Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Application Part 3 of 4

Part 3 includes:

Exhibit A Structure Drawings

Exhibit B Complaint Resolution Plan

Exhibit C EMF Study

Exhibit D AM/FM Radio Analysis

Exhibit E Off-Air Television Analysis

Exhibit F Licensed Microwave Report

Exhibit G Transmission Line Acoustic Assessment

Exhibit H Cultural Resources Transmission Line Memo

Exhibit I Correspondence with OHPO

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wvorys@dickinsonwright.com

Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit A

Structure Drawings

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
William V. Vorys (0093479)
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150 East Gay Street, Suite 2400
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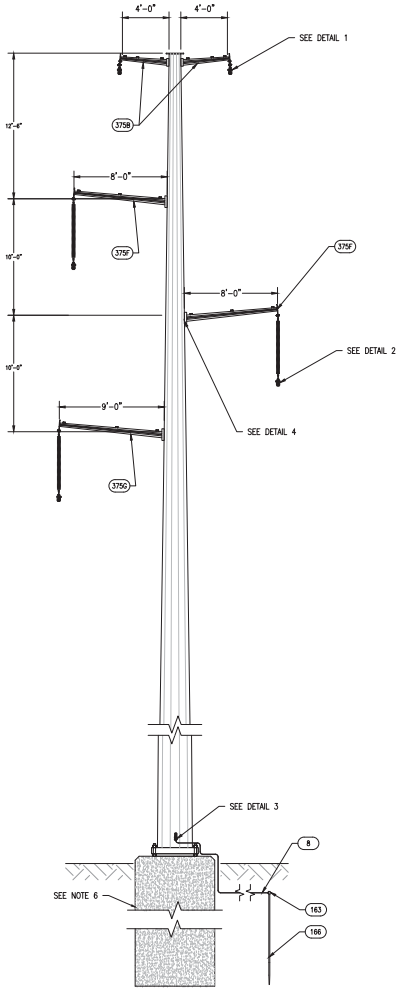
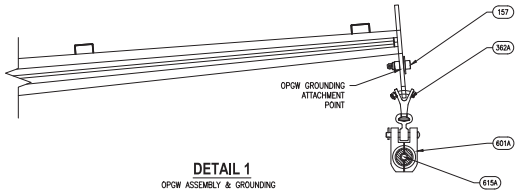
Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

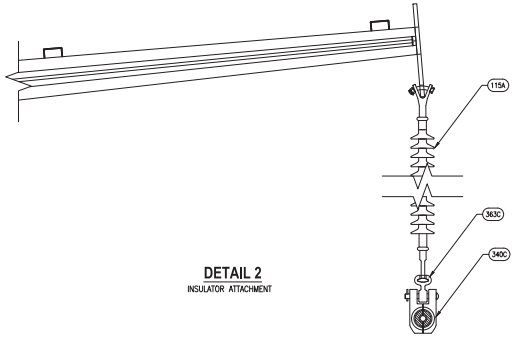
Exhibit A



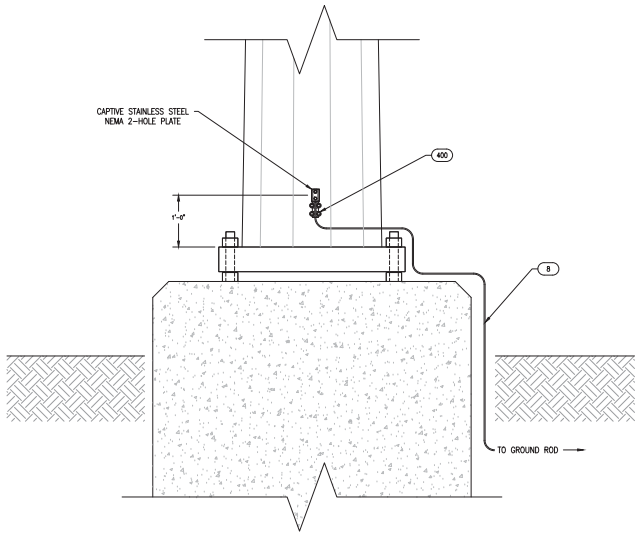
TYPE S-TAN-DAV



DETAIL 1
OPGW ASSEMBLY & GROUNDING



DETAIL 2
INSULATOR ATTACHMENT



DETAIL 3
POLE GROUNDING

TYPE S-TAN-DAV

ITEM NO.	QTY	UNIT OF MEASURE	MATERIAL DESCRIPTION	MANUFACTURER	CATALOG NO.
4.XX	1	EA	STEEL POLE, WITH BASE PLATE FOR FOUNDATION, SIZE VARIES	BY DESCRIPTION	OSE
8	15	FT	GROUND WIRE, 2/0 AWG COPPER, 7 STRAND, DIA. 0.4137", FT	BY DESCRIPTION	BY DESCRIPTION
115A	3	EA	INSULATOR, POLYMER, DEADEND, SUSPENSION, Y-CLEVIS BALL, 138kV, WITH 8" CORONA RING (50 KIP)	NGK-LOCKE	502-SS430-YK-08
157	3	EA	BONDING BOLT, DIA. 1/2", 1-1/2" LENGTH, INCLUDES NUT & LOCKNUT	HUGHES	GWB51-1/2
163	1	EA	GROUND CLAMP, BRONZE, 2/0 AWG COPPER TO DIA. 3/4" GROUND ROD	ERICO	HDC34SP
166	1	EA	GROUND ROD, COPPERBONDED, DIA. 3/4", 10' LENGTH	ERICO	613400
340C	3	EA	CUSHION CLAMP, .884"-1.196" DIA., FOR ALL 795 CONDUCTOR	PLP	CGS-1097
362A	2	EA	Y-CLEVIS BALL, (30 KIP)	HUBBELL	YBC30
363C	3	EA	SOCKET EYE (50 KIP)	HUBBELL	SA1550
375B	2	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 4' LENGTH	BY DESCRIPTION	OSE
375F	2	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 8' LENGTH	BY DESCRIPTION	OSE
375G	1	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 9' LENGTH	BY DESCRIPTION	OSE
400	1	EA	CONNECTOR, BRONZE, CABLE TO FLAT, 2-HOLE NEMA, GROUNDING	HUBBELL	SWL022B
601A	2	EA	CUSHION CLAMP FOR OPGW, .538"-.563" DIA., WITH CLEVIS EYE AND GROUND WIRE	PLP	4700106GYC

NOTES:
1. FOR POLE GROUNDING DETAILS SEE DWG. TMR04-T-0104, DETAIL GRD-1.
2. FOR CONCRETE FOUNDATION DETAILS SEE DWG. TMR04-T-0200.
3. FOR CONDUCTOR DAMPER INSTALLATION SEE DWG. TMR04-T-0109.
4. FOR OPGW DAMPER INSTALLATION SEE DWG. TMR04-T-0108.
5. FOR DAVIT ARM DETAILS SEE DWG. TMR04-T-0106.
6. FOR STEEL POLE LADDER DETAILS SEE DWG. TMR04-T-0107.
7. STEEL POLES, DAVIT ARMS AND LADDERS ARE REPRESENTATIVE OF THE DESIGN. FINAL CONFIGURATIONS AND DRAWINGS TO BE PROVIDED BY STEEL POLE VENDOR.

VER.	DATE	DRAWN	CHECKED	APPROVED	MODIFICATION
A	08/03/2018	SJF	DLH	TMH	ISSUED FOR REVIEW - 75% FOR BOP BID

DATE 08/03/2018 DRAWN SJF
SCALE VARIES
08/03/2018 CHECKED DLH
08/03/2018 APPROVED TMH
Format ANSI D

TIMBER ROAD WIND FARM

TIMBER ROAD IV
PAULDING COUNTY, OHIO
138kV GENERATOR LEAD
S-TAN-DAV STRUCTURE DETAIL

SGC Engineering
A Lloyd's Register Company

Rev. A | Page: 1 of 1
Proj. Nº: 1308004 | Doc. Nº: TMR04-T-0100
Drawing Nº: T-0100

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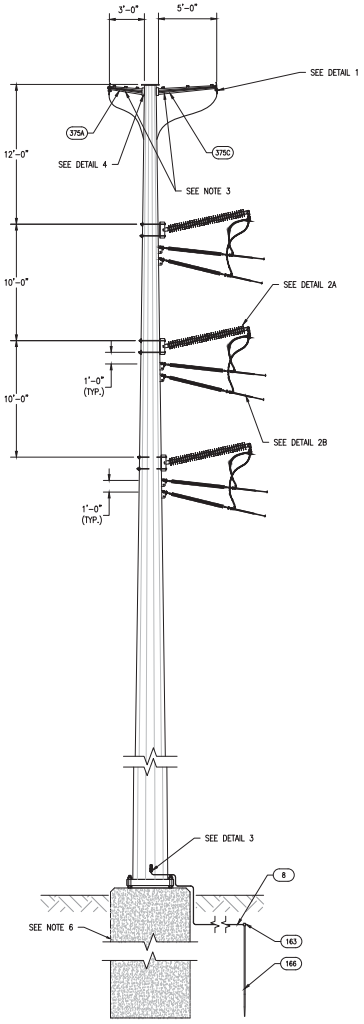

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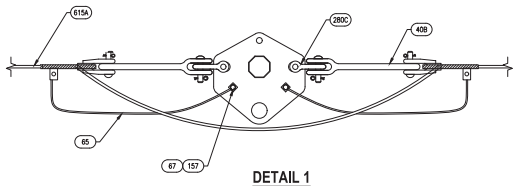
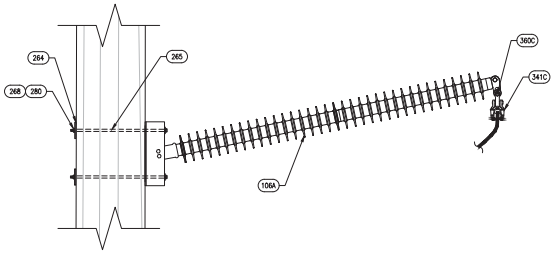
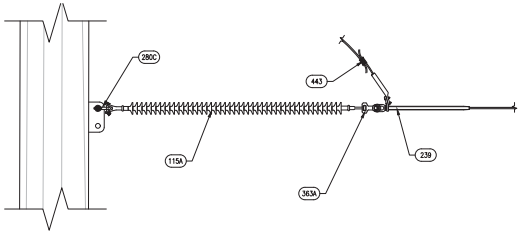


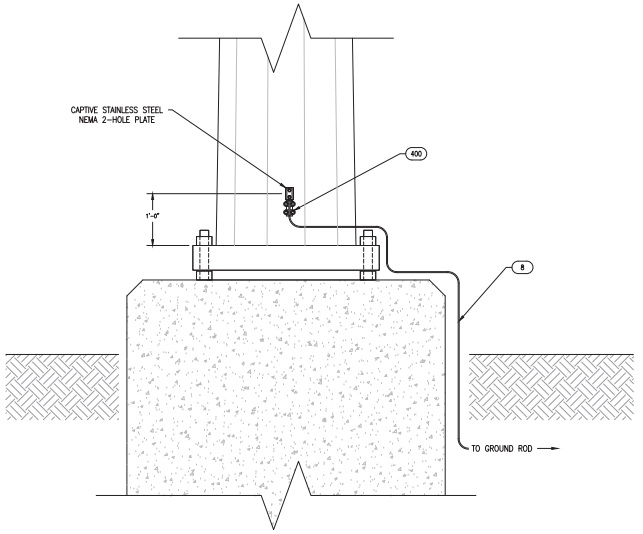
DETAIL 1
OPGW ASSEMBLY & GROUNDING



DETAIL 2A
HORIZONTAL LINE POST ASSEMBLY



DETAIL 2B
CONDUCTOR DEADEND ASSEMBLY



DETAIL 3
POLE GROUNDING

TYPE S-DE

ITEM NO.	QTY	UNIT OF MEASURE	MATERIAL DESCRIPTION	MANUFACTURER	CATALOG NO.
4.XX	1	EA	STEEL POLE, WITH BASE PLATE FOR FOUNDATION, SIZE VARIES	BY DESCRIPTION	OSE
8	20	FT	GROUND WIRE, 2/0 AWG COPPER, 7 STRAND, DIA. 0.4137", FT	BY DESCRIPTION	BY DESCRIPTION
40B	4	EA	DEADEND, OPGW, DIA. 0.551", INCLUDES 1/2" GROUNDING BOLT, NUT, & WASHER	PLP	2801310
65	4	EA	GROUNDING LEAD, NO. #4 - 7 STRAND CU., DIA. 0.232", 48" LENGTH, INCLUDES ONE SINGLE HOLE TERMINAL FOR DIA. 1/2" BOLT	PLP	710010016
67	4	EA	TERMINAL, COMPRESSION, SINGLE HOLE FOR DIA. 1/2" BOLT	BURNDY	YA28A3
106A	3	EA	INSULATOR, POLYMER, HORIZONTAL LINE POST, 138 kV	NGK-LOCKE	L2-SN361-13
115A	6	EA	INSULATOR, POLYMER, DEADEND, SUSPENSION, Y-CLEVIS BALL, 138kV, WITH 8" CORONA RING (50 KIP)	NGK-LOCKE	502-SS430-YK-08
157	5	EA	BONDING BOLT, DIA. 1/2", 1-1/2" LENGTH, INCLUDES NUT & LOCKNUT	HUGHES	GWB51-1/2
163	1	EA	GROUND CLAMP, BRONZE, 2/0 AWG COPPER TO DIA. 3/4" GROUND ROD	ERICO	HDC34SP
166	1	EA	GROUND ROD, COPPERBONDED, DIA. 3/4", 10' LENGTH	ERICO	613400
239	6	EA	STRAIN CLAMP, AL, COMPRESSION, 2-DIE, 795 MCM 26/7 "DRAKE" ACSR, INCLUDES 15° JUMPER TERMINAL, STAINLESS STEEL TERMINAL HARDWARE	ANDERSON	SEDA3309-SS
264	6	EA	WASHER, SQ. FLAT, GALV, 4" x 4" x 3/8", FOR DIA. 7/8" BOLT	HUGHES	SW4-80-3/8
265	6	EA	BOLT SQUARE HEAD, GALV, DIA. 7/8", 9 UNC THREAD, INC SQUARE NUT, LENGTH AS NEEDED	HUGHES	B8XX-X
268	6	EA	LOCKNUT, GALV, SQ., 7/8 "	HUGHES	MF80
280	6	EA	WASHER, HELICAL LOCK, GALV, FOR DIA. 7/8" BOLT	HUGHES	SLW2-80
280C	10	EA	ANCHOR SHACKLE, (50K)	HUBBELL	AS50BNK
341C	3	EA	SUSPENSION CLAMP, ALUMINUM, FOR .90" - 1.39" DIA. CONDUCTOR (25K)	HUBBELL	HAS 139-S
360C	3	EA	Y-CLEVIS EYE, 13/16" HOLE (30 KIP)	HUBBELL	YCS1059013
363A	6	EA	SOCKET, Y-CLEVIS, (50 KIP)	HUBBELL	SYC50
375A	1	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 3' LENGTH	BY DESCRIPTION	OSE
375C	1	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 5' LENGTH	BY DESCRIPTION	OSE
400	1	EA	CONNECTOR, BRONZE, CABLE TO FLAT, 2-HOLE NEMA, GROUNDING	HUBBELL	SWL022B
443	3	EA	U-BOLT, ALUMINUM ALLOY, HEAVY DUTY PARALLEL GROOVE, 3 U-BOLT, 6-3/4" LONG, FOR 605 - 900 ACSR CONDUCTOR (SPLICE JUMPER FOR 795 - 795 ACSR)	HUBBELL	LCU70066
615A	4	EA	MARKER WRAP AROUND FOR OPGW (.50" - 1.00" DIA.) ORANGE	ACP	DN-33O

NOTES:
1. FOR POLE GROUNDING DETAILS SEE DWG. TMR04-T-0104, DETAIL GRD-1.
2. FOR CONCRETE FOUNDATION DETAILS SEE DWG. TMR04-T-0201.
3. FOR CONDUCTOR DAMPER INSTALLATION SEE DWG. TMR04-T-0109.
4. FOR DAVIT ARM DETAILS SEE DWG. TMR04-T-0106.
5. FOR STEEL POLE LADDER DETAILS SEE DWG. TMR04-T-0107.
6. STEEL POLES, DAVIT ARMS AND LADDERS ARE REPRESENTATIVE OF THE DESIGN. FINAL CONFIGURATIONS AND DRAWINGS TO BE PROVIDED BY STEEL POLE VENDOR.

VER.	DATE	DRAWN	CHECKED	APPROVED	MODIFICATION
A	08/03/2018	SJF	DLH	TMH	ISSUED FOR REVIEW - 75% FOR BOP BID

DATE SCALE VARIES
08/03/2018 DRAWN SJF
08/03/2018 CHECKED DLH
08/03/2018 APPROVED TMH
Format ANSI D

TIMBER ROAD WIND FARM

TIMBER ROAD IV
PAULDING COUNTY, OHIO
138kV GENERATOR LEAD
S-DE STRUCTURE DETAIL
Proj. Nº:1308004 Doc. Nº: TMR04-T-0101

SGC Engineering
A Lloyd's Register Company
Rev. A Page: 1 of 1
Drawing Nº: T-0101

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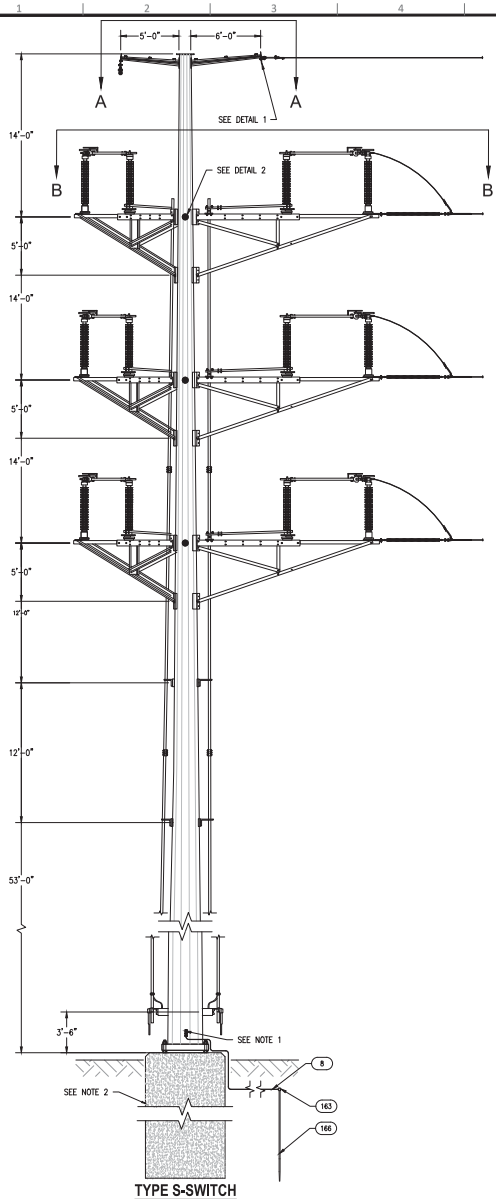
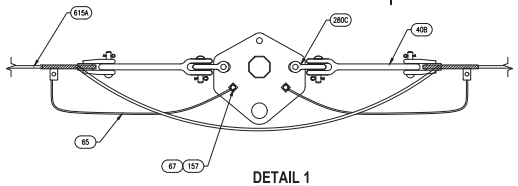
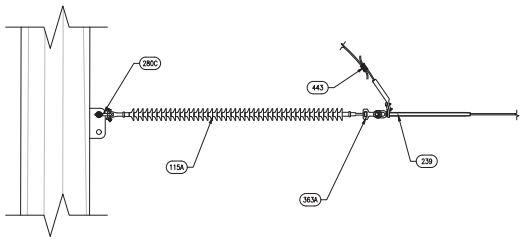


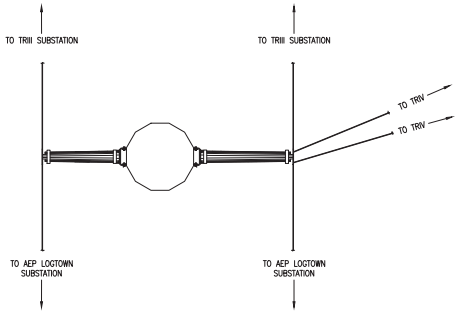
TYPE S-SWITCH



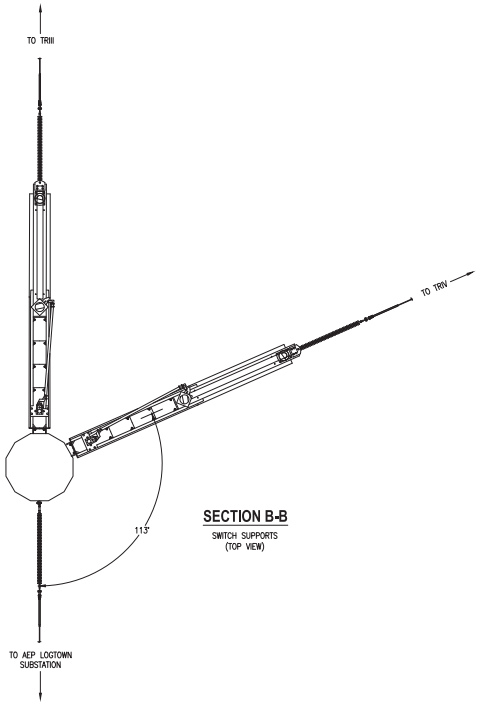
DETAIL 1
OPGW ASSEMBLY & GROUNDING



DETAIL 2
CONDUCTOR DEADEND ASSEMBLY



SECTION A-A
OPGW DAVIT ARMS
(TOP VIEW)



SECTION B-B
SWITCH SUPPORTS
(TOP VIEW)

TYPE S-SWITCH

ITEM NO.	QTY	UNIT OF MEASURE	MATERIAL DESCRIPTION	MANUFACTURER	CATALOG NO.
8	20	FT	GROUND WIRE, 2/0 AWG COPPER, 7 STRAND, DIA. 0.4137", FT	BY DESCRIPTION	BY DESCRIPTION
40B	6	EA	DEADEND, OPGW, DIA. 0.551", INCLUDES 1/2" GROUNDING BOLT, NUT, & WASHER	PLP	2801310
65	6	EA	GROUNDING LEAD, NO. #4 - 7 STRAND CU., DIA. 0.232", 48" LENGTH, INCLUDES ONE SINGLE HOLE TERMINAL FOR DIA. 1/2" BOLT	PLP	710010016
67	6	EA	TERMINAL, COMPRESSION, SINGLE HOLE FOR DIA. 1/2" BOLT	BURNDY	YA28A3
115A	9	EA	INSULATOR, POLYMER, DEADEND, SUSPENSION, Y-CLEVIS BALL, 138kV, WITH 8" CORONA RING (50 KIP)	NGK-LOCKE	502-SS430-YK-08
157	6	EA	BONDING BOLT, DIA. 1/2", 1-1/2" LENGTH, INCLUDES NUT & LOCKNUT	HUGHES	GWB51-1/2
163	1	EA	GROUND CLAMP, BRONZE, 2/0 AWG COPPER TO DIA. 3/4" GROUND ROD	ERICO	HDC34SP
166	1	EA	GROUND ROD, COPPERBONDED, DIA. 3/4", 10' LENGTH	ERICO	613400
239	9	EA	STRAIN CLAMP, AL, COMPRESSION, 2-DIE, 795 MCM 26/7 "DRAKE" ACSR, INCLUDES 15" JUMPER TERMINAL, STAINLESS STEEL TERMINAL HARDWARE	ANDERSON	SEDA3309-SS
280C	15	EA	ANCHOR SHACKLE, (50K)	HUBBELL	AS50BNK
363A	9	EA	SOCKET, Y-CLEVIS, (50 KIP)	HUBBELL	SYC50
400	1	EA	CONNECTOR, BRONZE, CABLE TO FLAT, 2-HOLE NEMA, GROUNDING	HUBBELL	SVL022B
401	15	EA	TERMINAL, BOLTED, 795 ACSR TO 4-HOLE NEMA	HUBBELL	ACF13D
615A	6	EA	MARKER WRAP AROUND FOR OPGW (.50" - 1.00" DIA.) ORANGE	ACP	DN-33O

NOTES:
1. FOR POLE GROUNDING DETAILS SEE DWG. TMR04-T-0104, DETAIL GRD-1.
2. FOR CONCRETE FOUNDATION DETAILS SEE DWG. TMR04-T-0202.
3. STRUCTURE AND SWITCHES TO BE PROVIDED BY OWNER AS A SINGLE UNIT TO BE ERECTED AND ASSEMBLED AT SITE. MATERIALS IN BILL OF MATERIALS (THIS PAGE) TO BE PROVIDE BY AND INSTALLED BY LINE CONTRACTOR
4. INSTALLATION OF THIS STRUCTURE MAY REQUIRE AN OUTAGE TO THE TIMBER ROAD III GENERATOR LEAD. PLEASE PROVIDE A DETAILED WORK PLAN FOR THIS INSTALLATION DETAILING WORK PROCESS, ALL EXPECTED OUTAGES, AND DURATIONS.
5. STEEL POLES, DAVIT ARMS, AND SWITCHES ARE REPRESENTATIVE OF THE DESIGN. FINAL CONFIGURATIONS AND DRAWINGS TO BE PROVIDED BY POLE AND SWITCH VENDOR.

VER.	DATE	DRAWN	CHECKED	APPROVED	MODIFICATION
A	08/03/2018	SJF	DLH	TMH	ISSUED FOR REVIEW - 75% FOR BOP BID

DATE	SCALE VARIES
08/03/2018	DRAWN SJF
08/03/2018	CHECKED DLH
08/03/2018	APPROVED TMH
Format ANSI D	

TIMBER ROAD IV
PAULDING COUNTY, OHIO

138kV GENERATOR LEAD
S-SWITCH STRUCTURE DETAIL

Proj. Nº: 1308004 | Doc. Nº: TMR04-T-0102

SGC Engineering
A Lloyd's Register Company

Rev. A | Page: 1 of 1

Drawing Nº: T-0102

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Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit B

Complaint Resolution Plan

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
William V. Vorys (0093479)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
Columbus, Ohio 43215
Phone: (614) 591-5461
Email: cpirik@dickinsonwright.com
todonnell@dickinsonwright.com
wvorys@dickinsonwright.com

Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

Paulding Wind Farm IV LLC, a wholey owned subsidiary of EDP Renwables North America LLC (EDPR)

Timber Road Complaint Resolution Plan

PURPOSE: To ensure that the wind farm does not make living conditions materially worse for residents of the community, a transparent and effective complaint resolution plan will be implemented so that members of the community have a mechanism for seeking resolution for interferences or disturbances experienced that are a direct result of the wind farm.

BACKGROUND: EDPR is committed to ensuring that an accessible process is in place for community members to voice concerns pertaining to the wind farm and for those concerns to be addressed as quickly and effectively as possible. Maintaining detailed record of all complaints and the resolutions that follow is an important aspect of the complaint resolution plan.

POLICY: The policy of EDPR is to take all reasonable actions necessary to rectify legitimate interference or disturbances that are a direct result of the wind farm. Where reasonable actions are implemented and do not minimize the interference or disturbance, EDPR will compensate the impacted resident by entering into a participation agreement that will provide annual compensation for the life of the wind farm project.

PROCEDURE: 1.) EDPR will offer to residents whose occupied residence is near a wind turbine a participation agreement prior to the wind farm being commercially operational. This will be done in order to educate residents about the wind farm and to compensate them even though it is not anticipated that they will receive any negative effects, disturbance or interference as a direct result of the wind farm.

www.edpr.com

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

2.) EDPR has established a toll free number , and EDPR will ensure that the phone number is provided to the county commissioners, township trustees, emergency responders and the schools and public libraries within the project area prior to Timber Road IV wind farms being commercially operational. A resident with a complaint may either call the toll free number, at 1-866-263-5594 and leave a message 24 hours a day, or, go to the Operations and Maintenance Facility for the wind farm to register a complaint.

3.) EDPR will be responsible for keeping a log book which registers every complaint that is received. The log book will contain all pertinent information about the person making the complaint, the issues surrounding the complaint and the date that it was received. The log book will also contain the resolution that was suggested and implemented and the date that the matter was resolved. EDPR personnel will forward complaints about interference or disturbance that are a direct result of the wind farm to the Ohio Power Siting Board within 48 hours of receiving the complaint and will generate a quarterly report outlining the nature of the resolution. Quarterly reports will be sent to the Staff of the Ohio Power Siting Board on the following date of each year (April 15th, July 15th, October 15th and January 15th).

4) Residents who register a complaint with EDPR will receive correspondence from the company no later than 72 hours after registering the complaint. The intent of the initial correspondence is to garner more information about the individual's complaint. Within 45 days of the complaint being received EDPR will take all reasonable action to resolve the legitimate complaint about interference or disturbance that is a direct result of the wind farm facility. If it is determined that the reasonable action taken by does not satisfactorily mitigate the interference or disturbance, EDPR will provide compensation to the resident in the form of a participation agreement in which annual compensation shall be provided to the resident.

www.edpr.com

EDP Renewables North America LLC
Corporate Headquarters
808 Travis, Suite 700
Houston, TX 77002
T: 713 265 0350 F: 713 265 0365

Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit C

EMF Study

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
William V. Vorys (0093479)
Dickinson Wright PLLC
150 East Gay Street, Suite 2400
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wvorys@dickinsonwright.com

Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

ELECTRIC AND MAGNETIC FIELDS AND RADIO NOISE LEVELS

TIMBER ROAD IV WIND FARM 138 kV GENERATOR INTERCONNECTION

Prepared for:

SGC ENGINEERING, LLC

Prepared by:

Commonwealth

ELECTRIC AND MAGNETIC FIELDS AND RADIO NOISE LEVELS

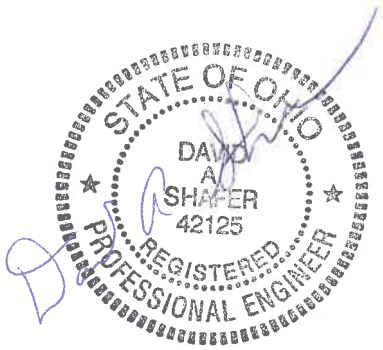
TIMBER ROAD IV WIND FARM 138 kV GENERATOR INTERCONNECTION

Prepared for:

SGC ENGINEERING, LLC

Prepared by:

Richard D. Cook, P.E.
Katherine J. Klaus



Approved for submittal by:

David A. Shafer

David A. Shafer, P.E.
Manager, Electrical Systems

At the Offices of:
Commonwealth Associates, Inc.
P.O. Box 1124
Jackson, Michigan 49204-1124

February 21, 2018
0313.0006\309

TABLE OF CONTENTS

EXHIBITS

INTRODUCTION

Commonwealth Associates, Inc. was contracted by SGC Engineering to perform calculations for Electric and Magnetic Fields and Radio Noise for the proposed 138 kV transmission line which is intended to interconnect the Bulk Electric System (BES) with the new Timber Road IV Wind Farm to be located in Paulding County about 4 miles SSE of Payne, Ohio. The new Wind Farm IV Substation will be constructed on the east side of Road 59 near its junction with Road 52, north of the currently operating Timber Road II Wind Farm also located in Paulding County, Ohio. The interconnection point is at a new 138 kV tap located 2.5 miles from the Timber Road II substation on the radial 138 kV line from the Timber Road II substation to the existing Timber Road III substation. The new 138 kV transmission line will extend 3 miles east from the new tap to the new Timber Road IV substation. The Timber Road II Substation is located along the 138 kV AEP circuit between the AEP Haviland and Tillman substations. A map for the proposed new 138 kV transmission line is shown in Exhibit 1 and the tangent vertical pole configuration is shown in Exhibit 2.

The proposed new 138 kV transmission line:

- Starts from a new 138 kV tap (Interconnection Point) on the existing Timber Road II to Timber Road III 138 kV radial transmission line
- Extends 2 miles east to proposed new Timber Road IV Wind Farm (along Road 59)
- Centered in 125-foot right-of-way (ROW)
- Phase Conductors will be 795 kcmil ACSR Drake
- Phase conductors are rated 852 Amps summer and 1252 Amps winter
- Conductors on vertical poles in a delta configuration (Exhibit 2)
- Topped with two OPGW shield wires
- Minimum conductor height, Hmin = 25’
- Span-to-span conductor sag is 11.5 feet
- Average conductor height, Havg = 28.833 feet

Ohio Power Siting Board (OPSB) Chapter 4906-5-07 (A) (2) (a) requires that applicants for electric power facilities shall calculate the electric and magnetic field strength levels for the transmission line at minimum conductor height measured at one meter above ground, both under the conductors and at the edge of the ROW (EROW) for:

(i) Winter normal conductor rating (1252 Amps)
(ii) Emergency Line Loading (852 Amps)
(iii) Normal Maximum loading (852 Amps)

The applicant shall provide a typical calculated profile of the electric and magnetic field strengths.

Ohio Power Siting Board (OPSB) Chapter 4906-5-07 (A) (3) requires that applicants for electric power facilities shall calculate radio and TV interference (radio noise). Because TV reception includes encoding that greatly limits the impacts of random electromagnetic noise such as generated by HV transmission lines, we did not include TV noise calculations in this study.

SUMMARY OF RESULTS

The following table describes the Electric and Magnetic Fields and Radio Noise; giving both peak (maximum) values within the planned ROW and values at the edge of the ROW (EROW). The Electric and Magnetic Fields and Radio Noise levels are calculated for both the minimum conductor height of 25 feet at the center of each transmission line span (point of maximum conductor sag), and at the average conductor height of 28.833 feet (based on a span-to-span conductor sag of 11.5 feet). The results at Hmin are representative of the values found under the transmission line conductors within the ROW and the results at Havg are representative of the values at the EROW and beyond. Heavy Rain Radio Noise levels were calculated at a frequency of 1000 kHz (center of the AM Radio frequency spectrum).

			Peak Inside ROW		**EROW (± 62.5')**	
			Hmin = 25'	**Havg = 28.833'**	**Hmin = 25'**	**Havg = 28.833'**
Electric Field	(kV/m)	144.9 kV	1.96	1.55	0.30	0.29
Magnetic Field - Winter	(mG)	1252 Amps	204.48	158.65	41.18	39.13
Magnetic Field - Summer	(mG)	852 Amps	139.15	107.96	28.02	26.63
Radio Noise (1000 kHz)	(dB)	144.9 kV	47.85	46.86	42.80	42.57

CALCULATIONS

The calculations for Electric and Magnetic Fields and Radio Noise profiles were made using the TRALIN module of the CDEGS program. The Radio Noise calculations were performed utilizing the IREQ (Canada) method within the TRALIN module of the CDEGS program.

The voltage dependent Electric Field calculations were performed assuming that the line was operating at an ANSI maximum of 1.05% of nominal voltage (138*1.05 = 144.9 kV). The current dependent Magnetic Field calculations were performed assuming the phase conductors were loaded to either their winter or summer normal rated current carrying capacity (1252 or 852 Amps respectively). The Radio Noise calculations were performed for "Heavy Rain" weather conditions at an altitude of 1000 feet above sea level.

Coordinates used for calculations were based on the tangent structure and are shown below and in Exhibit 2. The first number in each set is the horizontal distance in feet from the center line of the structure/right-of-way. The second number is the lowest height above level ground for the generator interconnection design.

Phase C	**Phase B**	**Phase A**	**Shield Wire 1**	**Shield Wire 2**
Hmin = 25'				
(-10.3', 25')	(8.8', 35')	(-8.7', 45')	(-4.48', 63.00')	(4.48', 63.00')
Havg = 28.833'				
(-10.3', 28.833')	(8.8', 38.833')	(-8.7', 48.833')	(-4.48', 66.33')	(4.48', 66.33')

ELECTRIC FIELD RESULTS

The High Voltage (HV) lines of the 138 kV Transmission Line create an electric field in the vicinity of the HV conductors. The AC electric field reaches a maximum level of almost 2 kV under the HV conductors within the ROW. Because the delta configuration on the vertical poles is not symmetrically positioned relative to the ground, the electric field is also mildly asymmetrical at the measurement point one meter above ground. Thus, as shown in Exhibit 3, at the right EROW the electric field is 0.30 kV/m and on the left EROW it is 0.24 kV/m; we reported the larger right-side value in the table on page 2.

MAGNETIC FIELD RESULTS

The Magnetic Field for the 138 kV Transmission Line was calculated with phase conductors carrying either their full winter or summer normal current of 1252 or 852 Amps respectively. The current in the phase conductors of the 138 kV Transmission Line creates a magnetic field in their vicinity. Under the phase conductors within the ROW, the AC magnetic field reaches a maximum level of almost 205 mG (milligauss) for Winter Normal (1252 Amps) and 139 mG for Summer Normal (852 Amps). Again, as shown in Exhibit 4, because the delta configuration on the vertical poles is not symmetrically positioned relative to the ground, the magnetic field is also mildly asymmetrical at the measurement point one meter above ground. Thus, the magnetic field at the right EROW is 35.29 mG and 24.04 mG, respectively for winter or summer, and on the left EROW it is 41.18 mG and 28.02 mG, respectively for winter or summer; we reported the larger left-side value in the table on page 2.

RADIO NOISE RESULTS

Corona is a common characteristic of HV lines like the proposed 138 kV Timber Road IV interconnection. The accumulation of water droplets on the underside of the phase conductors during rain causes additional corona activity and results in higher radio noise levels. As stated previously, these calculations were made for heavy rain weather conditions. The corona discharges from the surfaces of the 138 kV conductors are stronger during heavy rain which can result in higher Radio Noise emissions that may interfere with, in particular, AM radio reception. Modern TV and FM radio reception are coded in a manner which significantly reduces the problems of transmission line radio noise interference so these are not expected to see problems.

Commonwealth evaluated AM radio noise levels expected from the 138 kV transmission interconnection and has determined that the radio noise generated by the interconnection is similar to that produced by other 138 kV lines in the vicinity. Nearby AM radio stations, which will have stronger radio signals, should not experience noticeable radio noise interference even during heavy rain conditions. However, as shown in Exhibit 5, where roadways cross under the transmission line, especially in rural areas where AM reception may be weak, drivers may perceive a brief increase in radio interference if they pass near the middle of the span during heavy rain conditions when the maximum transmission line radio noise is 48 dB. The energy of the radio noise interference is almost half (down 5 dB) at the right EROW but some mild interference in rural areas with weak reception may still be experienced by radio receivers close to the EROW during heavy rain. Radio noise during fair weather conditions is not expected to interfere even with rural AM radio reception.

EXHIBIT 1

138 kV Transmission Line Interconnection Map

Exhibit 1

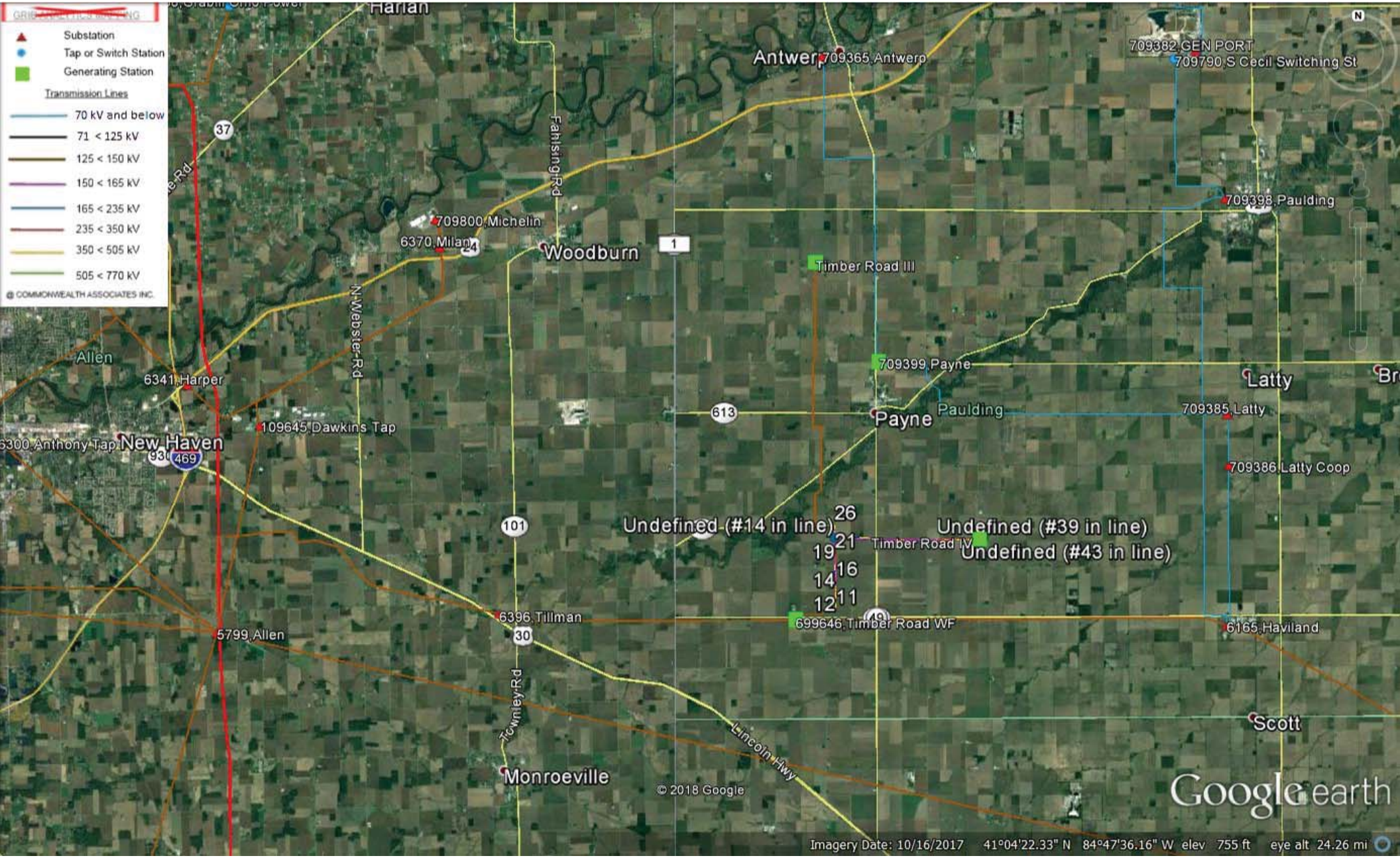
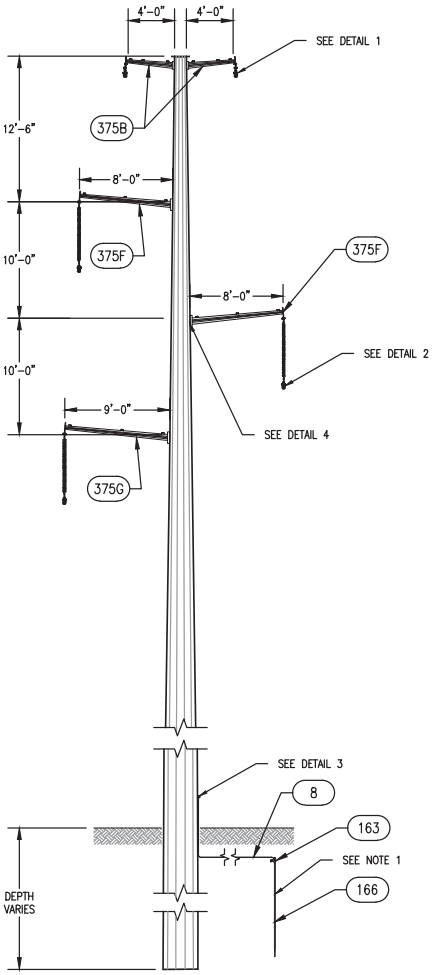
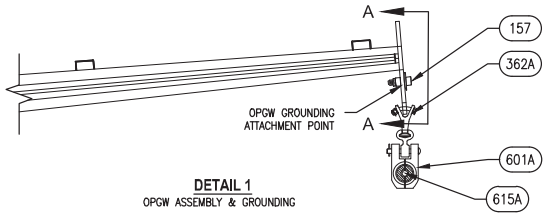

Substation
Tap or Switch Station
Generating Station
Transmission Lines
70 kV and below
71 < 125 kV
125 < 150 kV
150 < 165 kV
165 < 235 kV
235 < 350 kV
350 < 505 kV
505 < 770 kV
© COMMONWEALTH ASSOCIATES INC.
Harlan
Antwerp
709365 Antwerp
709382 GEN PORT
709790 S Cecil Switching St
709398 Paulding
709800 Michelin
6370 Milan
Woodburn
Timber Road III
Fahlsing Rd
N Webster Rd
Allen
6341 Harper
109645 Dawkins Tap
6300 Anthony Tap
New Haven
709399 Payne
Payne
Paulding
Latty
709385 Latty
709386 Latty Coop
Undefined (#14 in line)
Undefined (#39 in line)
Undefined (#43 in line)
Timber Road IV
26
21
19
16
14
11
12
699646 Timber Road WF
6396 Tillman
5799 Allen
6165 Haviland
Townley Rd
Lincoln Hwy
Scott
Monroeville
© 2018 Google
Google earth
Imagery Date: 10/16/2017 41°04'22.33" N 84°47'36.16" W elev 755 ft eye alt 24.26 mi

EXHIBIT 2

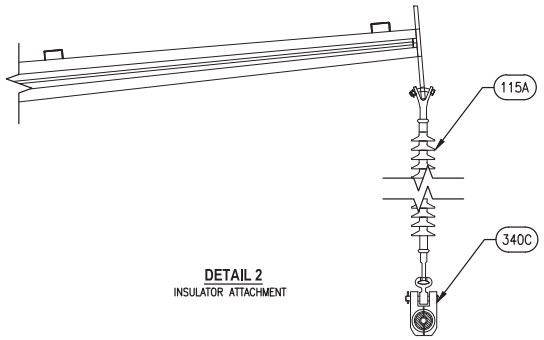
138 kV Transmission Line Tangent Vertical Pole Configuration



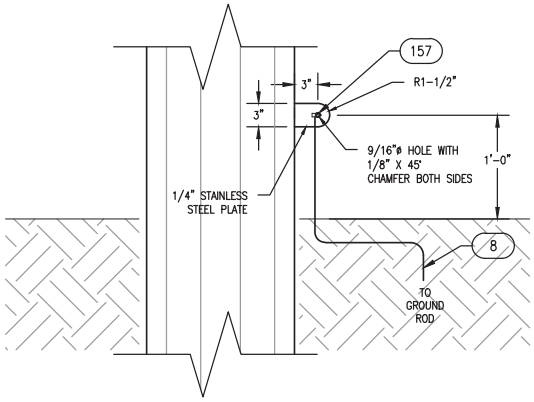
TYPE S-TAN-DAV



DETAIL 1
OPGW ASSEMBLY & GROUNDING



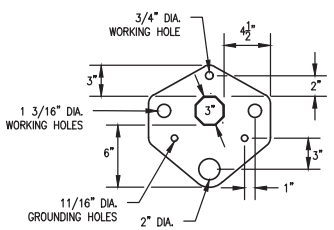
DETAIL 2
INSULATOR ATTACHMENT



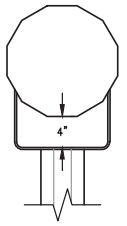
DETAIL 3
GROUNDING VANG

TYPE S TAN DAV

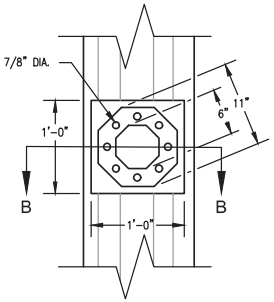
ITEM NO.	QTY	UNIT OF MEASURE	MATERIAL DESCRIPTION	MANUFACTURER	CATALOG NO.
XXX	1	EA	STEEL POLE, DIRECT EMBED, SIZE VARIES	BY DESCRIPTION	BY DESCRIPTION
0	15	FT	GROUND WIRE, 2/0 AWG COPPER, 7 STRAND, DIA. 0.417", FT	BY DESCRIPTION	BY DESCRIPTION
116A	3	EA	INSULATOR, POLYMER, DEADEND, SUSPENSION, Y-CLEVIS BALL, 138kV, WITH 8" CORONA RING (36 KIP)	MACLEAN	SS138008F-A01
157	3	EA	BONDING BOLT, DIA. 1/2", L-1/2" LENGTH, INCLUDES NUT & LOCKNUT	BURNDY	GWB51-1/2
163	1	EA	GROUND CLAMP, BRONZE, 2/0 AWG COPPER TO DIA. 3/4" GROUND ROD	ERICO	1ID0340C
166	1	EA	GROUND ROD, COPPERBONDED, DIA. 3/4", 10' LENGTH	ERICO	612400
375B	2	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 4' LENGTH	BY DESCRIPTION	BY DESCRIPTION
375F	2	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 8' LENGTH	BY DESCRIPTION	BY DESCRIPTION
375G	1	EA	DAVIT ARM, TUBULAR STEEL, 8T SHAPE, 9' LENGTH	BY DESCRIPTION	BY DESCRIPTION
340C	3	EA	CUSHION CLAMP, .864"-1.100" DIA., W/SOCKET EYE, FOR ALL 795 CONDUCTOR	PLP	OGS-1007-SE
362A	2	EA	Y-CLEVIS BALL, (36 KIP)	BURNDY	YBC36
601A	2	EA	CUSHION CLAMP FOR OPGW, .538"-.568" DIA., WITH SLEEVE LYL AND GROUND WIRE	PLP	4/0010001YG
615A	2	EA	MARKER WRAP AROUND FOR OPGW (.50" - 1.03" DIA.) ORANGE	ACP	DN-33O



SECTION A-A
DAVIT ARM ATTACHMENT PLATE DETAIL



SECTION B-B
DAVIT ARM CONNECTION (TOP VIEW)



DETAIL 4
DAVIT ARM CONNECTION DETAIL

NOTES:
1. FOR GROUNDING DETAILS SEE DWG. 1308-12-1137, DETAIL GRD-1.
2. FOR FOUNDATION DETAILS SEE DWG. 1308-12-1132.

SGC Engineering, LLC
a part of Senergy

TIMBER ROAD WIND FARM

THIS INFORMATION CONTAINED HEREIN IS STRICTLY CONFIDENTIAL AND IS THE SOLE PROPERTY OF THE PROJECT OWNER.

PRELIMINARY
NOT FOR CONSTRUCTION

DATE:	SCALE:	DRAWN:	DESIGN:	APPD:
NOVEMBER 18, 2015	N.T.S.	SJF	DLH	TMH

NO.	REVISION	APPD:	DATE:
A	ISSUED FOR 75% REVIEW	TMH	12/07/2015

TITLE: 138 kV Transmission Line Tangent Vertical Pole Configuration
TYPE S-TAN-DAV

PROJECT: TIMBER ROAD III WIND FARM
PAYNE, OHIO

CLIENT: PAULDING WIND FARM III, LLC
c/o EDPR NA LLC, 808 TRAVIS STREET, SUITE 700, HOUSTON TEXAS 77002

SGC PROJECT NUMBER: 1308001
DRAWING NUMBER: 1308-12-1001
REVISION: A
SHEET NUMBER: 1 OF 1

EXHIBITS 3 - 5

EXHIBIT 3 Electric Field Profile
EXHIBIT 4 Magnetic Field Profile
EXHIBIT 5 Radio Noise Profile

Exhibit 3
Timer Road IV Wind Farm
Tower Type S-TAN-DAV
Summer Normal

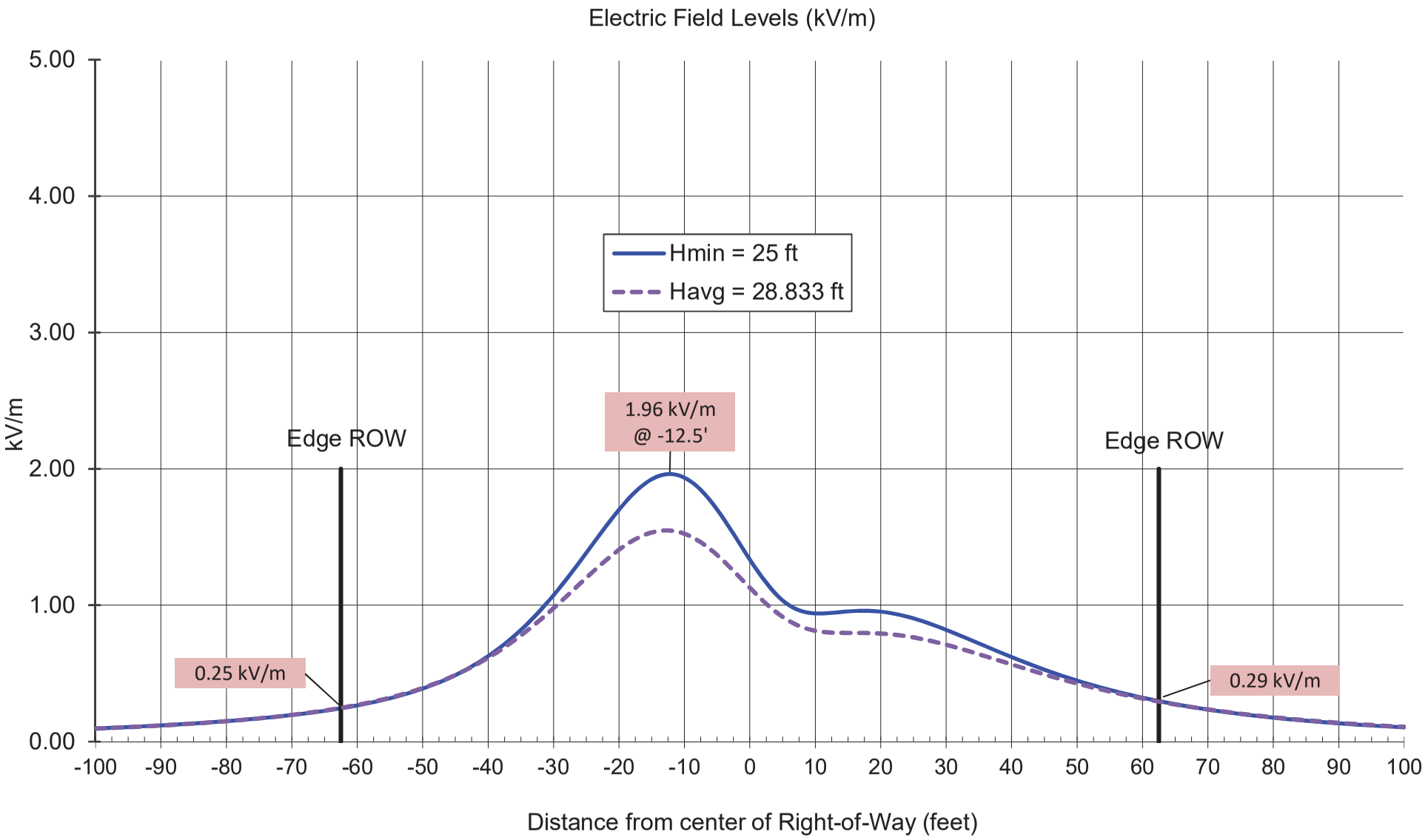


Exhibit 4
Timber Road IV Wind Farm
Tower Type S-TAN-DAV
Summer Normal

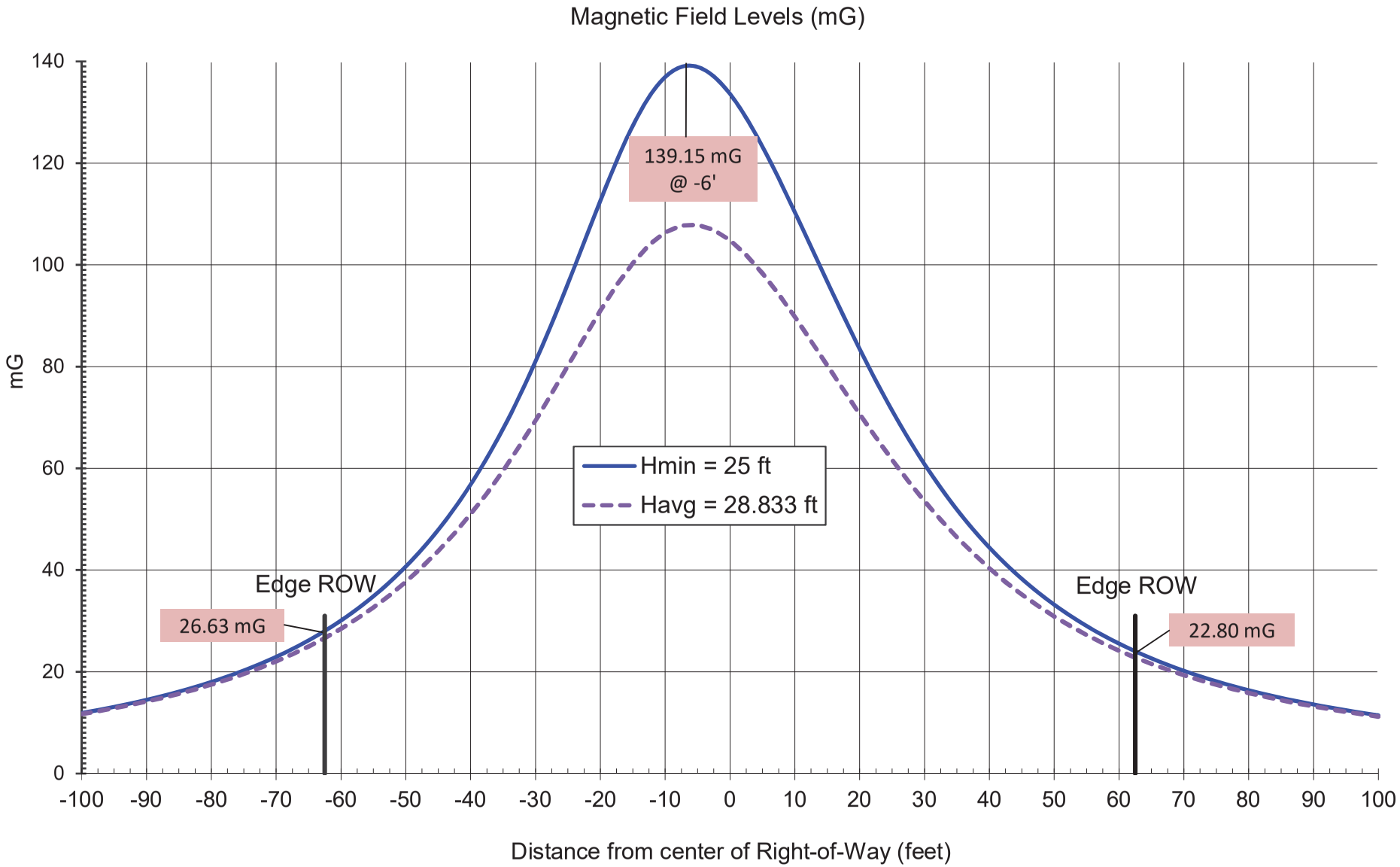
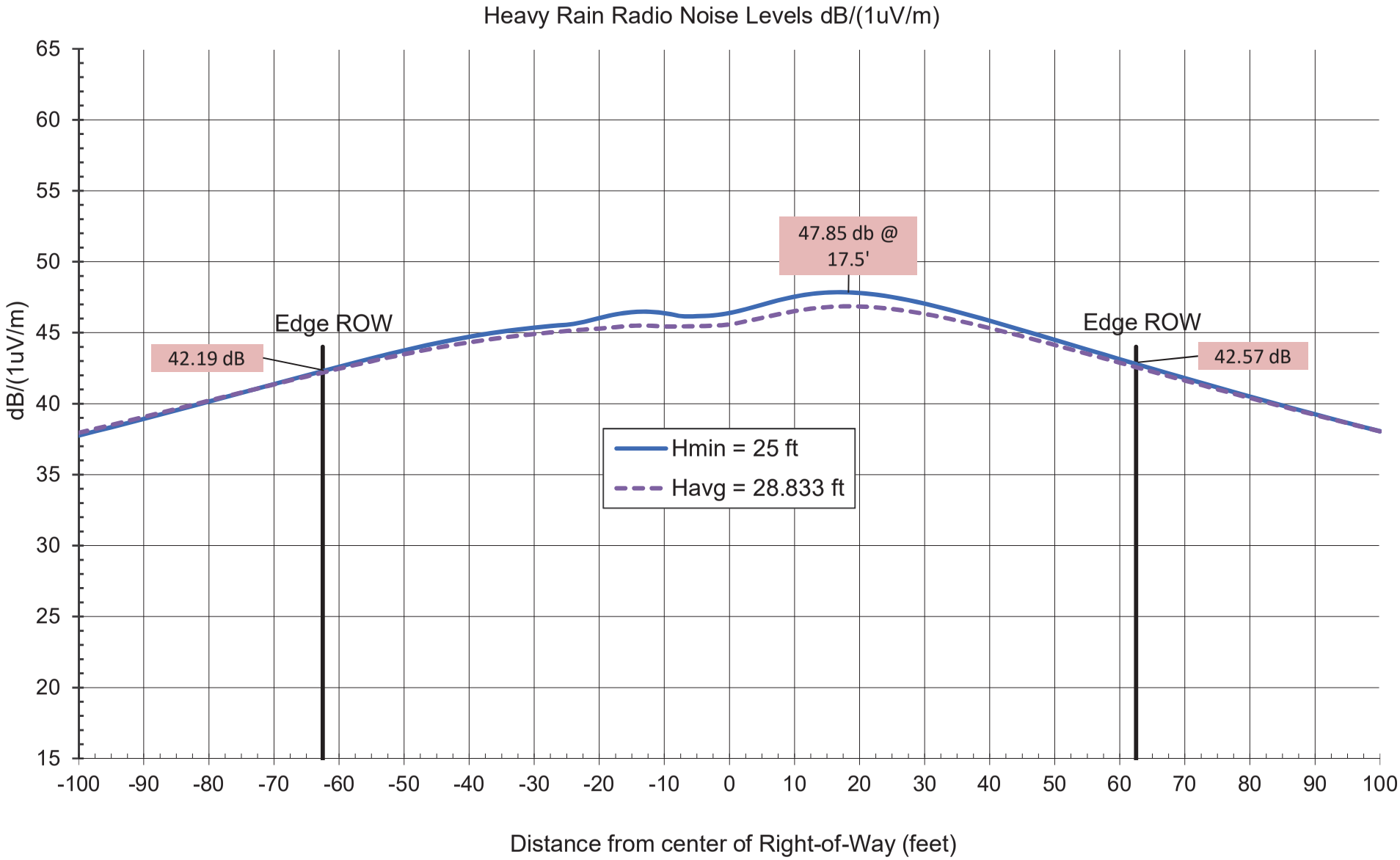


Exhibit 5
Timber Road IV Wind Farm
Tower Type S-TAN-DAV
Summer Normal



Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit D

AM/FM Radio Analysis

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Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

Wind Power GeoPlanner™

AM and FM Radio Report

Paulding Wind Farm IV LLC Transmission Lines

Prepared on Behalf of
EDP Renewables NA
LLC

August 31, 2018

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A CommScope Company

Table of Contents

1. Introduction

Comsearch analyzed AM and FM radio broadcast stations whose service could potentially be affected by the Paulding Wind Farm IV Transmission Lines project in Paulding County, Ohio.

2. Summary of Results

AM Radio Analysis

Comsearch found seven database records[1] for AM stations within approximately 30 kilometers of the project transmission line, as shown in Table 1 and Figure 1. These records represent station WERT, which broadcasts out Van Wert, Ohio, to the southeast of the project; station WJZI, out of Decatur, Indiana, to the southwest; and stations WFCV and WKJG, out of Fort Wayne, Indiana, to the west. Stations WERT, WFCV, and WKCG are licensed separately for operations during daytime and nighttime or critical hours.

ID	Call Sign	Status[2]	Frequency (kHz)	Transmit ERP[3] (kW)	Operation Time	Latitude (NAD 27)	Longitude (NAD 27)	Required Separation Distance[4] (km)	Distance to Trans. Line (km)
1	WERT	LIC	1220	0.25	Daytime	40.871944	-84.554167	0.25	20.50
2	WERT	LIC	1220	0.029	Nighttime	40.871944	-84.554167	0.25	20.50
3	WJZI	LIC	1540	0.25	Daytime	40.820556	-84.920000	0.19	27.15
4	WFCV	LIC	1090	2.5	Daytime	41.083611	-85.075556	2.75	27.44
5	WFCV	LIC	1090	1.0	Critical Hrs.	41.083611	-85.075556	2.75	27.44
6	WKJG	LIC	1380	5.0	Daytime	41.004167	-85.099167	2.17	29.34
7	WKJG	LIC	1380	5.0	Nighttime	41.004167	-85.099167	2.17	29.34

Table 1: AM Radio Stations within 30 Kilometers of Transmission Line

[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.

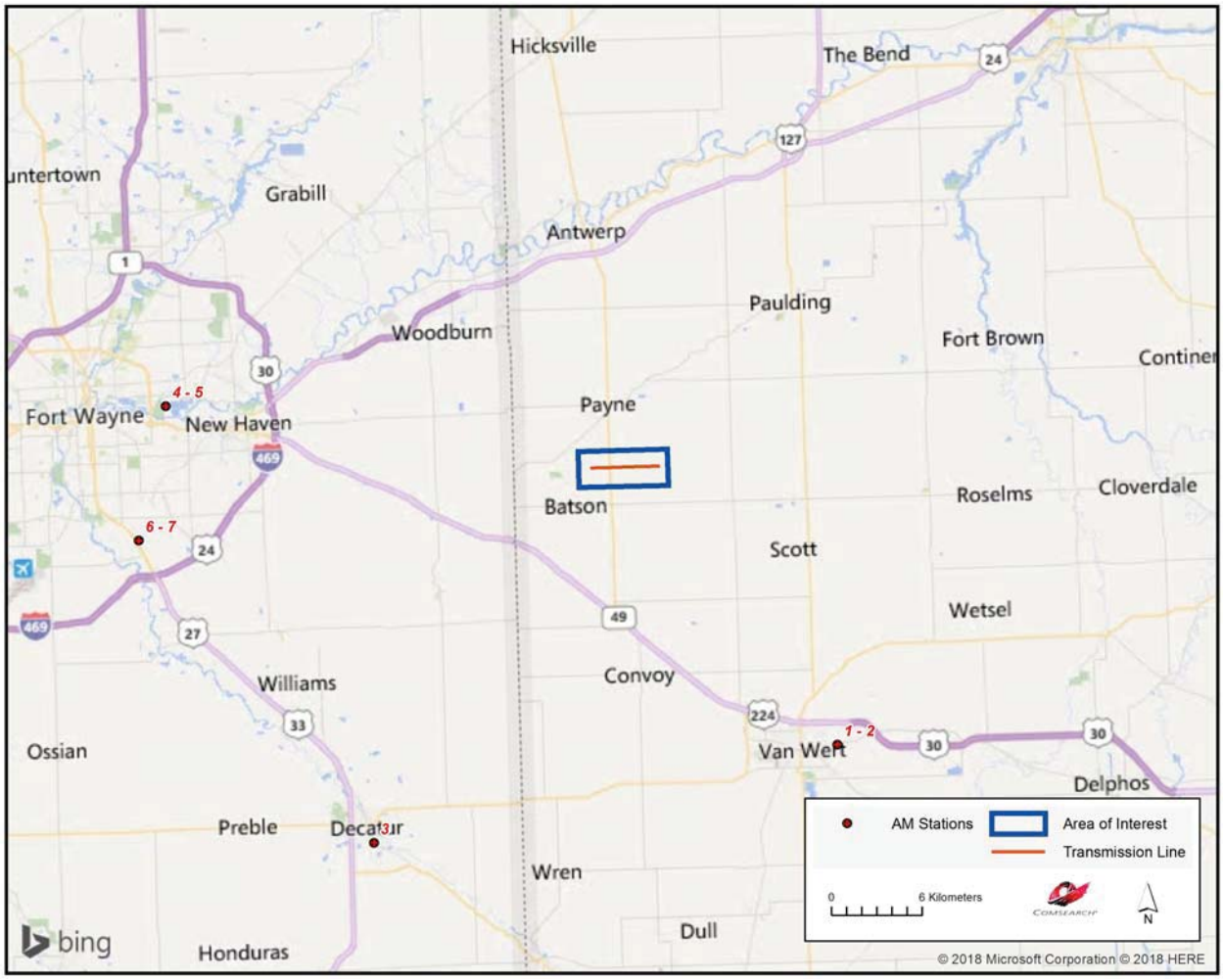

Figure 1: AM Radio Stations within 30 Kilometers of Transmission Line

FM Radio Analysis

Comsearch determined that there were twelve database records for FM stations within 30 kilometers of the transmission line, as shown in Table 2 and Figure 2. Only eleven of these stations are currently licensed and operating, six of which are low-power or translator stations that broadcast with limited range.

ID	Call Sign	Status[5]	Service[6]	Frequency (MHz)	Transmit ERP[7] (kW)	Latitude (NAD 27)	Longitude (NAD 27)	Distance to Trans. Line (km)
1	WKSD	LIC	FM	99.7	3.0	41.058889	-84.591667	7.62
2	WBYR	LIC	FM	98.9	50.0	40.953889	-84.885278	13.99
3	WMYW-LP	LIC	FL	102.7	0.008	41.178611	-84.627222	14.91
4	W282CF	LIC	FX	104.3	0.25	40.872222	-84.553611	20.50
5	WHNH-LP	LIC	FL	101.3	0.1	41.070694	-85.018889	22.55
6	W209AW	LIC	FX	89.7	0.08	41.072500	-85.038611	24.22
7	WLDE	LIC	FM	101.7	6.0	41.076389	-85.045278	24.82
8	WDBF-LP	LIC	FL	103.5	0.1	40.836667	-84.912500	25.30
9	WJFX	LIC	FM	107.9	3.2	41.023889	-85.064167	26.27
10	WDFM	LIC	FM	98.1	50.0	41.291111	-84.538056	29.29
11	W291DF	CP	FX	106.1	0.25	40.801944	-84.943611	29.96
12	WQSW-LP	LIC	FL	100.5	0.1	41.154361	-85.077194	29.65

Table 2: FM Radio Stations within 30 Kilometers of Transmission Line

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

[6] FM = FM broadcast station; FX = FM translator station; FL = Low-power FM station; FS = FM auxiliary (backup) station; FB = FM booster station.

[7] ERP = Transmit Effective Radiated Power.

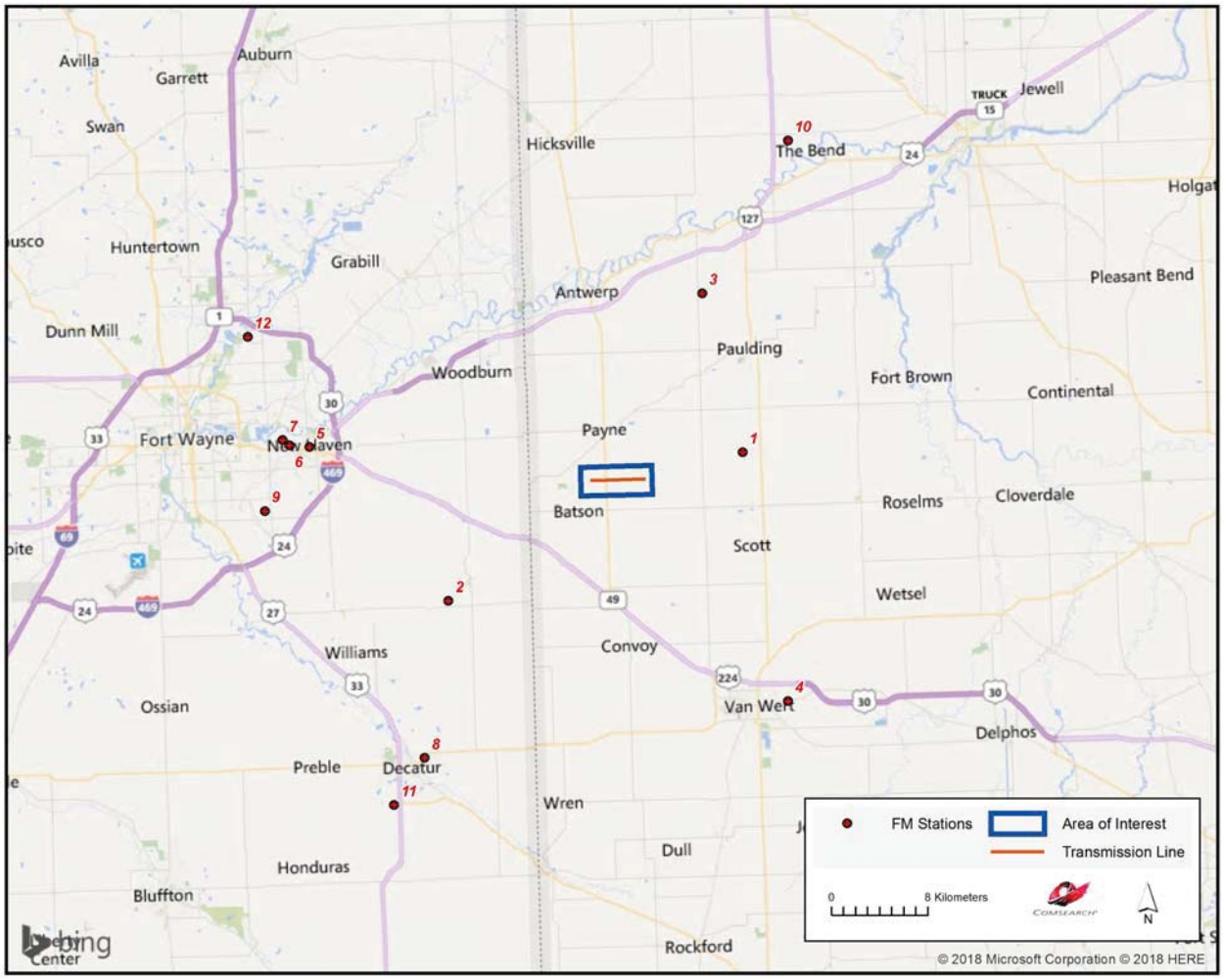

Figure 2: FM Radio Stations within 30 Kilometers of Transmission Line

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 the transmission line towers. The closest AM station to any point on the transmission line project is WERT at a distance of approximately 20.5 kilometers. Since there were no AM 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 towers should not impact the coverage of local AM stations.

The coverage of FM stations is generally not susceptible to interference caused by large objects, such as transmission line towers, especially when they are sited in the *far field* region of the radiating FM antenna, which mitigates the risk of distorting the antenna's radiation pattern. However, within the antenna's *near field* region, radiation pattern distortion can become a factor. Signal attenuation is also possible but can be difficult to quantify without precise field measurements. The closest FM station to the transmission line project, WKSD, is more than 7.6 kilometers away. At this distance, there should be adequate separation to avoid radiation pattern distortion.

Electromagnetic interference (EMI) from a transmission line is caused by an induction field, which is created by the 60 Hz electrical power carried on the transmission line conductors and the harmonics of the 60 Hz fundamental waveform. Interference can also result from arcing that occurs at high-voltage interconnect points on the transmission line. In either case, the interfering signal is amplitude-modulated (AM), and the propagation of the interference occurs over very short distances. These distances are generally around 500 feet or less, and the frequency of the electromagnetic interference does not normally extend above 50 MHz.

Accordingly, the only reception devices that could be affected by EMI would be AM radios, which operate between 0.5 and 1.6 MHz. The degree of degradation to AM reception would be a function of the separation distance of the AM radio from the transmission line and the strength of the received signal. Generally speaking, however, this degradation would be no different than what occurs when a car radio passes under or near existing high voltage transmission lines that interconnect utility companies and their sub stations throughout the state.

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:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5656
Fax:	703-726-5595
Email:	dmeyer@comsearch.com
Web site:	www.comsearch.com

Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit E

Off-Air Television Analysis

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Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

Wind Power GeoPlanner™

Off-Air TV Analysis

Paulding Wind Farm IV LLC Transmission Lines

Prepared on Behalf of
EDP Renewables NA
LLC

August 31, 2018

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 Paulding Wind Farm IV Transmission Lines project in Paulding County, Ohio. 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 transmission line.

2. Summary of Results

The proposed transmission line project area and local communities are depicted in Figure 1, below.

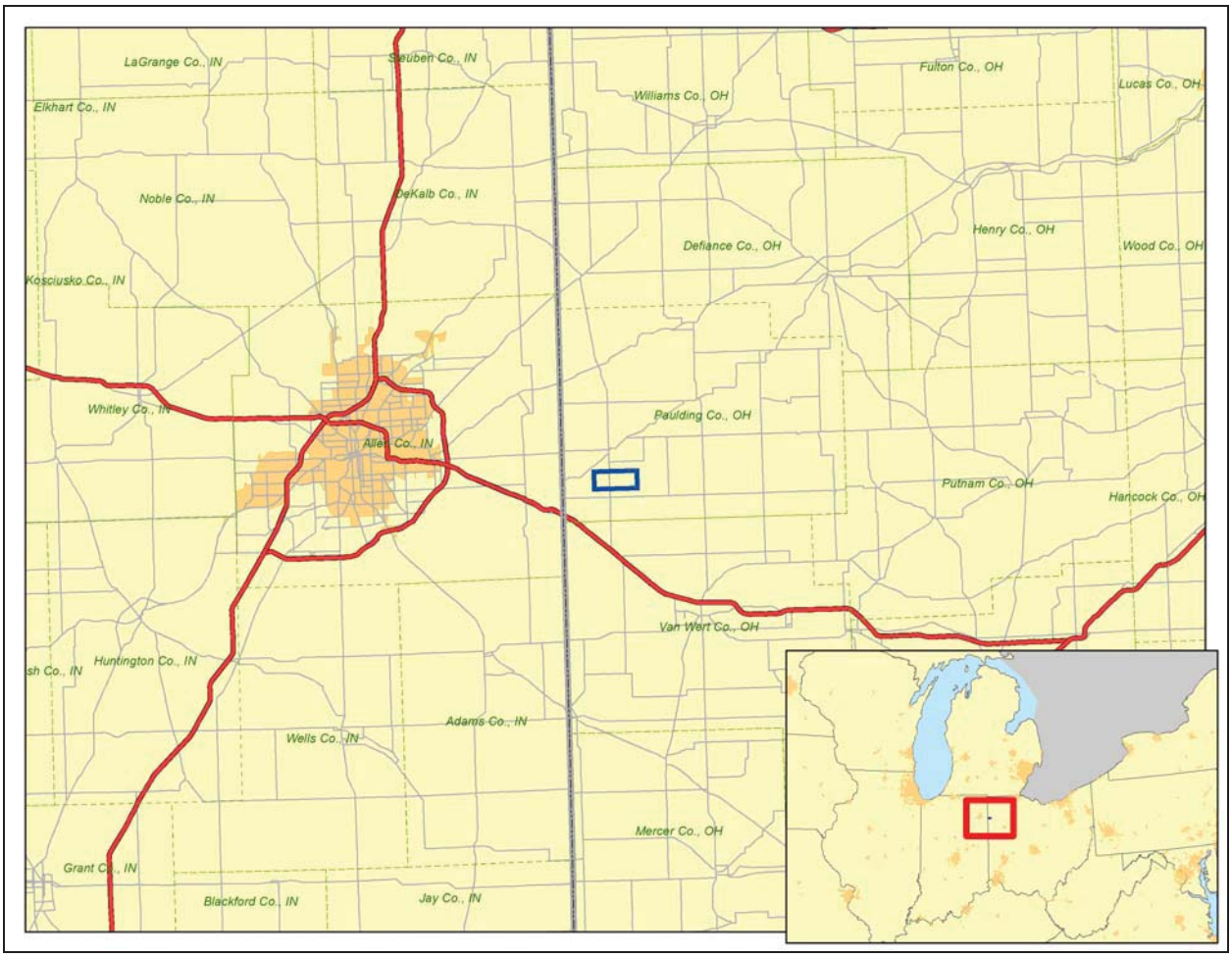

Figure 1: Transmission Line Project Area and Local Communities

To begin the analysis, Comsearch compiled all off-air television stations[1] within 150 kilometers of the transmission line. 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, below, and a plot depicting their locations is provided in Figure 2. There are a total of 116 database records for stations within approximately 150 kilometers of the transmission line. Of these stations, only sixty-eight are currently licensed and operating, twenty-nine 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.

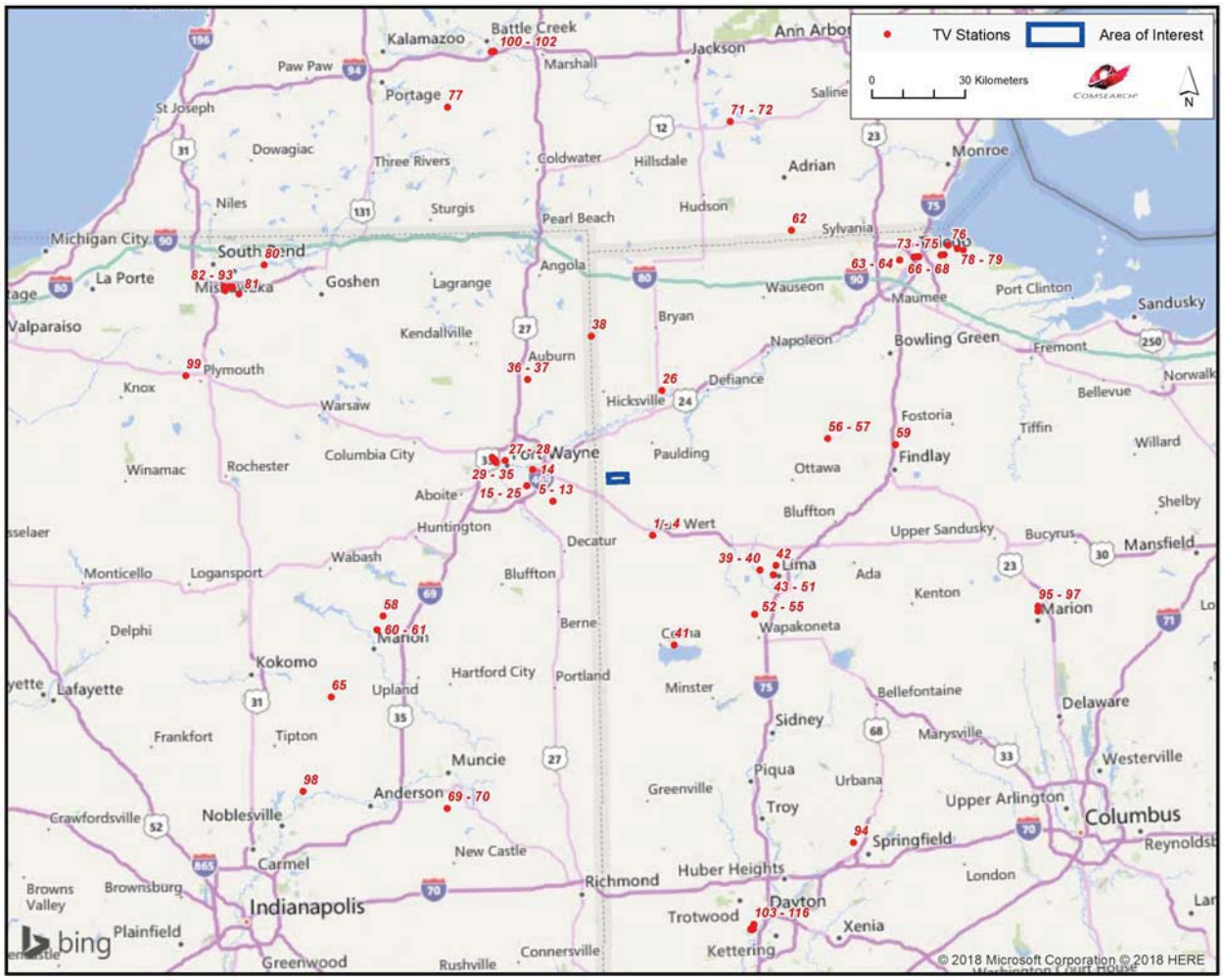

Figure 2: Plot of Off-Air TV Stations within 150 Kilometers of Transmission Line

[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 Center of Project (km)
1	W16DM-D	CP	LD	16	0.5	40.872806	-84.588000	21.49
2	W29EL-D	CP	LD	29	0.5	40.872806	-84.588000	21.49
3	W42EP-D	CP	LD	42	0.5	40.872806	-84.588000	21.49
4	W49EM-D	CP	LD	49	0.5	40.872806	-84.588000	21.49
5	WCUH-LD	CP MOD	LD	16	5.0	40.977250	-84.966056	22.03
6	WCUH-LD	LIC	LD	16	5.0	40.977250	-84.966056	22.03
7	W41DS-D	CP MOD	LD	41	6.0	40.977250	-84.966056	22.03
8	W41DS-D	LIC	LD	41	6.0	40.977250	-84.966056	22.03
9	W04DU-D	CP	LD	4	3.0	40.977222	-84.966111	22.04
10	W43DI-D	CP MOD	LD	43	10.0	40.977222	-84.966111	22.04
11	W43DI-D	LIC	LD	43	6.0	40.977222	-84.966111	22.04
12	WODP-LD	CP MOD	LD	49	7.0	40.977222	-84.966111	22.04
13	WODP-LD	LIC	LD	49	6.0	40.977222	-84.966111	22.04
14	NEW	CP	LD	35	3.0	41.071222	-85.040972	27.42
15	W14DS-D	CP	LD	14	15.0	41.023944	-85.064111	29.20
16	WCUH-LD	CP	LD	16	15.0	41.023944	-85.064111	29.20
17	W19DT-D	CP	LD	19	15.0	41.023944	-85.064111	29.20
18	WDGM-LD	CP MOD	LD	20	15.0	41.023944	-85.064111	29.20
19	W21DJ-D	CP	LD	21	15.0	41.023944	-85.064111	29.20
20	W33DC-D	CP	LD	33	15.0	41.023944	-85.064111	29.20
21	W41DS-D	CP	LD	41	15.0	41.023944	-85.064111	29.20
22	W43DI-D	CP	LD	43	15.0	41.023944	-85.064111	29.20
23	WODP-LD	CP	LD	49	5.0	41.023944	-85.064111	29.20
24	W51EQ-D	CP	LD	51	12.5	41.023944	-85.064111	29.20
25	WDGM-LD	CP MOD	LD	20	6.0	41.023917	-85.064111	29.20
26	WDFM-LP	LIC	TX	26	7.5	41.291389	-84.537500	31.78
27	WFWC-CD	CP	DC	16	0.876	41.099139	-85.145000	36.54
28	WFWC-CD	LIC	DC	45	1.62	41.099139	-85.145000	36.54
29	WANE-TV	LIC	DT	31	1000.0	41.093889	-85.180000	39.34
30	WISE-TV	LIC	DT	18	320.0	41.102222	-85.184722	39.88
31	WPTA	LIC	DT	24	335.0	41.102222	-85.184722	39.88

[2] Definitions of service and status codes:
DT – Digital television broadcast station
DX – Digital auxiliary (backup) facility
TX – Translator station
LD – Low power digital television broadcast station
CA – Class A analog television broadcast station
DC – Class A digital television broadcast station
LIC – Licensed and operational station
CP – Construction permit granted
CP MOD – Modification of construction permit
APP – Application for construction permit, not yet operational

[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 Center of Project (km)
32	WISE-TV	CP	DT	34	456.0	41.102222	-85.184722	39.88
33	WEIJ-LD	LIC	LD	38	15.0	41.103611	-85.191111	40.44
34	WFWA	LIC	DT	40	152.8	41.103611	-85.191111	40.44
35	WFFT-TV	LIC	DT	36	1000.0	41.109278	-85.195056	40.88
36	W07CL	LIC	TX	7	0.032	41.333639	-85.052167	43.07
37	W26DH-D	LIC	LD	26	6.0	41.333611	-85.052222	43.07
38	WINM	LIC	DT	12	16.5	41.454167	-84.802778	46.59
39	WTLW	CP MOD	DT	4	10.0	40.763056	-84.183056	54.51
40	WTLW	LIC	DT	44	165.0	40.763056	-84.183056	54.51
41	W32DS-D	LIC	LD	32	6.8	40.552917	-84.517250	56.63
42	WOHL-CD	APP	DC	15	15.0	40.775278	-84.121083	58.19
43	WLIO	LIC	DT	8	27.5	40.747556	-84.131750	59.06
44	WLIO	CP	DT	8	16.5	40.747556	-84.131750	59.06
45	WLQP-LP	CP	TX	25	7.5	40.747556	-84.131750	59.06
46	WLQP-LP	CP	TX	25	7.5	40.747556	-84.131750	59.06
47	WOHL-CD	LIC	DC	35	9.0	40.747556	-84.131750	59.06
48	WLMO-LP	CP	TX	38	5.3	40.747556	-84.131750	59.06
49	WLMO-LP	CP	TX	38	5.3	40.747556	-84.131750	59.06
50	WLQP-LP	CP	LD	45	15.0	40.747556	-84.131750	59.06
51	WLMO-LP	CP	LD	47	15.0	40.747556	-84.131750	59.06
52	WLQP-LP	LIC	TX	18	7.7	40.634194	-84.208000	62.24
53	W23DE-D	LIC	LD	23	3.0	40.634194	-84.208000	62.24
54	WLMO-LP	LIC	TX	38	15.0	40.634194	-84.208000	62.24
55	W23DE-D	CP	LD	43	7.85	40.634194	-84.208000	62.24
56	WBGU-TV	CP	DT	22	137.0	41.136667	-83.906667	68.97
57	WBGU-TV	LIC	DT	27	153.0	41.136667	-83.906667	68.97
58	WSOT-LD	LIC	LD	27	10.0	40.655028	-85.623028	87.50
59	WFND-LD	LIC	LD	22	15.0	41.111111	-83.648333	90.20
60	WIWU-CD	CP MOD	DC	28	9.0	40.615528	-85.646472	91.43
61	WIWU-CD	LIC	DC	51	1.45	40.615528	-85.646472	91.43
62	WLMB	LIC	DT	5	10.0	41.744722	-84.018333	97.73
63	WDMY-LP	CP	LD	23	8.0	41.646861	-83.604917	114.97
64	WDMY-LP	LIC	TX	38	8.2	41.646861	-83.604917	114.97
65	WCZA-LD	LIC	LD	15	6.0	40.421667	-85.824167	115.97
66	WDTJ-LD	LIC	LD	18	4.0	41.653361	-83.547972	119.27
67	WDTJ-LP	LIC	TX	68	6.6	41.653361	-83.547972	119.27
68	WMNT-CD	LIC	DC	48	15.0	41.653639	-83.530194	120.52
69	WIPB	CP	DT	19	228.0	40.093611	-85.392222	119.59
70	WIPB	LIC	DT	23	250.0	40.093611	-85.392222	119.59
71	-	CP	LD	26	0.1	42.066944	-84.240833	120.83
72	-	CP	LD	26	0.1	42.066944	-84.240833	120.83
73	WUPW	LIC	DT	46	110.0	41.656111	-83.444722	126.63

ID	Call Sign	Status	Service[2]	Channel	Transmit ERP[3] (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to Center of Project (km)
74	WUPW	CP	DT	46	200.0	41.656111	-83.444722	126.63
75	WGTE-TV	LIC	DT	29	49.5	41.657222	-83.431944	127.59
76	WTVG	LIC	DT	13	16.7	41.683333	-83.413611	130.44
77	WJGP-LD	LIC	LD	26	15.0	42.128833	-85.339472	131.62
78	WTOL	LIC	DT	11	16.9	41.672778	-83.379722	132.20
79	WNWO-TV	LIC	DT	49	105.0	41.667500	-83.356111	133.57
80	WEID-LD	LIC	LD	16	15.0	41.678306	-86.060778	132.92
81	WHME-TV	LIC	DT	48	300.0	41.595278	-86.160556	135.68
82	WCWW-LD	LIC	LD	25	14.9	41.615250	-86.185167	138.51
83	WBND-LD	LIC	LD	34	15.0	41.615250	-86.185167	138.51
84	WMYS-LD	LIC	LD	39	15.0	41.615250	-86.185167	138.51
85	WNIT	CP	DT	31	78.3	41.613667	-86.188889	138.71
86	WNIT	LIC	DT	35	85.0	41.613667	-86.188889	138.71
87	WSJV	LIC	DX	28	150.0	41.616111	-86.193889	139.20
88	WSJV	LIC	DT	28	311.0	41.616111	-86.193889	139.20
89	WSJV	CP	DT	30	324.0	41.616111	-86.193889	139.20
90	WNDU-TV	LIC	DT	42	631.0	41.605333	-86.212500	140.06
91	WNDU-TV	LIC	DT	42	800.0	41.605556	-86.212778	140.09
92	WSBT-TV	LIC	DT	22	266.0	41.616667	-86.216944	140.95
93	WSBT-TV	LIC	DX	22	261.0	41.616667	-86.216944	140.95
94	WLWD-LD	LIC	TX	20	8.7	39.962222	-83.863611	139.83
95	WCBZ-CD	LIC	DC	28	7.5	40.627556	-83.129889	141.51
96	WXCB-CD	CP MOD	DC	25	15.0	40.612778	-83.130000	142.06
97	WXCB-CD	LIC	DC	45	15.0	40.612778	-83.130000	142.06
98	WNDY-TV	LIC	DT	32	1000.0	40.148917	-85.935222	142.86
99	WUEA-LD	LIC	LD	23	6.0	41.358333	-86.367778	142.89
100	WXMI	LIC	LD	17	15.0	42.288722	-85.153278	143.40
101	WOBC-CD	LIC	DC	14	0.277	42.287972	-85.165083	143.57
102	WOBC-CD	CP	DC	16	0.296	42.287972	-85.165083	143.57
103	WHIO-TV	CP	DT	33	854.0	39.733889	-84.248056	150.37
104	WHIO-TV	LIC	DT	41	1000.0	39.733889	-84.248056	150.37
105	WHIO-TV	LIC	DX	41	1000.0	39.733889	-84.248056	150.37
106	WHIO-TV	LIC	DT	41	1000.0	39.733889	-84.248056	150.37
107	WLWD-LD	LIC	LD	20	5.0	39.724611	-84.254889	151.21
108	WBDT	LIC	DT	26	770.0	39.724611	-84.254889	151.21
109	WRGT-TV	LIC	DT	30	498.0	39.724611	-84.254889	151.21
110	WKEF	APP	DT	18	525.0	39.724444	-84.255000	151.23
111	WRCX-LP	LIC	TX	40	34.0	39.724444	-84.255000	151.23
112	WRCX-LP	CP	LD	40	0.32	39.724444	-84.255000	151.23
113	W22DE	LIC	TX	22	54.0	39.720556	-84.261111	151.51
114	WPTD	LIC	DT	16	163.0	39.721111	-84.250000	151.69
115	WPTD	CP	DT	35	250.0	39.721111	-84.250000	151.69

ID	Call Sign	Status	Service[2]	Channel	Transmit ERP[3] (kW)	Latitude (NAD 83)	Longitude (NAD 83)	Distance to Center of Project (km)
116	WDTN	LIC	DT	50	1000.0	39.718611	-84.256111	151.83

Table 1: Off-Air TV Stations within 150 Kilometers of Transmission Line

3. Impact Assessment

Typically, transmission lines do not create reception problems for television signals. This includes transmission lines carrying high voltages such as those planned for the Paulding Wind Farm IV Transmission Lines project. However, if the transmission lines are not well maintained, corona and arcing may occur at the insulators or conductor connectors, creating broad band noise. The broad band noise could cause interference to television receivers in residences near the transmission line project, particularly those residents whose homes are within approximately 500 feet of the transmission line. This distance is based on a worst-case scenario, which requires the presence of foul weather and takes into account the variable characteristics of the transmission line.

Based on a contour analysis of the licensed stations within 100 kilometers of the transmission line, it was determined that ten of the full-power digital stations, identified below in Table 2, have service contours that overlap with the transmission line project area and thus fall within the range of potential impact as described above.

ID	Call Sign	Status	Service[4]	Channel	Transmit ERP[5] (kW)	Latitude (NAD 27)	Longitude (NAD 27)	Distance to Center of Project (km)
29	WANE-TV	LIC	DT	31	1000.0	41.093889	-85.180000	39.34
30	WISE-TV	LIC	DT	18	320.0	41.102222	-85.184722	39.88
31	WPTA	LIC	DT	24	335.0	41.102222	-85.184722	39.88
33	WEIJ-LD	LIC	LD	38	15.0	41.103611	-85.191111	40.44
34	WFWA	LIC	DT	40	152.8	41.103611	-85.191111	40.44
35	WFFT-TV	LIC	DT	36	1000.0	41.109278	-85.195056	40.88
38	WINM	LIC	DT	12	16.5	41.454167	-84.802778	46.59
40	WTLW	LIC	DT	44	165.0	40.763056	-84.183056	54.51
43	WLIO	LIC	DT	8	27.5	40.747556	-84.131750	59.06
57	WBGU-TV	LIC	DT	27	153.0	41.136667	-83.906667	68.97

Table 2: Licensed Off-Air TV Stations Subject to Degradation

[4] Definitions of service and status codes:
DT – Digital television broadcast station
LIC – Licensed and operational station

[5] ERP = Transmit Effective Radiated Power

4. Recommendations

In order to prevent interference to television broadcast reception in the homes near the transmission line, there should be an effective quality control maintenance program in effect for the useful life period of the transmission line's operation. In the unlikely event that interference is observed in any of the TV service areas, a high-gain directional antenna may be employed, 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 transmission line and may be offered to those residents who can show that their off-air TV reception has been disrupted by the presence of the transmission line after it is installed.

5. Contact

For questions or information regarding the Off-Air TV Analysis, please contact:

Contact person:	David Meyer
Title:	Senior Manager
Company:	Comsearch
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Email:	dmeyer@comsearch.com
Web site:	www.comsearch.com

Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit F

Licensed Microwave Report

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Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

Exhibit F

Wind Power GeoPlanner™

Microwave Study

Paulding Wind Farm IV LLC - Transmission Line

Prepared on Behalf of
EDP Renewables NA
LLC

October 3, 2018

COMSEARCH®
A CommScope Company

Table of Contents

1. Introduction

Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States operate over a wide frequency range (900 MHz – 23 GHz). 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 transmission line on licensed, proposed and applied non-federal government microwave systems.

2. Project Overview

Project Information

Name: Paulding Wind Farm IV LLC - Transmission Line

Number of Structures: 19

County: Paulding

State: Ohio

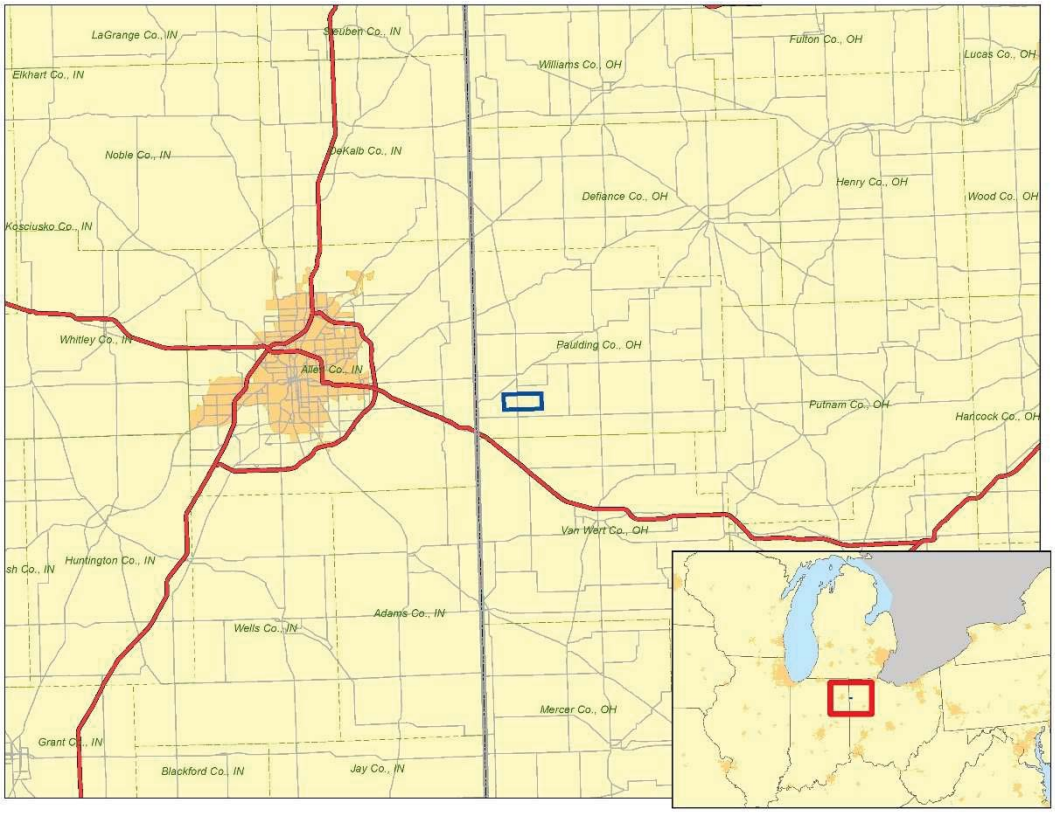


Figure 1: Area of Interest

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 transmission line support structures are shown in Figure 2. The IDs correspond to the path IDs from the March and August 2018 Microwave reports performed for the same project.

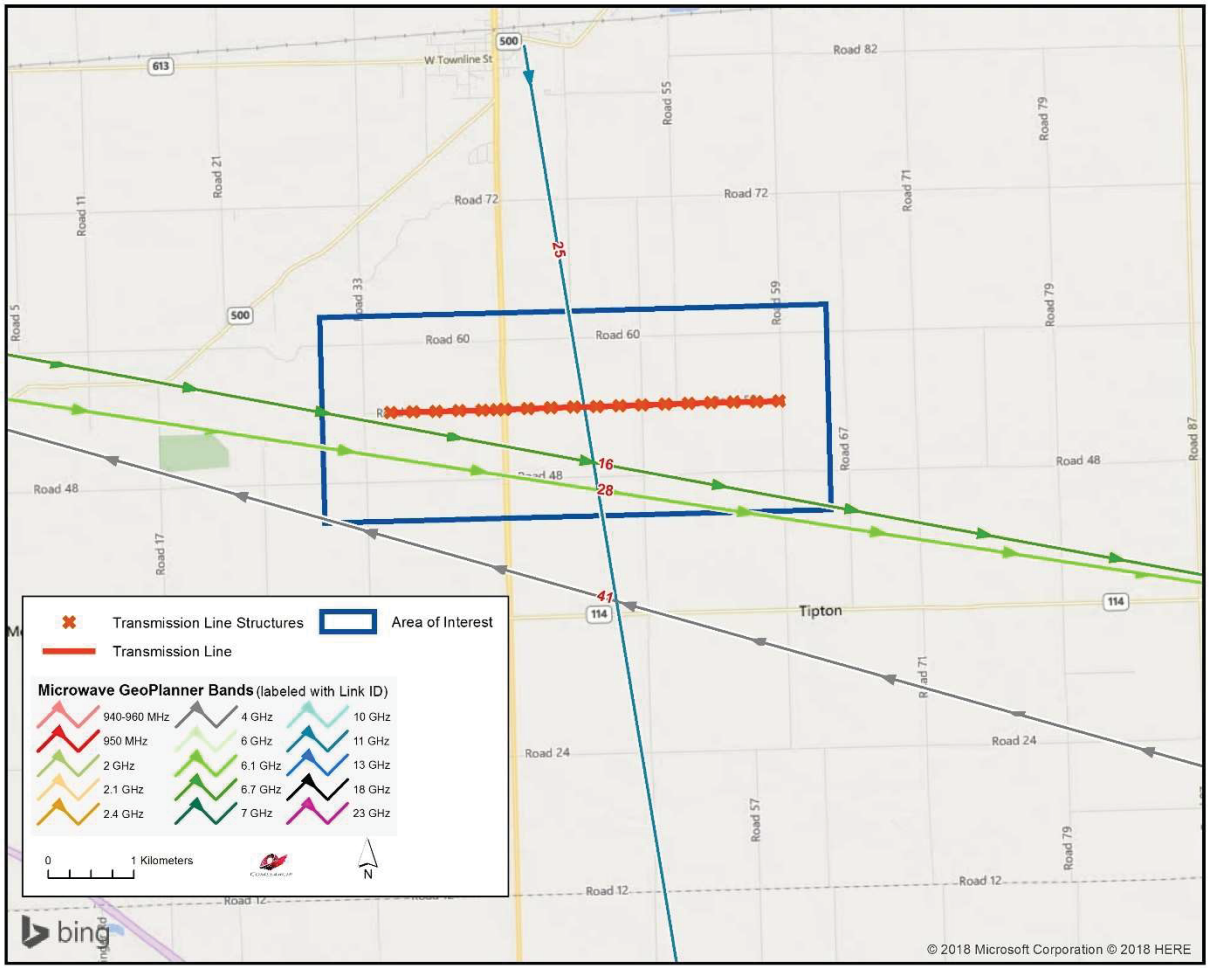


Figure 2: Microwave Paths that Intersect the Area of Interest

[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.

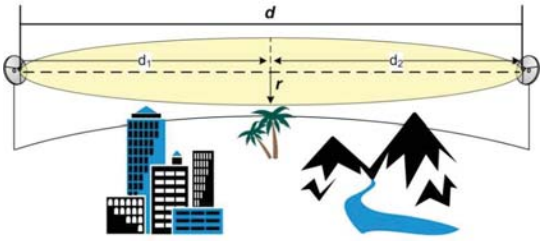
ID	Status	Callsign 1	Callsign 2	Band	Path Length (km)	Licensee
16	Licensed	WQON426	WQON427	6.7 GHz	51.69	Fort Wayne Communications Group Company
25	Licensed	WQRY696	WQRX772	11 GHz	18.18	Sprintcom, Inc
28	Licensed	WQSD967	WQSD966	6.1 GHz	49.79	Torellco LLC
41	Licensed	WQWF483	WQWF484	4 GHz	84.41	Waterleaf International 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. We verified these locations using aerial photography. All of the towers were found to be slightly off and were moved to their locations based on the aerial photos[3].

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 structures should be avoided, if possible. A depiction of the Fresnel Zones for each microwave path listed can be found in Figure 3, and is also included in the enclosed shapefiles[4,5].

[3] See enclosed mw_geopl.shp and mw_geopl_fcc.shp for details.

[4] The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 18 projected coordinate system.

[5] 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.

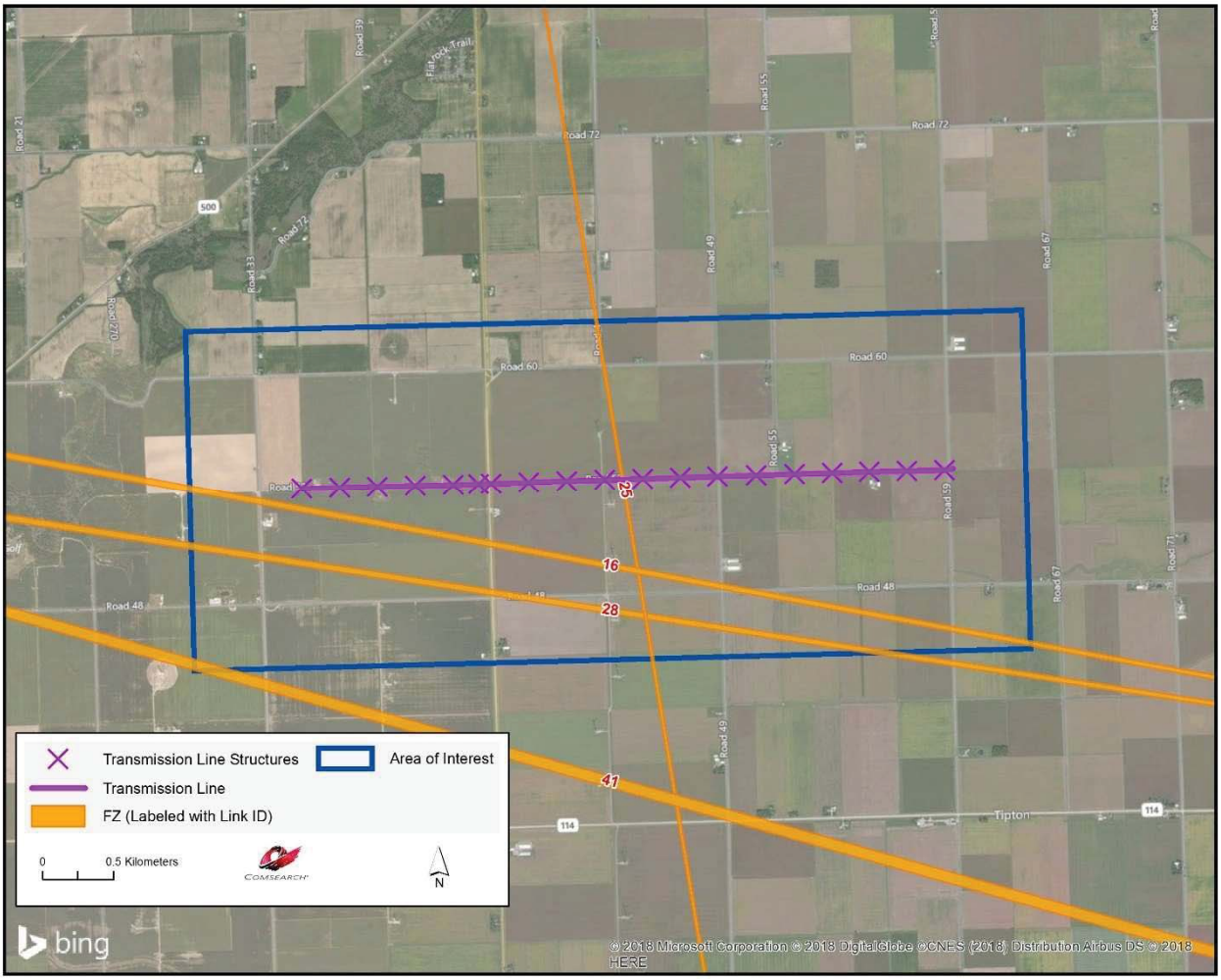


Figure 3: Fresnel Zones in the Area of Interest

Discussion of Potential Two Dimensional Obstructions

Total Microwave Paths	Paths with Affected Fresnel Zones	Total Support Structures	Support Structures intersecting the Fresnel Zones
4	0	19	0

Table 2: Fresnel Zone Analysis Result

Transmission lines generally do not affect the operation of microwave paths, as their attenuation loss is considered insignificant. Transmission support structures are considered to cause higher signal attenuation losses with more significant reflective and scattering properties and therefore were the primary focus of this study.

4. Conclusion

Our study identified four microwave paths intersecting the Paulding Wind Farm IV Transmission Line Project area. The Fresnel Zone for these microwave paths were calculated and mapped with respect to the position of the transmission line support structures provided. Nineteen support structures were considered in the analysis. Of those support structures, none were found to intersect the Fresnel Zones of the four microwave paths

5. Contact

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

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Company: Comsearch
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Fax: 703-726-5595
Email: dmeyer@comsearch.com
Web site: www.comsearch.com

Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit G

Transmission Line Acoustic Assessment

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Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

Exhibit G

Timber Road IV Wind Farm

Transmission Line Acoustic Assessment

September 2018

Prepared for

TIMBER ROAD
WIND FARM

Prepared by

Tetra Tech Inc.
160 Federal Street
Boston MA 02110

TABLE OF CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

AC	alternating current
ACSR	aluminum conductor steel reinforced
BPA	Bonneville Power Administration
CadnaA	Computer-Aided Noise Abatement Program
CAFE	Corona and Field Effects
dBA	A-weighted decibel
EPRI	Electric Power Research Institute
FHWA	Federal Highway Administration
Hz	Hertz
ISO	International Organization for Standardization
kV	kilovolt
L_{eq}	equivalent sound level
MW	megawatt
NSA	noise sensitive area
OPSB	Ohio Power Siting Board
Project	Timber Road IV Wind Farm
RCNM	Roadway Construction Noise Model
ROW	right-of-way
Tetra Tech	Tetra Tech, Inc.
USGS	United States Geological Survey

1.0 INTRODUCTION

EDP Renewables North America LLC currently owns and operates the Timber Road II Wind Farm in Paulding County, Ohio, and is proposing to construct a new phase referred to as the Timber Road IV Wind Farm (Project). The Project will consist of a combination of wind turbine generators, collection substation, and transmission line. The Project is anticipated to have a power output capacity of approximately 79.5 megawatts (MW). The current study addresses potential noise impacts at noise sensitive areas (NSAs; i.e., residences) associated with construction and operation of the Project transmission line.

The transmission line is rated at 138 kilovolts (kV) and will have a right-of-way of 150 feet (45.7 meters). For the purposes of permitting, two transmission line routes were analyzed, the preferred and alternate routes. Both routes extend from the collection substation to the interconnect. The length of the preferred route is approximately 2.9 miles (4.7 kilometers) whereas the length of the alternate route is approximately 3.8 miles (6.1 kilometers).

This technical report provides an overview of the mechanisms of corona sound generation, describes applicable requirements prescribed by the Ohio Power Siting Board (OPSB), presents the acoustic modeling methodologies and results. An assessment of construction noise is also provided.

1.1 Transmission Line Corona Noise

Transmission line noise (also called corona noise) is caused by the partial electrical breakdown of the insulating properties of air around the electrical conductors and overhead power lines. Audible noise generated by corona on transmission lines is composed of two major components. The higher frequencies of the broadband component distinguish it from more common outdoor environmental noise. The random phase relationship of the pressure waves generated by each corona source along a transmission line results in a characteristic sound commonly described as crackling, frying, or hissing. The second component is a lower-frequency sound that is superimposed over the broadband noise. The corona discharges produce positive and negative ions that, under the influence of the alternating electric field around alternating current (AC) conductors, are alternately attracted to and repelled from the conductors. This motion establishes a sound-pressure wave having a frequency twice that of the voltage, i.e., 120 hertz (Hz) for a 60-Hz system. Higher harmonics (e.g., 240 Hz) may also be present, but they are generally of lower significance (EPRI 2005). The relative magnitude of hum and broadband noise may be different depending on weather conditions at the line. According to EPRI when the line is wet such as during rainy weather conditions, typically the broadband component dominates; however, under icing conditions the lower frequency components may be more prevalent.

Figure 1-1 provides a representative frequency spectrum of AC transmission-line audible noise in rain, according to the Electric Power Research Institute (EPRI). The figure presents the 120 Hz hum and less significant 240 Hz frequency content. In this plot, the noise levels at frequencies below 100 Hz are likely influenced by ambient noise at the test site. The broadband noise extends in frequency above 10 kHz; however, the rolloff of the broadband noise above 10 kHz is related to the frequency response of the microphone and from the increasing effect of the air absorption of sound energy with frequency (EPRI, 2005). The higher frequency components tend to drop off much more rapidly with increased distance due to atmospheric absorption, so the lower frequency 120 and 240 Hz energy content tend to dominate. These frequencies are used as indicator markers to determine if corona noise is present.

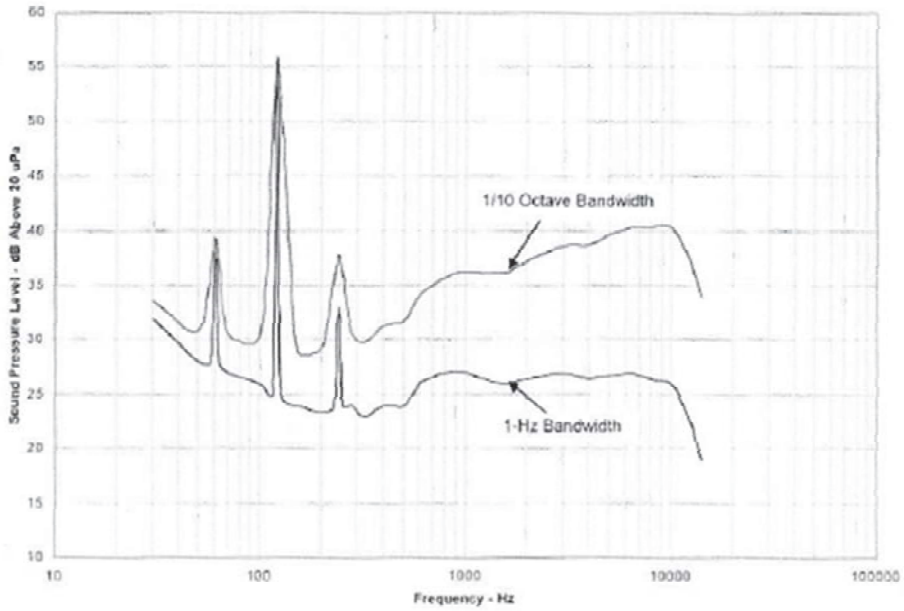


Figure 1-1. Typical Frequency Spectrum of AC Transmission-line Audible Noise in Rain

Audible noise from the Project transmission line would be expected to have a similar frequency spectrum to that indicated in Figure 1-1 when the line is wet. Corona noise levels during precipitation may vary over a wide range. During the initial stages, when the conductors are not thoroughly wet, there may be a considerable fluctuation in the noise level as the precipitation intensity varies. When the conductors are thoroughly wet, the noise fluctuations will often be less significant, since even as the intensity of precipitation diminishes the conductors will still be saturated, which can result in corona discharge. Audible noise may also be present when water droplets remain on conductors after precipitation has stopped or under a light mist or heavy fog, although these conditions result in highly variable corona noise levels dependent in part on the duration of the event. Audible noise before, during and after a rain event is shown in Figure 1-2, as presented by EPRI. The bars on the x-axis show rate of rain. High-humidity conditions may also result in elevated sound levels on the line, similar to those found under sustained fog conditions, see Figure 1-3, also by EPRI. In this example, fog dissipates as the sun rises in the early morning hours causing the corona noise to dissipate rapidly.

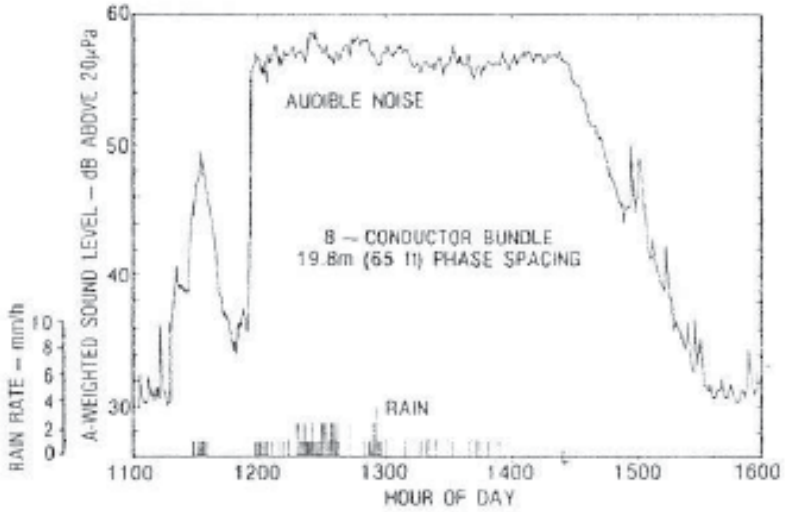


Figure 1-2. EPRI Audible Noise Before, During, and After a Rain Event

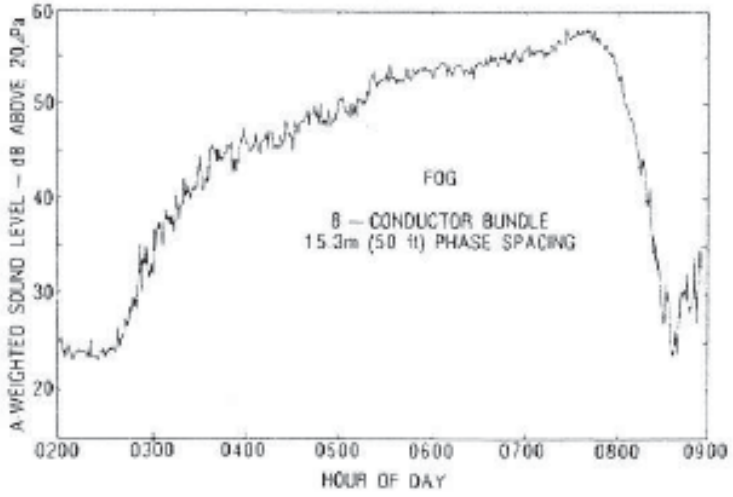


Figure 1-3. EPRI Audible Noise under Sustained Fog

2.0 NOISE REGULATIONS AND GUIDELINES

The OPSB Rule §Chapter 4906-5 Certificate Applications for Electric Transmission Facilities and Gas Pipelines defines certification requirements for noise that must be adequately addressed during both Project construction and operation, which were recently revised. There are no noise requirements at the county or local levels.

The following information is required as part of the Project application:

4906-5-07(A)(4) The applicant shall provide an estimate of the effect of noise generation due to the construction, operation, and maintenance of the transmission line or pipeline and associated facilities. The applicant shall describe any equipment and procedures designed to mitigate noise emissions during site clearing, construction, operation, and maintenance of the facility to minimize noise impact, including limits on the time of day at which construction activities may occur. The applicant shall estimate the nature of any intermittent, recurring, or particularly annoying sounds from the following sources:

(a) Blasting activities.

(b) Operation of earth moving and excavating equipment.

(c) Driving of piles, rock breaking or hammering, and horizontal directional drilling.

(d) Erection of structures.

(e) Truck traffic.

(f) Installation of equipment.

The OPSB does not prescribe numerical decibel limits within the rules in Chapter 4906-5 Certificate Applications for Electric Transmission Facilities and Gas Pipelines but for noise associated with windfarms Section §4906-4-09(F) providex further assessment guidelines:

- 4906-4-09(F)(1): General construction activities shall be limited to the hours of seven a.m. to seven p.m., or until dusk when sunset occurs after seven p.m. Impact pile driving, hoe ram, and blasting operations, if required, shall be limited to the hours between ten a.m. to five p.m., Monday through Friday. Construction activities that do not involve noise increases above ambient levels at sensitive receptors are permitted outside of daylight hours when necessary. Sensitive receptor, for purposes of this rule, refers to any occupied building. The applicant shall notify property owners or affected tenants within the meaning of paragraph (B)(2) of rule 4906-3-03 of the Administrative Code of upcoming construction activities including potential for nighttime construction activities.

- 4906-4-09(F)(2): The facility shall be operated so that the facility noise contribution does not result in noise levels at any non-participating sensitive receptor within one mile of the project boundary that exceed the project area ambient nighttime average sound level (L_{eq}) by five A-weighted decibels (dBA). During daytime operation only (seven a.m. to ten p.m.), the facility may operate at the greater of: the project area ambient nighttime L_{eq} plus five dBA; or the validly measured ambient L_{eq} plus five dBA at the location of the sensitive receptor. After measured ambient L_{eq} plus five dBA at the location of the sensitive receptor. After commencement of commercial operation, the applicant shall conduct further review of the impact and possible mitigation of all project-related

noise complaints through its complaint resolution process. Non-participating, as used in this context, refers to a property for which the owner has not signed a waiver or otherwise agreed to be subject to a higher noise level.

3.0 ACOUSTIC MODELING METHODOLOGY

The acoustic assessment of the Project transmission line involved two separate analytical methods. The Bonneville Power Administration (BPA) Corona and Field Effects (CAFE) program Version 3 was used to determine anticipated corona noise levels generated along the transmission line conductors. DataKustik's Computer-Aided Noise Abatement (CadnaA) was then used to model how sound propagates from the transmission line to the NSAs.

3.1 Modeling Input Parameter Assumptions

As mentioned previously, two transmission lines routes were analyzed, the preferred route that is 2.9 miles (4.7 kilometers) in length and the alternative route that is 3.8 miles (6.1 kilometers) in length. The proposed conductor for the 138-kV transmission line structures is 765 KCM aluminum conductor steel reinforced (ACSR) "Drake" conductor for the phase wires. Figure 3-1 shows the typical transmission line structure planned for the Project.

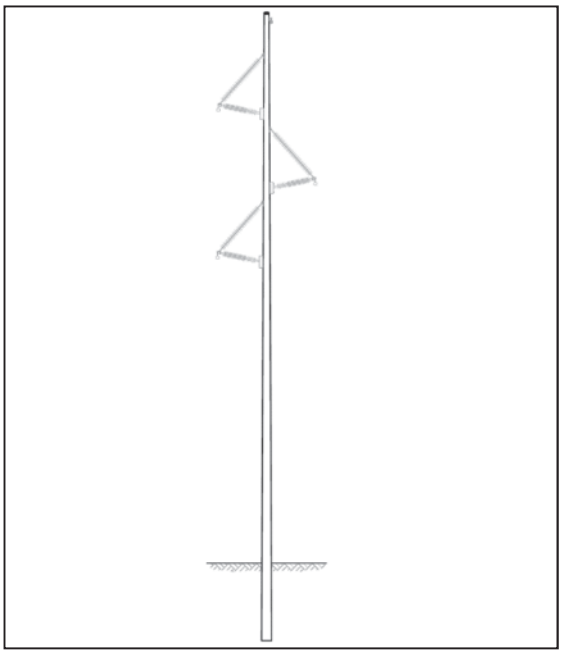


Figure 3-1. Typical 138-kV Transmission Line Type

Representative broadband and octave band center frequencies were derived using the BPA CAFE program and from standardized engineering technical guidelines based on measurements from similar equipment types and line types operating after the burn-in period. It is expected that the transmission line installed will exhibit sound source characteristics similar to the sound data used in the acoustic modeling analysis; however, it is possible that the final values may vary. Table 3-1 further summarizes setup parameters used in the acoustic modeling analysis.

Table 3-1. Operational Acoustic Modeling Parameters

Model Input	Parameter Value
138-kV Transmission Line Source Characteristics	See Figure 4-1 for audible noise level results using the Bonneville Power Administration (BPA) Corona and Field Effects (CAFE) program.
Engineering Design	Site plan dated September 20, 2015
Terrain Parameters	U.S. Geological Survey digital elevation data
Site elevation range	735 feet (224 meters) to 748 feet (228 meters) above mean sea level
Transmission Line Source Heights	60 feet (18.3 meters)
Receiver Characteristics	5 feet (1.52 meters) above ground level
Temperature	50°F (10°C)
Relative Humidity	For Computer-Aided Noise Abatement (CadnaA), >90%
Meteorological Factors	CadnaA assumes moderate downwind propagation. The CAFE program assumes a wind speed of 0.5 mile per hour. For CAFE, rain rate is assumed to be 1 inch/hour
Ground Absorption	Ground absorption coefficient of 0.5, representing a semi-reflective surface.
Standards	ISO 9613-2, Acoustics – Attenuation of sound during propagation outdoors.
Search radius	8,000 meters (26,246 feet)
Noise Modeling Software	BPA CAFE program DataKustik CadnaA v 2018 MR1

3.2 Corona and Field Effects Program

To support engineering design and permitting efforts for the Project, audible noise calculations were performed for the preferred and alternative transmission lines. Corona source noise levels were calculated using methodologies described in the BPA CAFE 3 program. Developed by the U.S. Department of Energy and the BPA, CAFE algorithms have been validated and used by engineers and scientists for many years to calculate the expected levels of audible noise produced by transmission lines. The inputs to the model include line voltage, load flow (current), altitude, meteorological conditions that would result in the conductors being wet, the physical dimensions of the line, conductor diameter, spacing, and height of the conductors and receivers above ground level. The BPA method of calculating audible noise from transmission lines is based on long-term statistical data collected from operating and test transmission lines. This method calculates the foul weather L_{50} noise level during rainy conditions of 1 inch per hour. Long-term measurements show that L_{50} audible noise levels occur at this rain rate (EPRI 2005). The BPA CAFE modeling for this line assumes astandard rain rate of 1” per hour which was used for this modeling.. Results during fair weather conditions are also estimated. Received sound levels generated by the Project at the edge of the right-of-way (ROW) during fair weather conditions will be substantially lower than during foul weather conditions.

3.3 CadnaA

DataKustik GmbH’s CadnaA, a computer-aided noise abatement program (DataKustik v 2018 MR1) was used for the acoustic modeling analysis. CadnaA is a comprehensive three-dimensional acoustic software model that conforms to the ISO 9613-2 standard (ISO 1996). The engineering methods specified in this

standard consist of full octave band algorithms that incorporate geometric spreading due to wave divergence, reflection from surfaces, atmospheric absorption, screening by topography and obstacles, ground effects, source directivity, heights of both sources and receptors, seasonal foliage effects, and meteorological conditions.

CadnaA allows for three basic types of sound sources to be introduced into the model: point, line, and area sources. Point sources can be used for small sources such as fans or for larger sources with proportioned dimensions that are located away from the relevant receptors. Line sources are used for linear sources such as transmission lines. Area sources can be vertical such as transformers or noise-radiating façades. The Project was represented as a continuous line source. The lateral attenuation from a line source of noise such as a transmission line is governed by the laws of acoustics and is due to the divergence of the sound pressure waves with increased distance from the source. The acoustic model calculations assumed corona is uniformly distributed along the conductor with the resulting pressure wave propagating in a cylindrical fashion.

Molecular absorption of energy as the sound waves propagate through the air results in additional attenuation. Atmospheric absorption is a function of frequency, temperature, and relative humidity. The absorption effect increases with frequency. At distances farther from the transmission line the frequency spectrum will shift towards the lower end of the spectrum as greater attenuation of the high frequency sound component will occur. Sound propagation calculations applied meteorological conditions consistent with weather conditions that typically result in greater noise production (i.e., high humidity conditions which includes all precipitation events) as identified in the Project Order. CadnaA does not allow for use of a rain rate as an assumption. Accordingly, attenuation rates due to air absorption were predicted using 90 percent or greater relative humidity.

The effects of wind gradients on outdoor sound propagation can cause variations in the sound level of a distant facility. Similar effects are caused by temperature changes in the atmosphere and resulting variation in the sound speed profile. The sound level variations caused by wind and temperature gradients are most pronounced for large separation distances. Calculations were completed for meteorological conditions corresponding to moderate downwind propagation (i.e. moderate downward refraction). This condition results in efficient outdoor sound propagation between a source and receptor and is consistent with the ISO 9613-2 standard (ISO 1996). Lower sound levels are expected in other directions dependent on wind velocities, speed, direction, and gustiness.

4.0 PROJECT OPERATING NOISE LEVELS

Operational received sound levels (dBA) were calculated assuming for the transmission line using the BPA CAFE program and CadnaA and results of those analyses are presented in the following subsections.

4.1 Results

The BPA CAFE program calculated the expected audible noise levels in both foul and fair weather at the edges of the ROW. The audible noise level in fair weather at the edges of the ROW are negligible. In foul weather the audible noise levels are approximately 17.5 dBA increasing to an approximate maximum of 22.4 dBA directly beneath the line (Figure 4-1). As expected, audible noise levels associated with the proposed transmission line are very low, which is due to the low voltage of the line and the low elevation of the site. Audible noise levels would increase with increasing voltage and altitude.

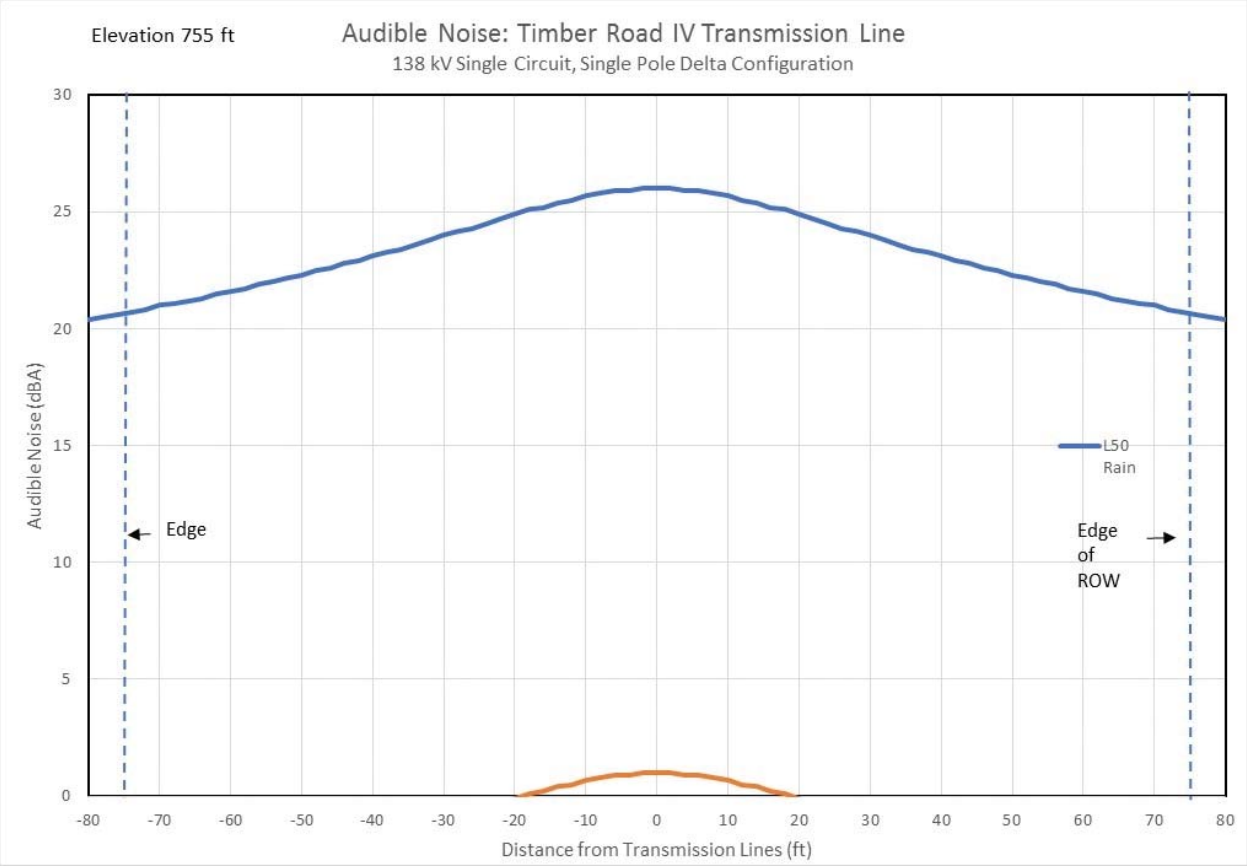
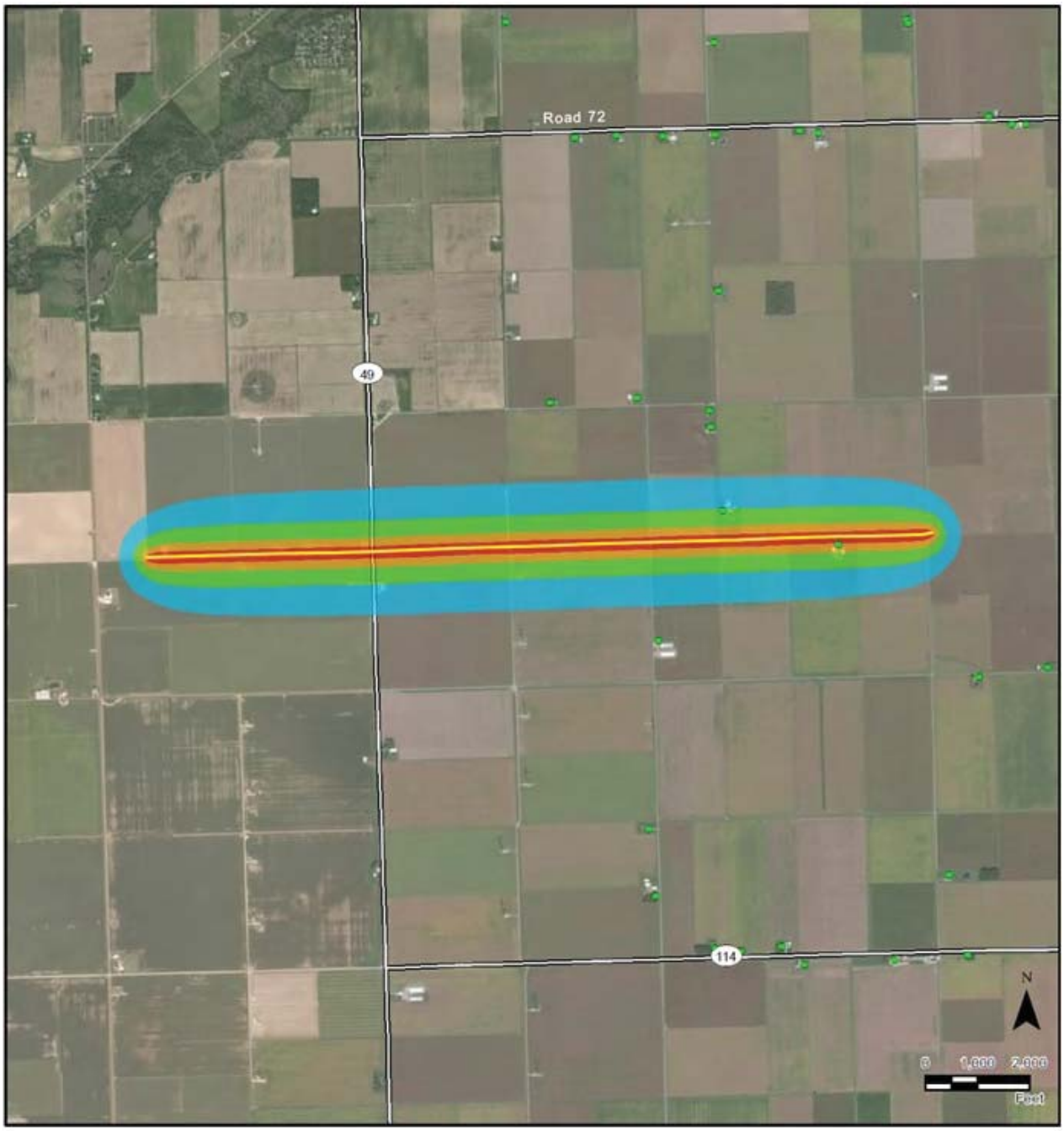


Figure 4-1. Audible Noise Profile at Midspan for proposed 138-kV Transmission Line Tower

The source characteristics from the BPA CAFE program for foul weather conditions were input into CadnaA and received sound levels were predicted at NSAs, inclusive of a 3 dBA engineering safety factor. Fair weather conditions were not modeled using since transmission line sound source levels were sufficiently low so that no impacts were expected. Maximum received sound levels at NSAs when modeling both the gen-tie and alternative transmission line routes under foul weather conditions were below 25 dBA. Sound contour plots displaying Project operational sound levels in color-coded isopleths are provided for the gen-tie and alternative transmission lines in Figures 4-2 and 4-3, respectively.



Noise Sensitive Areas

Proposed Gen-Tie Transmission Line

Sound Level Contour Ranges (dBA):

5 - 10

10 - 15

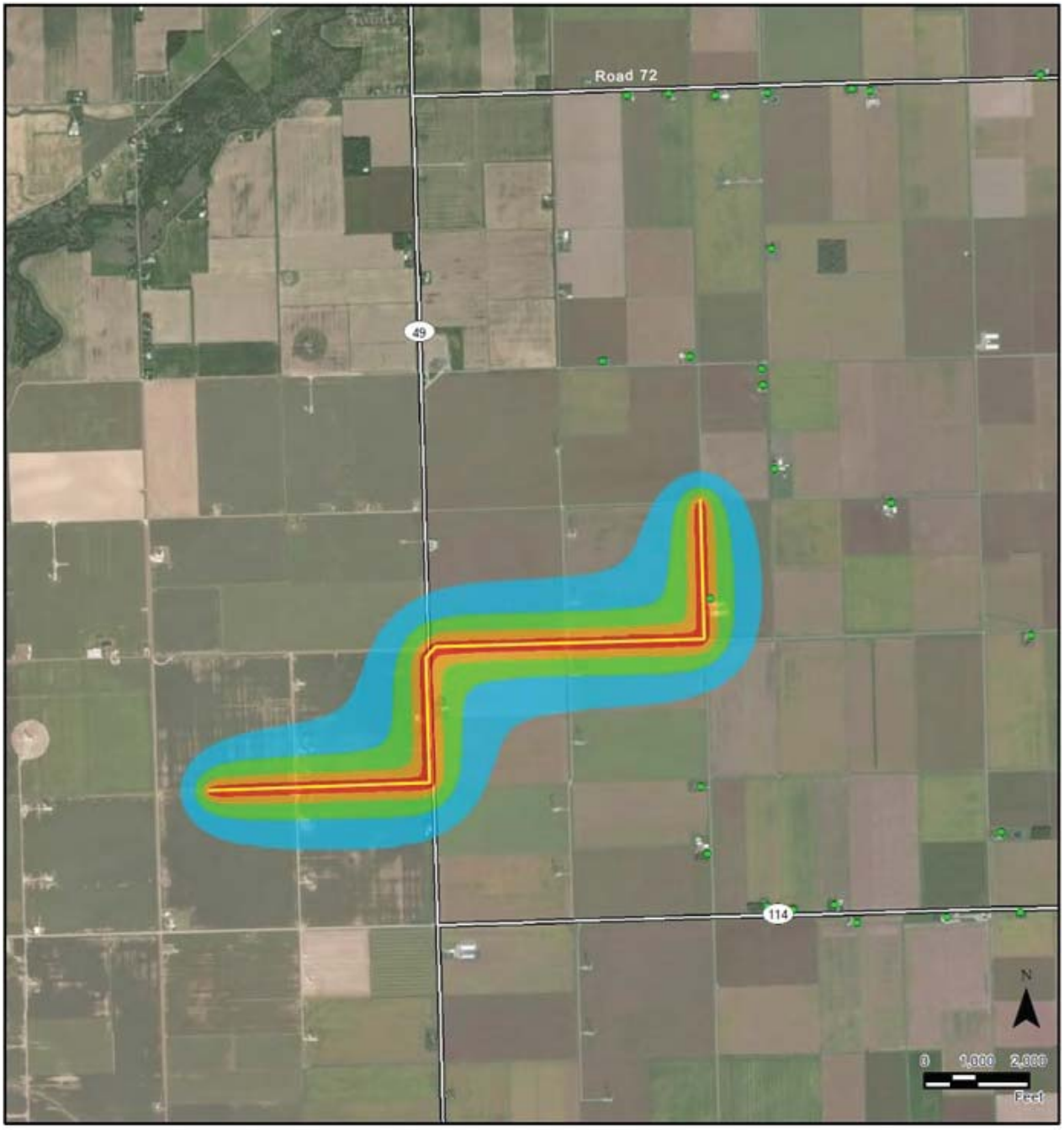
15 - 20

20 - 25

FIGURE 4-2
TIMBER ROAD IV WIND FARM
RECEIVED SOUND LEVELS:
PROPOSED GEN-TIE TRANSMISSION LINE ROUTE

OPERATION: FOUL WEATHER

PAULDING COUNTY, OHIO



Noise Sensitive Areas
Alternative Gen-Tie Transmission Line
Sound Level Contour Ranges (dBA):
5 - 10
10 - 15
15 - 20
20 - 25

FIGURE 4-3
TIMBER ROAD IV WIND FARM
RECEIVED SOUND LEVELS:
ALTERNATIVE GEN-TIE TRANSMISSION LINE ROUTE

OPERATION: FOUL WEATHER

PAULDING COUNTY, OHIO

5.0 PROJECT CONSTRUCTION NOISE LEVELS

Transmission line construction will generate periodically audible noise levels. Additional noise sources may include commuting workers and trucks moving material to and from the work sites. The construction equipment that will be used is similar to that used during typical public-works projects and tree service operations (e.g., road resurfacing, storm-sewer installation, natural gas line installation, tree removal, etc.). Transmission line construction will occur sequentially, moving along the length of the Project route, or in other areas such as near access roads, structure sites, conductor pulling sites, and staging and maintenance areas. Overhead line construction is typically completed in the following stages, but various construction activities may overlap, with multiple construction crews operating simultaneously:

1. **Site access and preparation**: Preparing the right-of-way would require the removal of trees from the ROW and may also require selective clearing of tall trees near the ROW.

2. **Installation of structure foundations**: The next step in the construction process is drilling foundations for the new transmission structures. This involves drilling large holes, which are then typically filled with concrete for the steel structure foundation.

3. **Erecting of support structures**: Once the foundation is cured, transmission structure installation can begin. The new steel poles often come in sections that are assembled on or near the foundation. Cranes and/or bucket trucks are used to lift the poles and set them into position on the foundations.

4. **Stringing of conductors**: With the new steel structures in place, the next step is to install the conductor wire. The wire-stringing operation requires equipment at each end of the section being strung. Wire is pulled between these "pulling sites" through stringing blocks (pulleys) at each structure. These pulling sites are set up at various intervals along the right-of-way, typically one to three miles apart.

Noise levels from overhead transmission line construction were evaluated using a screening-level analysis approach. The calculation methodology requires the input of the number and type of construction equipment by phase as well as typical noise levels associated with each piece of equipment. Construction sound source level data were obtained from the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM). These data were used to determine the composite sound levels at distances of 50 feet and 1,000 feet. Table 5-1 summarizes results for the four conceptual construction phases.

Construction sound would attenuate with increased distance from the ROW. Other factors, such as vegetation, terrain, and obstacles such as buildings would also act to further limit the impact of construction noise levels, but were not considered in the analysis. Actual received sound levels would fluctuate, depending on the construction activity, equipment type, and separation distances between source and receiver. The variation in power and usage imposes additional complexity in characterizing construction noise levels and the analysis conservatively assumes all phased construction equipment operating simultaneously. As a general construction practice, functional mufflers would be maintained on all equipment to maintain noise levels as low as reasonably achievable.

Received sound levels at NSAs from construction will depend on the type of equipment used, the mode of equipment operation, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the sound source and NSA. All of these factors are expected to vary regularly throughout the construction period making the calculation of a specific received sound-level

value at each NSA location difficult. Work in the proximity of any single general location will likely last no more than a few days to one week as construction activities move along the corridor; therefore, no single receptor will be exposed to significant noise levels for an extended period.

Table 5-1. Summary of Transmission Line Construction Noise at Specified Reference Distances

Phase No.	Construction Phase	Example Construction Equipment	Equipment Noise Level at 15 m (50 ft.), dBA	Composite Noise Level at 15 m (50 ft), dBA	Composite L_{eq} Noise Level at 1000 feet, dBA
1	Site Access and Preparation	Bulldozer	85	88	53
		Grader	85		
		Roller – Compactor	85		
		Loader	80		
		Water Truck	84		
		Dump Truck	84		
2	Installation of Structure Foundations	Bulldozer	85	90	56
		Loader	80		
		Backhoe-Loader	80		
		Forklift	80		
		Mobile Crane	85		
		Auger Rig	85		
		Drill Rig	85		
		Compressor	80		
		Pump	77		
		Portable Mixer	82		
		Jackhammer	85		
		Cement Mixer Truck	85		
		Dump Truck	84		
		Slurry Truck	78		
		Specialty Truck	84		
		Water Truck	84		
3	Erecting of Support Structures	Forklift	80	86	52
		Mobile Crane	85		
		Compressor	80		
		Flatbed Truck	84		
		Flatbed Truck	84		
		Water Truck	84		
4	Stringing of Conductors	Tracked Dozer	85	88	54
		Backhoe-Loader	80		
		Compressor	80		
		Line Puller	81		
		Mixed Trucks	84		
		Specialty Truck	84		
		Specialty Truck	84		
		Water Truck	84		

Source: Equipment Noise Levels from FHWA 2006 Construction Noise Handbook

6.0 CONCLUSIONS

Operational sound levels of the Timber Road IV Wind Farm 138-kV transmission line were modeled and potential for adverse noise impacts were analyzed at nearby NSAs. Both the preferred gen-tie line and alternative transmission routes were analyzed using the same inputs and methodologies. Results showed that the highest predicted received sound levels at NSAs were below 25 dBA, which is well below the OPSB noise criterion which states the facility may operate at the project area ambient nighttime Leq plus five dBA as well as other well-recognized noise guidelines established by the U.S. Environmental Protection Agency or World Health Organization. This acoustic assessment demonstrates that for the both the primary gen-tie and alternative transmission lines routes would result in very low level noise. Furthermore, due to the low 138-kV voltage of the Project transmission line, noise at NSAs are expected to be minimal and will not result in any cumulative noise impacts with furture wind turbine operation.

7.0 TECHNICAL REFERENCES

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Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit H

Cultural Resources Transmission Line Memo

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memorandum

To:	EDP Renewables	EDR Project No:	17031
From:	Andrew Roblee, Grant Johnson		
Date:	August 28, 2018		
Reference:	Paulding Wind Farm IV – Paulding County, Ohio Cultural Resources Transmission Line Memo		

Purpose of the Memorandum

Paulding Wind Farm IV LLC (the Applicant), a Delaware limited liability company (a wholly-owned subsidiary of EDP Renewables North America LLC, a Delaware limited liability company), is proposing to construct a 2.9-mile 138 kilovolt (kV) transmission line in association with the Paulding Wind Farm IV in Paulding County, Ohio (OPSB Case No. 18-91-EL-BGN). This memo summarizes the previously identified cultural resources located within 1,000 feet of a proposed transmission line in accordance with the requirements of Chapter 4906-5-07(E) of the Ohio Administrative Code and is based on the results of a Cultural Resources Records Review undertaken by the Applicant in association with Paulding Wind Farm IV.

Project Description

The proposed transmission line consists of a new 138 kV transmission line, which will be used to deliver 75.9 MW of power generated by Paulding Wind Farm IV to the regional power grid. The transmission route will travel west along Township Road (TR) 52 from the collection substation, which is located at the intersection of TR 52 and TR 59, ending at the existing Paulding Wind Farm III Transmission Line. This route is hereafter referred to as the "Preferred Transmission Route" or simply the "Preferred Route." An alternate route has been identified for the transmission line that travels west along TR 52 from the collection substation, then turns south State Route (SR) 49 and continues in a southwestern direction before tying into the existing Paulding Wind Farm III transmission line (hereafter referred to as the Alternate Route) (see Figure 1).

Methodology

Per the requirements of Ohio Administrative Code Chapter 4906-5-07(E), the Applicant has identified cultural resources within 1,000 feet of each route alternative. This review was done using the online Geographic Information Systems (GIS) mapping system of the Ohio Historic Preservation Office (OHPO).

Previously Identified Cultural Resources

A summary of cultural resources within 1,000 feet of each route alternative identified using the OHPO GIS is provided below. The locations of resources located within 1,000 of each route alternative are indicated on Figure 1.

National Register of Historic Places (NRHP)

No resources listed on the NRHP are located within the 1,000-foot Study Area.

NRHP Determination of Eligibility (DOE) properties

No resources previously determined eligible for listing on the NRHP are located within the 1,000-foot Study Area.

National Historic Landmarks (NHL)

No designated National Historic Landmarks are located within the 1,000-foot Study Area.

Ohio Historic Inventory (OHI)

Five resources listed on the OHI are located within the 1,000-foot Study Area:

- W. D. Price Farmstead, a farmstead consisting of a two-story vernacular residence and six associated agricultural buildings located at 4560 Township Road 52. OHPO records indicate that this property has been demolished and consequently not eligible for listing in the S/NRHP(Rutter, 2011a).
- William Rodenhaver Farmstead, a vacant gable roof barn with a small associated shed located on the 4000 block of Township Road 52. OHPO records indicate that the extant buildings are in an advanced state of deterioration and are therefore determined not to be eligible for listing in the S/NRHP (Rutter, 2011b).
- George Armstrong Farmstead, a two-story residence with an attached garage located at 4987 Township Road 52. OHPO records indicate that this residence has been extensively renovated and modernized and is therefore not eligible for listing in the S/NRHP (Rutter, 2011c).

- C. Christman Farmstead, a one-and-one-half-story vernacular residence with gambrel roof barn located at 4624 County Road 55. OPHO records indicate that the residence has been extensively renovated and modernized and is therefore not eligible for listing in the S/NRHP (Rutter, 2011d).
- Karschner-Maloy Farmstead, a gable roof corn crib and gable roof chicken coop located on the 3000 block of State Route 49. OHPO indicates that the primary buildings associated with the farmstead are no longer extant, and therefore the property is determined not to be eligible for listing in the S/NRHP (Rutter, 2011e).

Historic Bridge Inventory

No historic bridges as listed on the Ohio Historic Bridge Inventory are located within the Study Area.

Ohio Archaeological Inventory (OAI)

One resource listed in the OAI is located within the 1,000-foot Study Area:

- Site number PA0263, a non-aboriginal historic archaeological site located on the north side of Township Road 52, west of Township Road 49. OHPO records indicate that the site did not have the potential to yield important information and was determined not to be eligible for listing in the S/NRHP (JFNew, 2010).

Ohio Genealogical Society (OGS) files

No OGS Cemeteries are located within the 1,000-foot Study Area.

Conclusion

Per the requirements of Ohio Administrative Code Chapter 4906-5-07(E), the Applicant identified cultural resources within 1,000 feet of each transmission line route alternative. Per 4906-5-07(E), the impact of the proposed transmission line on resources eligible for listing in the S/NRHP must be evaluated. Based on a review of OHPO records, none of the cultural resources identified in this memo are eligible for listing in the S/NRHP. Therefore, there will be no impact to cultural resources as the result of the proposed transmission line for the Paulding Wind Farm IV.

Attachments:

Figure 1: Previously Identified Cultural Resources Within 1,000 Feet of the Proposed Transmission Line

References Cited:

JFNew. 2010. *Site No. 33-PA-0263.* Ohio Archaeological Inventory Form. On file, Ohio Historic Preservation Office, Columbus, OH. Available at https://www.ohiohistory.org

Rutter, William. 2011a. *W.D. Price Farmstead.* Ohio Historic Inventory Form. On file, Ohio Historic Preservation Office, Columbus, OH. Available at https://www.ohiohistory.org

Rutter, William. 2011b. *William Rodenhaver Farmstead.* Ohio Historic Inventory Form. On file, Ohio Historic Preservation Office, Columbus, OH. Available at https://www.ohiohistory.org

Rutter, William. 2011c. *George Armstrong Farmstead.* Ohio Historic Inventory Form. On file, Ohio Historic Preservation Office, Columbus, OH. Available at https://www.ohiohistory.org

Rutter, William. 2011d. *C. Christman Farmstead.* Ohio Historic Inventory Form. On file, Ohio Historic Preservation Office, Columbus, OH. Available at https://www.ohiohistory.org

Rutter, William. 2011e. *Karschner-Maloy Farmstead.* Ohio Historic Inventory Form. On file, Ohio Historic Preservation Office, Columbus, OH. Available at https://www.ohiohistory.org

Copies To: Pat Heaton, Lindsay Dressel (EDR); file.

Timber Road IV Wind Farm Transmission Facility

Benton and Blue Creek Townships, Paulding County, Ohio

Figure 1: Previously Identified Cultural Resources Within 1,000 Feet of the Proposed Transmission Line and Laydown Area

- OHI Historic Structure
- Previously Recorded Archaeological Site
- Alternate Transmission Line Route
- Preferred Transmission Line Route
- Laydown Area
- 1,000-Foot Study Area
- Township Boundary

Notes: 1. Basemap: ESRI ArcGIS Online "World Topographic Map" map service. 2. This map was generated in ArcMap on September 18, 2018. 3. This is a color graphic. Reproduction in grayscale may misrepresent the data. 4. Timber Road IV and III Facility components provided by EDPR; Cultural resource data obtained from publicly available sources (e.g. Ohio Historic Inventory). 5. Map scale 1:17,000.

TIMBER ROAD WIND FARM

edr

www.edrdpc.com

Paulding Wind Farm IV LLC
Case No. 18-1293-EL-BTX

Exhibit I

Correspondence with Ohio Historic Preservation Office

Christine M.T. Pirik (0029759)
(Counsel of Record)
Terrence O'Donnell (0074213)
William V. Vorys (0093479)
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150 East Gay Street, Suite 2400
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Attorneys for Paulding Wind Farm IV LLC

Date Filed: October 17, 2018

OHIO HISTORY CONNECTION

In response, reply to:
2018-PAU-33658

April 4, 2018

Patrick Heaton
Environmental Design and Research
217 Montgomery Street, Suite 1000
Syracuse, NY 13202

Re: Timber Road IV Wind Farm and Transmission Line Project
Paulding County, Ohio

Dear Mr. Heaton,

This is in response to your correspondence submitted by email on April 3, 2018, regarding the above referenced project. The comments of the Ohio State Historic Preservation Office (SHPO) are submitted in accordance with provisions of Ohio Revised Code 149.53 requesting cooperation among state agencies in the preservation of historic properties, Ohio Administrative Code 4906-17-08(D1-D3), and with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]).

The correspondence presents a detailed description of the Phase I Archaeological Survey Work Plan for the Timber Road IV Wind Project. This phase of construction for Timber Road will add between 36 and 44 turbines within an area of approximately 22,000 acres. The SHPO has reviewed and approves the Phase I Archaeological Survey Work Plan for the Timber Road IV Wind Project. In our opinion the planned archaeological survey work can be implemented immediately.

The design of the archaeological survey work plan begins with the development of an archaeology sensitivity model and focuses on areas of high probability for identifying prehistoric and historic-era archaeological sites. The primary attribute for delineating areas of high probability for prehistoric sites is distance of less than 300 m to a stream or wetland which shows evidence from geography, topology, and mapping as remaining relatively unchanged by channelization, ditching, or straightening in the past two hundred years. The primary attribute for delineating areas of high probability for historic-era sites is distance of less than 60 m to a Map Documented Structure. The SHPO agrees that these distances provide a well-supported basis for conducting the survey.

Figure 3 shows the archaeological survey work plan and high probability areas. It is the opinion of the SHPO that the work plan includes a reasonable sample of turbine locations. These are locations where there will be a good deal of ground disturbance. We agree with the premise that not exceeding the standard interval spacing for pedestrian walk-over and shovel testing is preferable to substantially increasing the interval to cover more ground.

Any questions concerning this matter should be addressed to David Snyder at (614) 298-2000, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

David Snyder

David Snyder, Ph.D., Archaeology Reviews Manager
Resource Protection and Review

DMS/ds

August 6, 2018

In reply, please refer to:
2015-PAU-33658

Susan Lawson
Environmental Design and Research
217 Montgomery Street, Suite 1000
Syracuse, New York 13202

RE: Timber Road IV Wind Project – Historic Resources Survey Work Plan
Paulding County, Ohio

Dear Ms. Lawson:

This letter is in response to correspondence received via email on July 24, 2018. The comments of Ohio's State Historic Preservation Office (SHPO) are submitted in accordance with provisions of Ohio Revised Code 149.53 requesting cooperation among state agencies in the preservation of historic properties, Ohio Administrative Code 4906-17-08(D1-D3), and with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]).

The correspondence presents a detailed description of the Historic Resources Survey Work Plan for the Timber Road IV Wind Project. The proposed Facility includes the installation and operation of up to 54 turbine locations within an approximately 32-square mile Facility Site; the final number of turbines will depend on the final turbine model selected.

The design of the historic resources survey work begins with defining the Area of Potential Effects for indirect (visual) effects. In prior consultation on January 23, 2018, SHPO agreed that a reconnaissance survey for areas previously surveyed during the Timber Road I-III Wind projects is not necessary. Figure 4 shows the areas of overlap with previous surveys and the remaining unsurveyed area. SHPO continues to agree that a targeted intensive-level survey should be conducted that focuses on locally significant resources within the previously unsurveyed area.

The Historic Resources Survey Report will include a cumulative visual effects analysis depicting the predicted visibility of the existing Timber Road I-III turbines as well as the proposed locations of the Timber Road IV turbines. SHPO agrees this analysis will provide a suitable basis to evaluate the overall effects of the Timber Road projects and inform appropriate mitigation measures.

The Historic Resources Survey Report will also include the preparation of a mitigation plan that will focus on locally significant historic sites, structures, and/or landmarks. Additional research may include, but not be limited to, identifying grant applicants through Heritage Ohio, contacting owners of NRHP-listed properties, reviewing Timber Road I-III surveys for mitigation associated with NRHP-eligible properties, and review of Village/Town strategic plans. SHPO looks forward to consultation regarding mitigation appropriate to the scale of the project.

If you have any questions, please contact me at jwilliams@ohiohistory.org or (614) 298-2000. Thank you for your cooperation.

Sincerely,

Joy Williams

Joy Williams, Project Reviews Manager
Resource Protection and Review

RPR Serial No: 1075000

OHIO POWER SITING BOARD

REVIEW FORM

Paulding Wind Farm IV

18-0091-EL-BGN

REVIEW AGENCY: Ohio Historic Preservation Office

CONTACT PERSON: Mr. Dave Snyder

Please check all that apply:

- [x] Our agency has reviewed the application for informational requirements, and it is complete.
- [ ] Our agency has reviewed the application for informational requirements, and it is incomplete. We have attached a list of required additional items needed from the Applicant.
- [ ] Attached is our evaluation of the application. Any comments may be used in the Staff Report of Investigation and the evaluator(s) may be called on to testify on such comments.
- [ ] Our agency requires additional information from the Applicant to complete our evaluation. Attached is a list of requested interrogatories.
- [ ] Our agency has no comment on this application.

David Snyder 08/07/18

Signature Date

Return by: Thursday, August 9, 2018

By Mail:
Grant Zeto
Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215-3793
(614) 644-7743
By Email:
grant.zeto@puco.ohio.gov

OHIO HISTORY CONNECTION

In response, reply to:
2015-PAU-33658

August 7, 2018

Ray Strom
Ohio Power Siting Board
180 East Broad Street
Columbus, OH 43215-3793

Re: Paulding Wind Farm IV (aka Timber Road Wind Farm IV), 18-0091-EL-BGN
Paulding County, Ohio

Dear Mr. Strom,

This is in response to Ohio Power Siting Board (OPSB) correspondence submitted July 10, 2018, regarding the above referenced project. The comments of the Ohio State Historic Preservation Office (SHPO) are submitted in accordance with provisions of Ohio Revised Code 149.53 requesting cooperation among state agencies in the preservation of historic properties, Ohio Administrative Code 4906-17-08(D1-D3), and with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]).

The correspondence presents an application providing the detailed description of the Phase IV construction plans for the expansion the Paulding Wind Farm (Timber Road Wind Farm). Beginning in 2012 the SHPO began reviewing this wind farm under the Timber Road Wind Farm name. Please let us know if we should now refer to this project as the Paulding Wind Farm.

The SHPO has in the past six months reviewed the field work designs for planned Archaeological and History-Architecture surveys. There is much work to do to compile information on cultural resources, evaluate the significance of the resources, and complete consultation that includes the OPSB, SHPO, and applicant in considering the effects of the wind farm expansion on significant cultural resources. The application presents a coordinated approach which gives us confidence that the necessary information will be compiled, assembled, and reviewed within the project's timeline and that the review can be completed prior to reaching the initiation of construction.

Any questions concerning this matter should be addressed to Joy Williams or David Snyder at (614) 298-2000, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

David Snyder

David Snyder, Ph.D., Archaeology Reviews Manager
Resource Protection and Review

DMS/ds (serial number 1074770)\

xc: Patrick Heaton, EDR (by email)

Attachments: SHPO correspondence approving work plans for Archaeological and History-Architecture surveys.

OHIO HISTORY CONNECTION

In response, reply to:
2018-PAU-33658

April 4, 2018

Patrick Heaton
Environmental Design and Research
217 Montgomery Street, Suite 1000
Syracuse, NY 13202

Re: Timber Road IV Wind Farm and Transmission Line Project
Paulding County, Ohio

Dear Mr. Heaton,

This is in response to your correspondence submitted by email on April 3, 2018, regarding the above referenced project. The comments of the Ohio State Historic Preservation Office (SHPO) are submitted in accordance with provisions of Ohio Revised Code 149.53 requesting cooperation among state agencies in the preservation of historic properties, Ohio Administrative Code 4906-17-08(D1-D3), and with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]).

The correspondence presents a detailed description of the Phase I Archaeological Survey Work Plan for the Timber Road IV Wind Project. This phase of construction for Timber Road will add between 36 and 44 turbines within an area of approximately 22,000 acres. The SHPO has reviewed and approves the Phase I Archaeological Survey Work Plan for the Timber Road IV Wind Project. In our opinion the planned archaeological survey work can be implemented immediately.

The design of the archaeological survey work plan begins with the development of an archaeology sensitivity model and focuses on areas of high probability for identifying prehistoric and historic-era archaeological sites. The primary attribute for delineating areas of high probability for prehistoric sites is distance of less than 300 m to a stream or wetland which shows evidence from geography, topology, and mapping as remaining relatively unchanged by channelization, ditching, or straightening in the past two hundred years. The primary attribute for delineating areas of high probability for historic-era sites is distance of less than 60 m to a Map Documented Structure. The SHPO agrees that these distances provide a well-supported basis for conducting the survey.

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Any questions concerning this matter should be addressed to David Snyder at (614) 298-2000, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

David Snyder

David Snyder, Ph.D., Archaeology Reviews Manager
Resource Protection and Review

DMS/ds

OHIO HISTORY CONNECTION

August 6, 2018

In reply, please refer to:
2015-PAU-33658

Susan Lawson
Environmental Design and Research
217 Montgomery Street, Suite 1000
Syracuse, New York 13202

RE: Timber Road IV Wind Project – Historic Resources Survey Work Plan
Paulding County, Ohio

Dear Ms. Lawson:

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If you have any questions, please contact me at jwilliams@ohiohistory.org or (614) 298-2000. Thank you for your cooperation.

Sincerely,

Joy Williams

Joy Williams, Project Reviews Manager
Resource Protection and Review

RPR Serial No: 1075000

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

10/17/2018 9:38:19 AM

in

Case No(s). 18-1293-EL-BTX

Summary: Application Part 3 of 4, Exhibits A through I electronically filed by Christine M.T. Pirik on behalf of Paulding Wind Farm IV LLC