsoil. Best Efforts will be made to store the topsoil near the excavation site in such a manner that it will not become intermixed with subsoil materials.

B. Best Efforts will be made to store all disturbed subsoil material near the excavation site and separate from the topsoil.

C. When backfilling an excavation site, the stockpiled subsoil material will be placed back into the excavation site before replacing the topsoil.

D. Refer to Item No. 7.A. through 7.D for procedures pertaining to rock removal from the subsoil and topsoil.

E. Refer to Items No. 8.A. through 8.D. for procedures pertaining to the alleviation of compaction of the topsoil.

F. Best Efforts will be performed to place the topsoil in a manner so that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored as close as reasonably practicable. The same shall apply where excavations are made for road, stream, drainage ditch, or other crossings. In no instance will the topsoil materials be used for any other purpose unless agreed to otherwise by the Landowner.

G. Excess subsoil material resulting from wind turbine foundation excavation shall be removed from Landowner's property, unless otherwise agreed to by Landowner.

H. Topsoil stripping or separation is not required for the excavation of narrow trenches, those 24 inches wide or less.

6. Repair of Damaged Tile Lines

If underground drainage tile is damaged by Construction or Deconstruction, it will be repaired in a manner that assures the tile line's proper operation at the point of repair. The following shall apply to the tile line repair:

A. The Facility Owner will work with the Landowner to identify the tile lines traversing the property included within the Underlying Agreement which will be crossed or disturbed by the construction of the Facility. All tile lines identified in this manner will be shown on the Construction and Deconstruction Plans and staked or flagged in the locations where expected crossing or disturbance is anticipated prior to Construction or Deconstruction to alert Construction and Deconstruction crews to the possible need for tile line repairs.

B. Tile lines that are damaged, cut, or removed shall be staked or flagged with stakes or flags placed in such a manner they will remain visible until the permanent repairs are completed. In addition, the location of damaged drain tile lines will be recorded using Global Positioning Systems (GPS) technology.

C. If water is flowing through any damaged tile line, the Facility Owner shall utilize Best Efforts to immediately and temporarily repair the tile line until such time that the Facility Owner can make permanent repairs. If the tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repairs can be made by the Facility Owner within 14 days (weather and soil conditions permitting) of the time damage occurred; however, the exposed tile lines will be screened or otherwise protected to prevent the entry of foreign materials or animals into the tile lines.

D. Where tile lines are severed by an excavation trench, repairs shall be made using the IDOA Drain Tile Repairs, Figures 1 and 2.

   If there is any dispute between the Landowner and the Facility Owner on the method of permanent tile line repair, the appropriate Soil and Water Conservation District's opinion shall be considered by the Facility Owner and the Landowner.

E. To the extent practicable, there will be a minimum of one foot of separation between the tile line and the Underground Cable whether the Underground Cable passes over or under the tile line. If the tile line was damaged as part of the excavation for installation of the Underground Cable, the Underground Cable will be installed with a minimum one foot clearance below or over the tile line to be repaired or otherwise to the extent practicable.

F. The original tile line alignment and gradient shall be maintained. A laser transit shall be used to ensure the proper gradient is maintained. A laser operated tiling machine shall be used to install or replace tiling segments of 100 linear feet or more.

G. During Construction stage, all permanent tile line repairs must be made within fourteen (14) days of identification or notification of the damage, weather and soil conditions permitting. At other times, such repairs must be made at a time mutually agreed upon by the Facility Owner and the Landowner.

H. Following Construction and/or Deconstruction activities, the Facility Owner will utilize best practices to restore the drainage in the area to the condition it was before the commencement of the Construction/Deconstruction activities. If the Facility Owner cannot agree upon a reasonable method to complete this restoration, the Facility Owner may – but is not required to – implement the recommendations of the appropriate County SWCD and such implementation would resolve the dispute.

I. Following completion of the work, the Facility Owner will be responsible for correcting or paying for the correction of all tile line repairs that fail due to Construction and/or Deconstruction, provided any such failure was identified by Landowner within twenty-four (24) months after Construction or Deconstruction. The Facility Owner will not be responsible for tile line repairs that the Facility Owner pays the Landowner to perform. Facility Owner shall use Best Efforts to utilize a local drain tile repair company.

7. Rock Removal

The following rock removal procedures only pertain to rocks found in the uppermost 42 inches of soil, the common freeze zone in Illinois, which emerged on Landowner property as a result of Construction and/or Deconstruction.

A. Before replacing any Topsoil, Best Efforts will be taken to remove all rocks greater than 3 inches in any dimension from the surface of exposed subsoil which were brought to the site as a result of Construction and/or Deconstruction.

B. As topsoil is replaced, all rocks greater than 3 inches in any dimension will be removed from the topsoil which emerged at the site as a result of Construction and/or Deconstruction activities.

C. If trenching, blasting, or boring operations are required through rocky terrain, precautions will be taken to minimize the potential for oversized rocks to become interspersed with adjacent soil material.

D. Rocks and soil containing rocks removed from the subsoil areas, topsoil, or from any excavations, will be hauled off the Landowner's premises or disposed of on the Landowner's premises at a location that is mutually acceptable to the Landowner and the Facility Owner.

8. Compaction and Rutting

A. Unless the Landowner opts to do the restoration work, after the topsoil has been replaced, all areas that were traversed by vehicles and Construction and/or Deconstruction equipment will be ripped at least 18 inches deep, and all pasture and woodland will be ripped at least 12 inches deep to the extent practicable. The existence of tile lines or underground utilities may necessitate less depth. The disturbed area will then be disked. Decompaction shall be conducted according to the guidelines provided in Appendices A and B.

B. To the extent practicable, all ripping and disking will be done at a time when the soil is dry enough for normal tillage operations to occur on land adjacent to the right-of-way.

C. The Facility Owner will restore all rutted land to a condition as close as possible to its original condition.

D. If there is any dispute between the Landowner and the Facility Owner as to what areas need to be ripped/disked or the depth at which compacted areas should be ripped/disked, the appropriate County SWCD's opinion shall be considered by the Facility Owner and the Landowner.

9. Construction During Wet Weather

Except as provided below, construction activities are not allowed on farmland where normal farming operations, such as plowing, disking, planting or harvesting, cannot take place due to excessively wet soils. Wet weather conditions are to be determined on a field by field basis and not for the project as a whole.

A. Construction activities on prepared surfaces, surfaces where topsoil and subsoil have been removed, heavily compacted in preparation, or otherwise stabilized (e.g. through cement mixing) may occur at the discretion of the Facility Owner in wet weather conditions.

B. Construction activities on unprepared surfaces will be done only when work will not result in rutting which results in a mixing of subsoil and topsoil. Determination as to the potential of subsoil and topsoil mixing will be in consultation with the underlying Landowner, or, if approved by the Landowner, his/her designated Tenant.

10. Land Leveling

A. Following the completion of Construction and/or Deconstruction of a Commercial Wind Energy Facility, the Facility Owner will utilize Best Efforts to restore the disturbed area to its original pre-construction elevation and contour should uneven settling occur or surface drainage problems develop as a result of said activity.

B. If, within twenty-four (24) months after Construction or Deconstruction, uneven settling occurs or surface drainage problems develop as a result of the Construction or Deconstruction of a Facility, the Facility Owner will provide such land leveling services within 45 days of a Landowner's written notice, weather and soil conditions permitting.

C. If there is any dispute between the Landowner and the Facility Owner as to what areas need additional land leveling beyond that which is done at the time of Construction, the Facility Owner may – but is not required to – implement the recommendations of the appropriate SWCD and such implementation will resolve the dispute.

11. Prevention of Soil Erosion

A. The Facility Owner will work with Landowners to prevent excessive erosion on land that has been disturbed by Construction or Deconstruction of a Commercial Wind Energy Facility. Consultation with the local SWCD by the Facility Owner will take place to determine the appropriate methods to be implemented to control erosion. This is not a requirement, however, if the land is bare Cropland that the Landowner intends to leave bare until the next crop is planted.

B. If the Landowner and Facility Owner cannot agree upon a reasonable method to control erosion on the Landowner's right-of-way, the Facility Owner may – but is not required to – implement the recommendations of the appropriate SWCD and such implementation will resolve the dispute.

12. Repair of Damaged Soil Conservation Practices

Consultation with the local SWCD by the Facility Owner will be carried out to determine if there are soil conservation practices (such as terraces, grassed waterways, etc.) that will be damaged by the Construction and/or Deconstruction of a Commercial Wind Energy Facility. Those conservation practices will be restored to their preconstruction condition as close as reasonably practicable in accordance with USDA Natural Resources Conservation Service technical standards. All repair costs shall be borne by the Facility Owner.

13. Damages to Private Property

The Facility Owner will reasonably compensate Landowners for damages caused by the Facility Owner. Damage to Cropland will be reimbursed to the Landowner as prescribed in the applicable Underlying Agreement.

14. Clearing of Trees and Brush

A. If trees are to be removed for the Construction or Deconstruction of a Commercial Wind Energy Facility, the Facility Owner will consult with the Landowner to determine if there are trees of commercial or other value to the Landowner.

B. If there are trees of commercial or other value to the Landowner, the Facility Owner will allow the Landowner the right to retain ownership of the trees to be removed with the disposition of the removed trees to be negotiated prior to the commencement of land clearing.

C. Unless otherwise restricted by federal, state or local regulations, the Facility Owner will follow the Landowner's desires regarding the removal and disposal of trees, brush, and stumps of no value to the Landowner by burning, burial, etc., or complete removal from any affected property.

15. Interference with Irrigation Systems

A. If the Construction or Deconstruction of a Commercial Wind Energy Facility interrupts an operational (or soon to be operational) spray irrigation system, the Facility Owner will establish with the Landowner an acceptable amount of time the irrigation system may be out of service.

B. If, as a result of Construction or Deconstruction of a Facility, an irrigation system interruption results in crop damages, the Landowner will be compensated for all such crop damages per the applicable Underlying Agreement.

C. If it is feasible and mutually acceptable to the Facility Owner and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which a Facility is also being Constructed or Deconstructed.

16. Access Roads

A. To the extent practicable, access roads will be designed to not impede surface drainage and will be built to minimize soil erosion on or near the access roads.

B. Access roads may be left intact through mutual agreement of the Landowner and the Facility Owner unless otherwise restricted by federal, state, or local regulations after the Useful Life.

C. If the access roads are removed, Best Efforts will be expended to assure that the land shall be restored to equivalent condition(s) as existed prior to their construction, or as otherwise agreed to by the Facility Owner and the Landowner. All access roads that are removed shall be ripped to a depth of 18 inches. All ripping will be done consistent with Items 8.A. through 8.D.

17. Weed Control

A. The Facility Owner will provide for weed control in a manner that prevents the spread of weeds onto agricultural land affected by Construction or Deconstruction. Spraying will be done by a pesticide applicator that is appropriately licensed for doing such work in the State of Illinois.

B. The Facility Owner will be responsible for reimbursing all reasonable costs incurred by owners of agricultural land affected by Construction or Deconstruction where it has been determined that weeds have spread from land impacted by the Facility. Reimbursement is contingent upon written notice to the Facility Owner and failure to respond within forty-five (45) days after notice is received.

18. Pumping of Water from Open Excavations

A. In the event it becomes necessary to pump water from open excavations, the Facility Owner will pump the water in a manner that will avoid damaging agricultural land affected by Construction or Deconstruction. Such damages include, but are not limited to: inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of subsoil sediment and gravel in fields and pastures.

B. If it is impossible to avoid water-related damages as described in Item 18.A. above, the Facility Owner will compensate the Landowner for damages to crops as prescribed in the applicable Underlying Agreement.

C. All pumping of water shall comply with existing drainage laws, local ordinances relating to such activities and any other applicable laws, specifically including the Clean Water Act.

19. Advance Notice of Access to Private Property

A. The Facility Owner will provide the Landowner or Tenant with a minimum of 48 hours prior notice before accessing his/her property for the purpose of Construction or Deconstruction of a Commercial Wind Energy Facility.

B. Prior notice shall consist of either: (i) a personal contact, telephone contact or email contact, whereby the Landowner or tenant is informed of the Facility Owner's intent to access the land; or (ii) the Facility Owner mails or hand delivers to the Landowner or tenant's home a dated, written notice of the Facility Owner's intent. Such written or hand delivered notice shall include a toll-free number at which agents of the Facility Owner can be reached. The Landowner or tenant need not acknowledge receipt of the written notice before the Facility Owner can enter the Landowner's property.

20. Indemnification

The Commercial Wind Energy Facility Owner will indemnify all Landowners, their heirs, successors, legal representatives, and assigns from and against all claims, injuries, suits, damages, costs, losses, and reasonable expenses resulting from or arising out of Construction and/or Deconstruction, including damage to such Commercial Wind Energy Facility or any of its appurtenances, except where claims, injuries, suits, damages, costs, losses, and expenses are caused by the negligence or intentional acts, or willful omissions of such Landowners, and/or the Landowners heirs, successors, legal representatives, and assigns. In such circumstances, the Landowners, and the Landowners' heirs, successors, legal representatives, and assigns will indemnify the Facility Owner, its heirs, successors, legal representatives, and assigns from and against said claims, injuries, suits, damages, costs, losses, and reasonable expenses including but not limited to attorneys' fees and costs.

21. Deconstruction of Commercial Wind Energy Facilities and Financial Assurance

A. Deconstruction of a Facility shall include the removal/disposition of the following equipment/facilities utilized for operation of the Facility and located on Landowner property:

1. Wind Turbine towers and blades;

2. Wind Turbine generators;
3. Wind Turbine foundations (to depth of 5 feet);
4. Transformers;
5. Collection/interconnection substation (components, cable, and steel foundations), provided, however, that electrical collection cables at a depth of 5 feet or greater may be left in place;
6. Overhead collection system;
7. Operations/maintenance buildings, spare parts buildings and substation/ switching gear buildings unless otherwise agreed to by the Landowner;
8. Access Road(s) (unless Landowner requests in writing that the access road is to remain);
9. Operation/maintenance yard/staging area unless otherwise agreed to by the Landowner; and
10. Debris and litter generated by Deconstruction and Deconstruction crews.

B. The Facility Owner shall, at its expense, complete Deconstruction of a Commercial Wind Energy Facility within eighteen (18) months after the end of the Useful Life of the Facility.

C. During the County permit process, the Facility Owner shall file with the County, a Deconstruction Plan. A second Deconstruction Plan shall be filed with the County on or before the end of the tenth year of the Commercial Operation Date.

D. The Facility Owner shall provide the County with Financial Assurance to cover the estimated costs of Deconstruction of the Commercial Wind Energy Facility. Provision of this Financial Assurance shall be phased in over the first 11 years of the Project's operation as follows:

1. On or before the first anniversary of the Commercial Operation Date, the Facility Owner shall provide the County with Financial Assurance to cover ten (10) percent of the estimated costs of Deconstruction of the Facility as determined in the Deconstruction Plan provided during the county permit process.

2. On or before the sixth anniversary of the Commercial Operation Date, the Facility Owner shall provide the County with Financial Assurance to cover fifty (50) percent of the estimated costs of Deconstruction of the Facility as determined in the Deconstruction Plan provided during the county permit process.

3. On or before the eleventh anniversary of the Commercial Operation Date, the Facility Owner shall provide the County with Financial Assurance to cover one hundred (100) percent of the estimated costs of Deconstruction of the Facility as determined in the Deconstruction Plan provided during the tenth year of the Commercial Operation Date.

The Financial Assurance shall not release the surety from liability until the Financial Assurance is replaced. The salvage value of the Facility may only be used to reduce the estimated costs of Deconstruction in the Deconstruction Plan if the County agrees that all interests in the salvage value are subordinate or have been subordinated to that of the County if Abandonment occurs.

E. The County may – but is not required to – reevaluate the estimated costs of Deconstruction of any Commercial Wind Energy Facility after the tenth anniversary, and every five years thereafter, of the Commercial Operation Date which reevaluation must be performed by an independent third party Professional Engineer licensed in the State of Illinois. The County shall provide the Facility Owner with a copy of any reevaluation report. Based on any reevaluation, the County may require changes in the level of Financial Assurance used to calculate the phased coverages described in Section 21 D. required from the Facility Owner. The Facility Owner shall be responsible for the cost of any reevaluation by a third party Professional Engineer.

F. Upon Abandonment, the County may take all appropriate actions for Deconstruction, including drawing upon the Financial Assurance. In the event the County declines to take any action for Deconstruction, the Landowners may draw upon the Financial Assurance.

Concurrence of the Parties to this AIMA

The Illinois Department of Agriculture and Virden Wind Energy, LLC concur that this AIMA is the complete AIMA governing the mitigation of agricultural impacts that may result from the construction of the wind farm project in Montgomery County within the State of Illinois.

The effective date of this AIMA commences on the date of execution.

STATE OF ILLINOIS
DEPARTMENT OF AGRICULTURE

Jerry Costello II

By Jerry Costello II, Director 4

Clay Nordsiek

By ~~Jess Feagans, General Counsel~~
Clay Nordsiek, Deputy General Counsel

801 E. Sangamon Avenue, 62702
State Fairgrounds, POB 19281
Springfield IL 62794-9281

2/9, 2023 24

VIRDEN WIND ENERGY, **LLC**
a Delaware **limited liability company**

Daniel E. DuBois

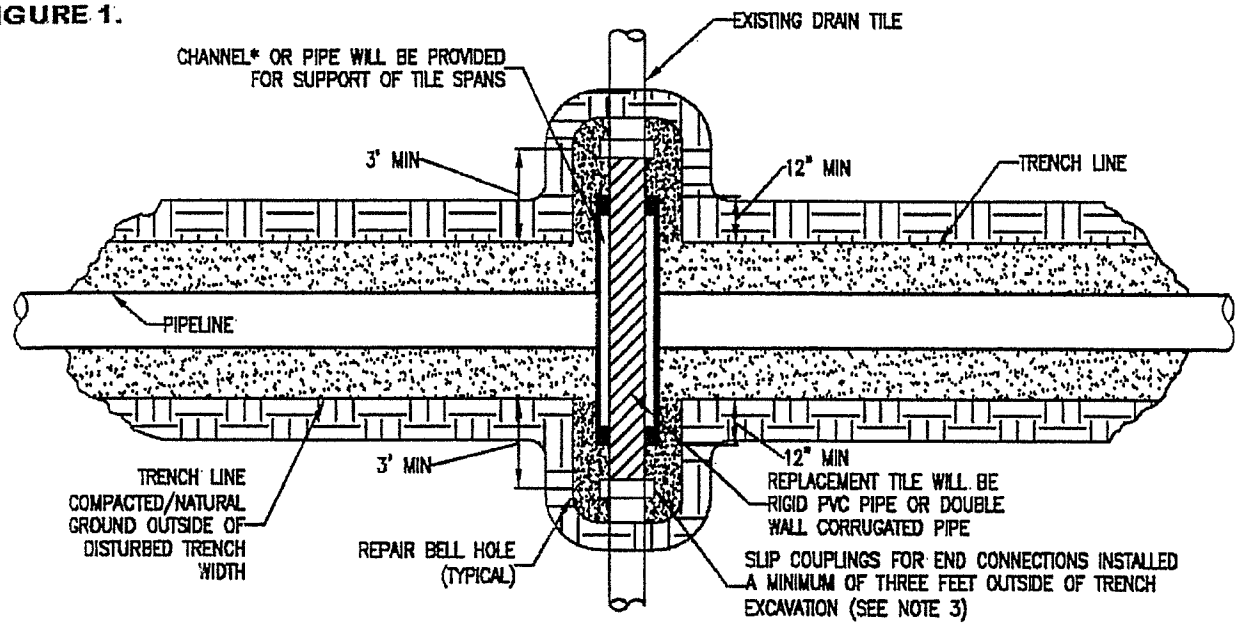
By Daniel DuBois, Managing Director

1002 SE Monterey Commons Boulevard
Suite 300
Stuart, Florida 34996

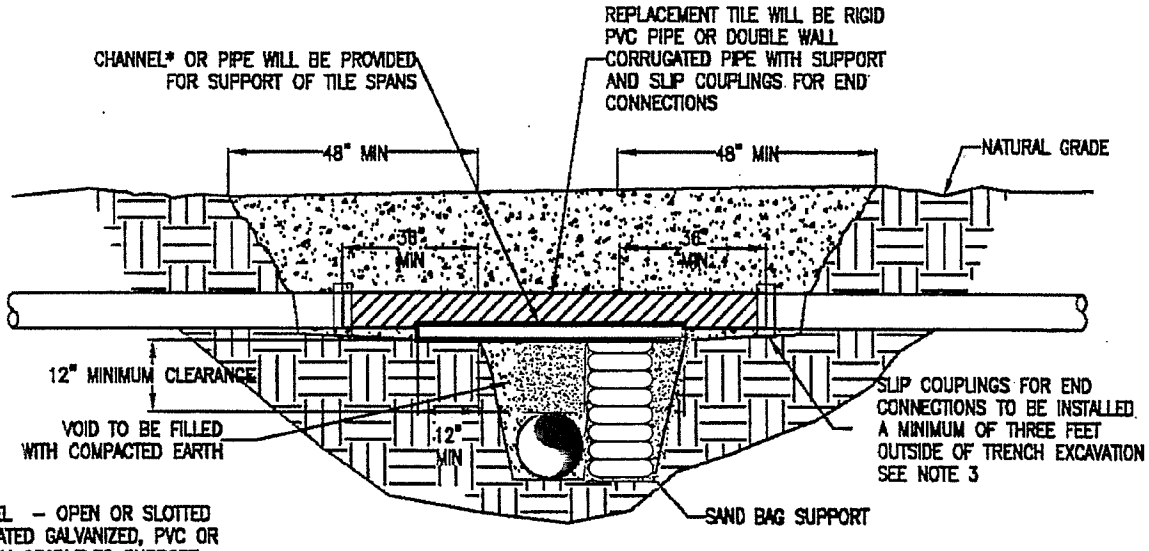
January 10, 2024, 2023

Wind Farm AIMA template - 81818

FIGURE 1.



PLAN
N.T.S.



*CHANNEL – OPEN OR SLOTTED CORRUGATED GALVANIZED, PVC OR ALUMINUM CRADLE TO SUPPORT DRAIN TILE.

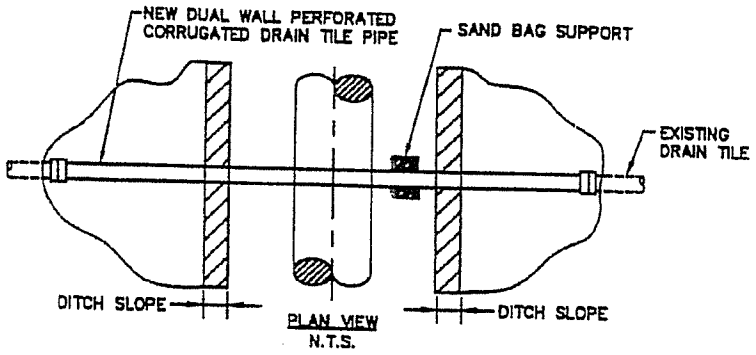
CROSS SECTION
N.T.S.

NOTE:

1. IMMEDIATELY REPAIR TILE IF WATER IS FLOWING THROUGH TILE AT TIME OF TRENCHING. IF NO WATER IS FLOWING AND TEMPORARY REPAIR IS DELAYED, OR NOT MADE BY THE END OF THE WORK DAY, A SCREEN OR APPROPRIATE 'NIGHT CAP' SHALL BE PLACED ON OPEN ENDS OF TILE TO PREVENT ENTRAPMENT OF ANIMALS ETC.
2. CHANNEL OR PIPE (OPEN OR SLOTTED) MADE OF CORRUGATED GALVANIZED PIPE, PVC OR ALUMINUM WILL BE USED FOR SUPPORT OF DRAIN TILE SPANS.
3. INDUSTRY STANDARDS SHALL BE FOLLOWED TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES.

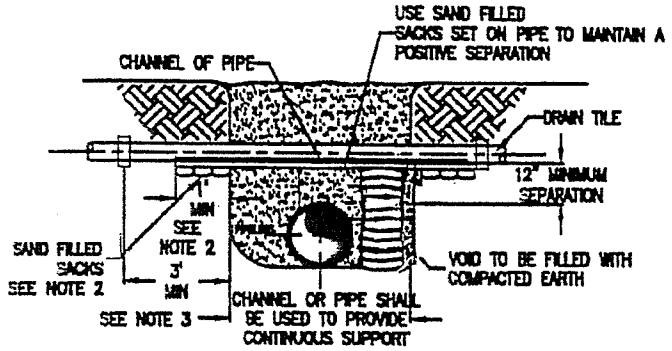
TEMPORARY DRAIN TILE REPAIR

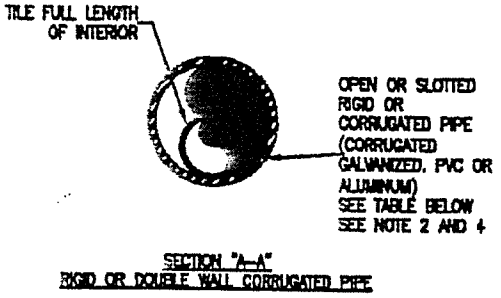
FIGURE 2.



PLAN VIEW
N.T.S.

PLAN VIEW





SECTION "A-A"
RIGID OR DOUBLE WALL CORRUGATED PIPE

END VIEWS

MINIMUM SUPPORT TABLE			
TILE SIZE	CHANNEL SIZE	PIPE SIZE	
3"	4" @ 5.4 #/ft	4"	STD. WT.
4"-5"	5" @ 6.7 #/ft	6"	STD. WT.
8"-9"	7" @ 9.8 #/ft	9"-10"	STD. WT.
10"	10" @ 15.3 #/ft	12"	STD. WT.

NOTE:

1. TILE REPAIR AND REPLACEMENT SHALL MAINTAIN ORIGINAL ALIGNMENT GRADIENT AND WATER FLOW TO THE GREATEST EXTENT POSSIBLE. IF THE TILE NEEDS TO BE RELOCATED, THE INSTALLATION ANGLE MAY VARY DUE TO SITE SPECIFIC CONDITIONS AND LANDOWNER RECOMMENDATIONS.

2. 1'-0" MINIMUM LENGTH OF CHANNEL OR RIGID PIPE (OPEN OR SLOTTED CORRUGATED GALVANIZED, PVC OR ALUMINUM CRADLE) SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. SHIM WITH SAND BAGS TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES).

3. DRAIN TILES WILL BE PERMANENTLY CONNECTED TO EXISTING DRAIN TILES A MINIMUM OF THREE FEET OUTSIDE OF EXCAVATED TRENCH LINE USING INDUSTRY STANDARDS TO ENSURE PROPER SEAL OF REPAIRED DRAIN TILES INCLUDING SLIP COUPLINGS.

4. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF THE RIGID PIPE.

5. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY COMPANY REPRESENTATIVES AND LANDOWNER IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY COMPANY REPRESENTATIVES AND FURNISHED TO CONTRACTOR FOR SPANS IN EXCESS OF 20', TILE GREATER THEN 10" DIAMETER, AND FOR "HEADER" SYSTEMS.

6. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.

7. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE LATERALLY INTO THE EXISTING TILE TO FULL WIDTH OF THE RIGHTS OF WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.

PERMANENT DRAIN TILE REPAIR

Appendix A.

Guidelines for Conducting Proper and Successful Decompaction

1. Decompaction is required when all three conditions apply.
   A. the area has been trafficked or traversed by vehicles or construction equipment, and
   B. the soil penetrometer readings are 300 psi or greater, and
   C. The soil strength (psi) in the right-of-way area is greater than that of the non-trafficked area.

2. An Environmental and/or Agricultural Inspector (AI), with experience and training in the proper identification of compacted soil and operation methods of deep decompaction tools is required to observe the daily operation of the ripper/subsoiler to ensure the conditions are appropriate for decompaction efforts and that the proper equipment is utilized and that equipment is set-up and operated correctly.

3. To achieve the most effective shatter of the compacted soil the following guidelines have been established:
   A. Conduct ripping when the soil is dry. Follow the "Soil Plasticity Test Procedures" detailed in Appendix B to determine if soil conditions are adequately dry to conduct decompaction efforts.
   B. Deep ripping shall be conducted using a ripper or subsoiling tool with a shank length of no less than 18 inches and a shank spacing of approximately the same measurement as the shank length.
   C. Use a ripper with a knife length of no less than 2 inches more than the desired depth of decompaction.
   D. To best promote revegetation and restore crop production, a total depth of 30 or more inches of soil (topsoil plus subsoil) is required.
   E. The minimum depths of decompaction stated above in 3.D. are required where possible. A safe distance from sub-surface structures (tile drains, pipelines, buried utilities, bedrock, etc.) must be maintained at all times. Where such structures exist, a lesser depth of decompaction will be required to prevent damage to equipment and the structures as well as to maintain a safe work environment. The allowable decompaction depth in these instances will be determined on a site by site basis.
   F. When the knives are in the soil to the desired depth, the tongue of the ripper should be parallel to the surface of the ground.
   G. Select a tractor that has enough horsepower to pull the ripper at a speed of 1.5 to 2 mph and whose footprint is of equal or lesser width than the ripper. Tracked equipment is preferred and typically required to achieve this criteria.
   H. The ripper shanks should not create ruts, channels, or mixing of the sub-soil with topsoil. A speed of 1.5 to 2 mph is recommended to minimize the risk of rutting and soil mixing. The ideal operating speed can vary with soil characteristics, tractor and ripping tool used. An excessive travel speed will often increase mixing of soil horizons.
   I. When the equipment is set up and operated correctly, the ripper should create a wave across the surface of the ground as it lifts and drops the soil.

J. Make one ripping pass through the compacted area. Using a penetrometer, the AI will measure the PSI between the ripped knife tracks to determine if the single ripping pass was successful. Additional passes should only be used where needed as they may reduce the effectiveness of the ripping by recompacting the soil shattered in the previous pass.

K. If the first pass does not successfully decompact the soil, additional passes will be needed. Should multiple passes of the ripper be needed to achieve decompaction between the knives tracks of the ripping tool, the subsequent passes should be positioned so the knife tracks from the previous pass are split by the second pass. If three or more passes have been made and sufficient decompaction has not yet been achieved the AI may choose to halt further decompaction efforts in that area until conditions improve or better methods are determined.

L. Following ripping, all stone and rock three or more inches in size which has been lifted to the surface shall be collected and removed from agricultural areas.

M. After ripping has been conducted, do not allow unnecessary traffic on the ripped area.

N. In agricultural lands and croplands that will not be replanted to vegetation by the Company, recommend to landowners to plant a cover crop (cereal rye, clover, alfalfa, tillage radish, turnips, etc.) following decompaction. Reduced compaction created by the ripper pass will not remain over time without subsequent root penetration. Root penetration into the shattered soil is necessary to establish permanent stabilized channels to conduct air and water into the soil profile. Two good sources for landowner cover crop education are http://www.mccc.msu.edu/CCinfo/cropbycrop.html and http://mcccdev.anr.msu.edu/. For local expertise, consult with your county's Soil and Water Conservation District /USDA Natural Resource Conservation Service (NRCS) office for cover crop selection and compliance with NRCS planting deadlines.

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Appendix B.

Soil Plasticity Test Procedures

The Agricultural Inspector will test the consistency of the surface soil to a depth of approximately 4 to 8 inches using the Field Plasticity Test procedure developed from the *Annual Book of ASTM Standards, Plastic Limit of Soils* (ASTM D-4318).

1. Pull a soil plug from the area to be tilled, moved, or trafficked to a depth of 4-8 inches.

2. Roll a portion of the sample between the palms of the hands to form a wire with a diameter of one-eighth inch.

3. The soil consistency is:

   A. Tillable (able to be worked) if the soil wire breaks into segments not exceeding 3/8 of an inch in length.

   B. Plastic (not tillable) if the segments are longer than 3/8 of an inch before breaking.

4. This Procedure is to be used to aid in determining when soil conditions are dry enough for construction activities to proceed.

5. Once the soil consistency has been determined to be of adequate dryness, the plasticity test is not required again until the next precipitation event.

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