



Executive Summary – Wind Power GeoPlanner™

Licensed Microwave Search & Worst Case Fresnel Zone

Comsearch performed an analysis to evaluate the potential effects of the planned Blue Creek wind energy project in Allen County, Indiana, Paulding County, and Van Wert County, Ohio on existing non-Federal Government microwave telecom systems.

Microwave Search Results: Comsearch's Wind Power GeoPlanner™ provides a graphical representation of affected microwave paths and provides supporting technical parameters. The microwave path data is overlaid on topographic basemaps. Comsearch identified 57 microwave paths that intersect the project area (see Figure 1 and Table 1 below).

Comsearch then calculated a Worst Case Fresnel Zone (WCFZ) for each microwave path in the project area. The mid-point of a full microwave path is the location where the widest (or worst case) Fresnel zone occurs. Fresnel zones are calculated for each path using the following formula.

$$R_n \cong 17.3 \sqrt{\frac{n}{FGHz} \left(\frac{d_1 d_2}{d_1 + d_2} \right)}$$

Where,

R_n = First Fresnel Zone Radius, meters

n = The Number 1

$FGHz$ = Frequency of Microwave Link, GHz

d_1 = Distance to Wind Turbine from Microwave Station 1, km

d_2 = Distance to Wind Turbine from Microwave Station 2, km

note: For WCFZ calculation $d_1 = d_2$

The calculated WCFZ radius, giving the linear path an area or swath, buffers each microwave path in the project area. The distance unit is in meters and can be found in the column attribute "WCFZ." In general, this is the XY area where the planned wind turbines should be avoided, if possible. These areas are shown in Figures 2 through 4.

Please note that because the turbine locations were not provided, we could not determine if any potential obstruction cases exist between the planned wind turbines and the microwave systems. If the latitude and longitude values for turbine locations are provided, Comsearch can identify specific microwave telecom paths and turbines where a potential XY conflict exists. Additionally, when wind turbines need to be located inside a WCFZ, Comsearch can provide a detailed clearance study, which considers the vertical Z-height clearance objectives.



Map Projection: The ESRI® Shapefiles contained in the enclosed GeoPlanner CD are in NAD 83 UTM Zone 16 projected coordinate system.

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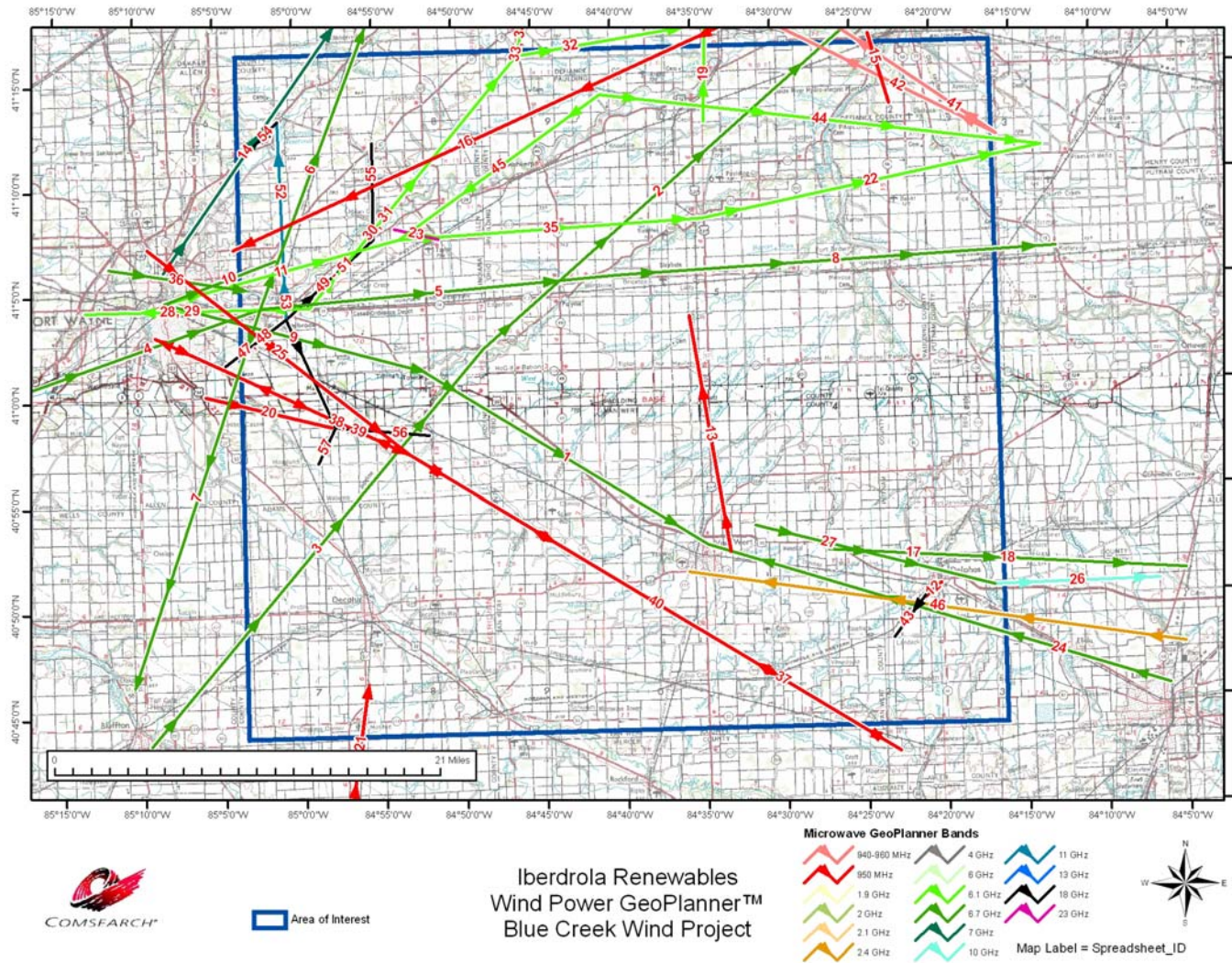
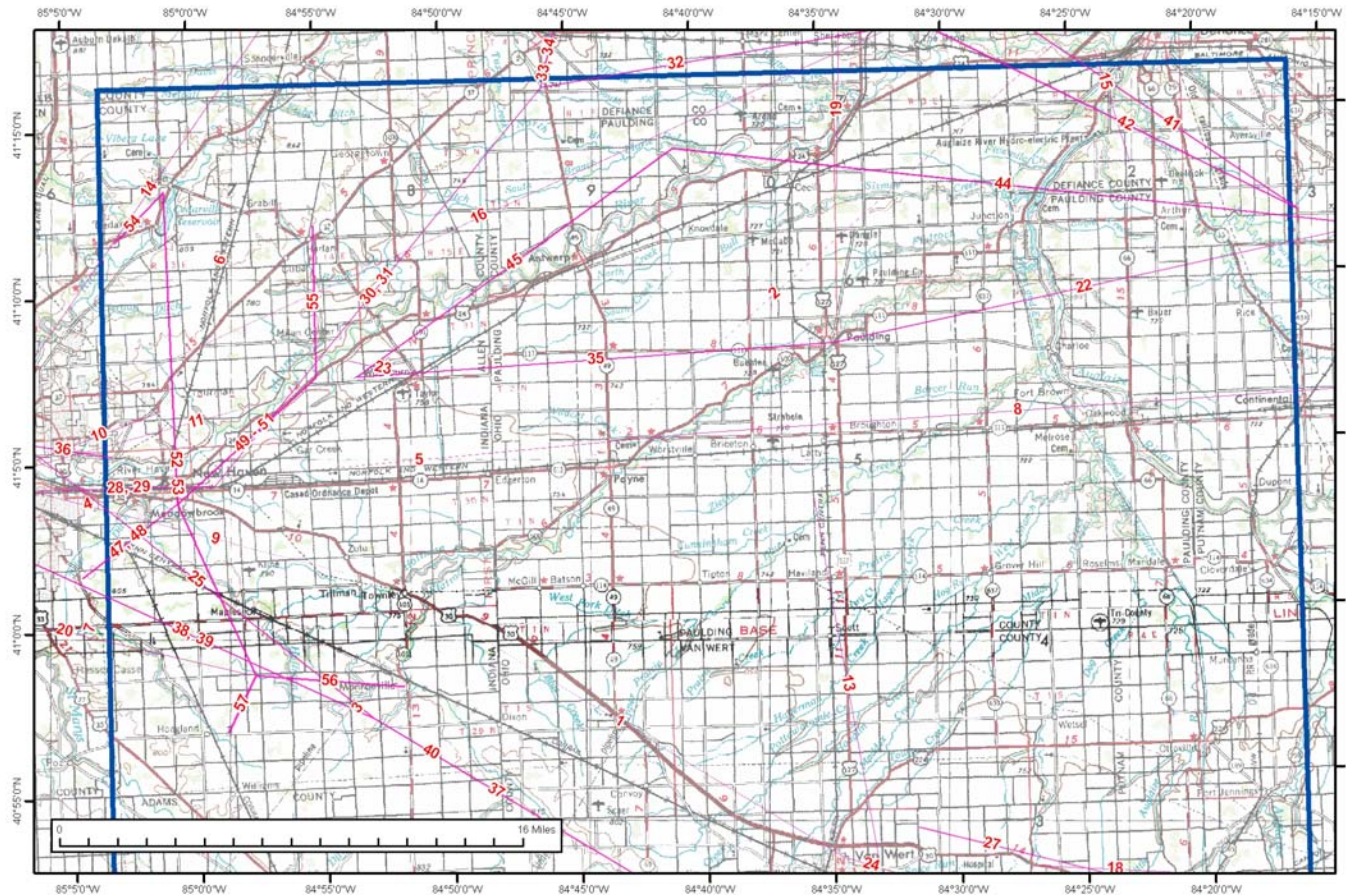


Figure 1 – Wind Power GeoPlanner™



Iberdrola Renewables
Wind Power GeoPlanner™
Blue Creek Wind Project

WCFZ
Area of Interest



Map Label = Spreadsheet_ID

Figure 2 – Wind Power GeoPlanner™ & WCFZ (north)

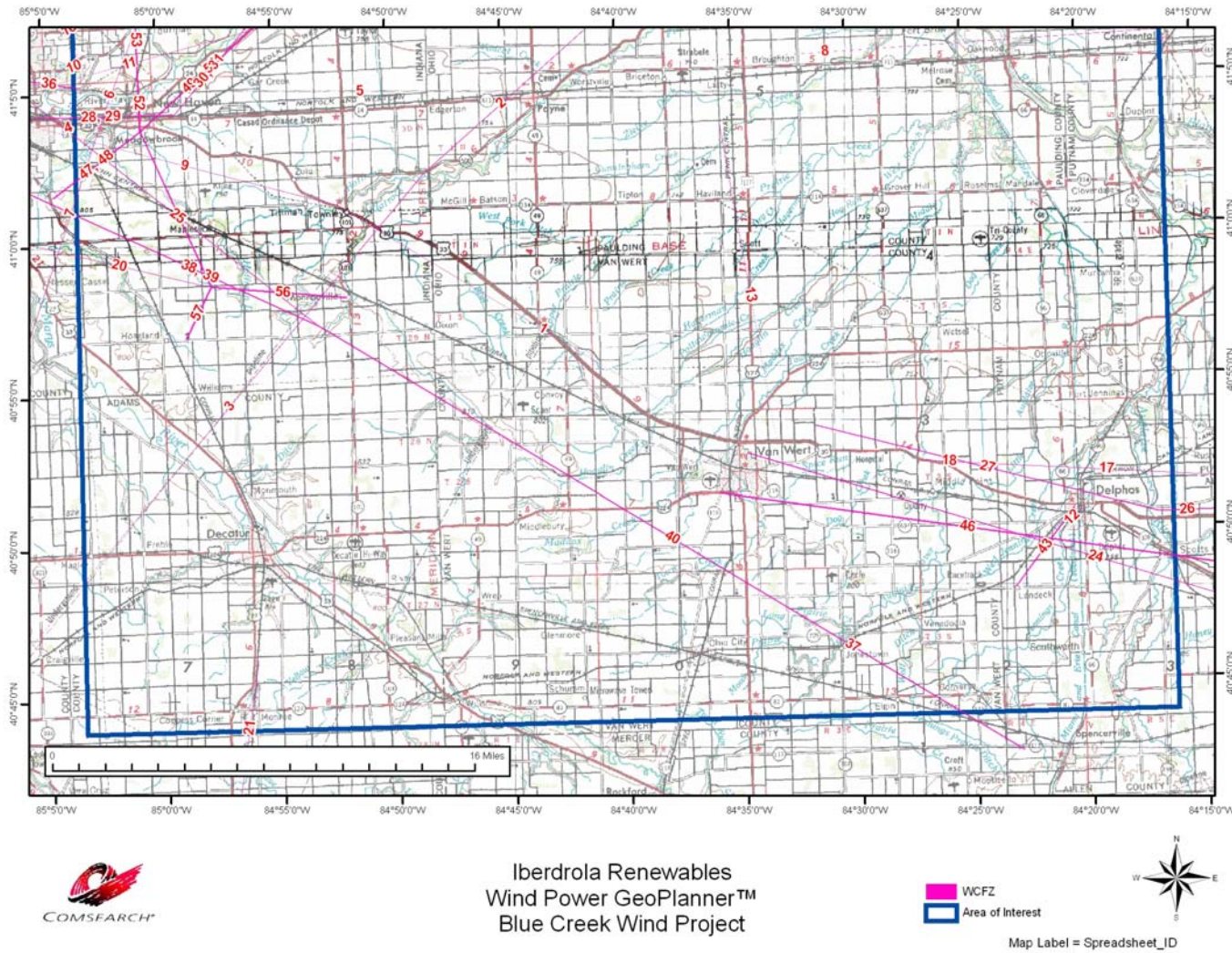
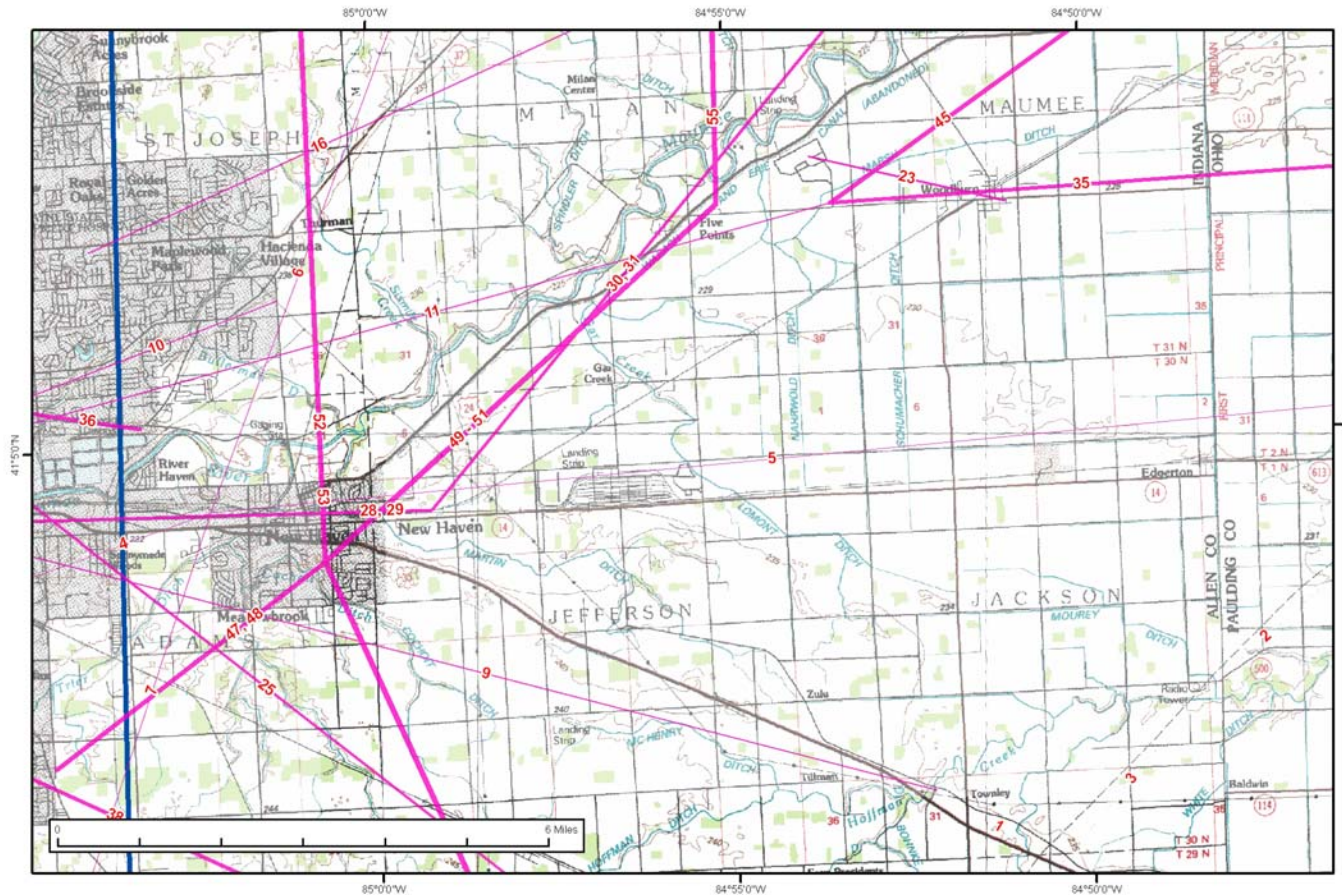


Figure 3 – Wind Power GeoPlanner™ & WCFZ (south)



Iberdrola Renewables
Wind Power GeoPlanner™
Blue Creek Wind Project

 WCFZ
 Area of Interest



Map Label = Spreadsheet_ID

Figure 4 – Wind Power GeoPlanner™ & WCFZ (New Haven)



ID	Name Site 1	Name Site 2	Call Sign Site 1	Call Sign Site 2	Band Name	Licensee	WCFZ (m)
1	TILLMAN	VAN WERT	KDQ90	KBV76	Upper 6 GHz	INDIANA MICHIGAN POWER COMPANY	18.07
2	EDGERTON	DEFIANCE	KJI65	KYK81	Upper 6 GHz	PANHANDLE EASTERN PIPELINE COMPANY, LLC	24.95
3	BLUFFTON	EDGERTON	KJI66	KJI65	Upper 6 GHz	PANHANDLE EASTERN PIPELINE COMPANY, LLC	22.53
4	HUNTINGTON	FT WAYNE	WAZ562	WAZ563	Upper 6 GHz	Norfolk Southern Railway	18.80
5	FT WAYNE	WORSTVILLE	WAZ563	WAZ596	Upper 6 GHz	Norfolk Southern Railway	18.73
6	FT WAYNE	ST JOE	WAZ563	WAZ599	Upper 6 GHz	Norfolk Southern Railway	18.93
7	FT WAYNE	BLUFFTON	WAZ563	WHJ344	Upper 6 GHz	Norfolk Southern Railway	19.78
8	WORSTVILLE	KIEFERVILLE	WAZ596	WBB735	Upper 6 GHz	Norfolk Southern Railway	20.75
9	FORT WAYNE	TILLMAN	WGX813	KDQ90	Upper 6 GHz	INDIANA MICHIGAN POWER COMPANY	16.17
10	FORT WAYNE	NE SC	WGX813	WPNM859	Upper 6 GHz	INDIANA MICHIGAN POWER COMPANY	10.78
11	FORT WAYNE	MILAN	WGX813	WPQX475	Lower 6 GHz	INDIANA MICHIGAN POWER COMPANY	16.08
12	SECOND ST	DELPHOS	WHY626	RXONLY	950 MHz	MAVERICK MEDIA OF LIMA LICENSE LLC	12.20
13	MENDON ROAD	CNTY RD 107	WLD621	RXONLY	950 MHz	First Family Broadcasting, Inc.	40.67
14	N CLINTON S	WILLIAMS	WLJ991	RXONLY	7 GHz	Tri-State Christian TV, Inc	22.69
15	RADIO DR	BOWMAN RD	WLO685	RXONLY	950 MHz	CC LICENSES, LLC	22.52
16	ROSEBROOK RD	FORT WAYNE	WLP745	RXONLY	950 MHz	CITICASTERS LICENSES, LP	61.63
17	MIDDLEPOINT	CAIRO 750	WLV307	WLT571	Lower 6 GHz	New Par	19.48
18	MIDDLEPOINT	CAIRO 750	WLV307	WLT571	Upper 6 GHz	New Par	18.70
19	PAULDING	BRYAN	WMN405	WMN404	Lower 6 GHz	ALLTEL Communications of Ohio No. 3 Inc.	20.94
20	MAPLES RD	MONROEVILLE	WMU214	RXONLY	950 MHz	JAM COMMUNICATIONS, INC	29.95
21	955 N US 27	210 E 200 N	WMU431	RXONLY	950 MHz	ADAMS COUNTY RADIO, INC	30.51



**Iberdrola Renewables
Blue Creek**

ID	Name Site 1	Name Site 2	Call Sign Site 1	Call Sign Site 2	Band Name	Licensee	WCFZ (m)
22	PAULDING	PLEASNT BEND	WNEH649	KLZ78	Lower 6 GHz	AMERICAN ELECTRIC POWER SERVICE CORP.	19.17
23	WOODBURN	UNION HALL	WNEZ567	RXONLY	23 GHz	MICHELIN NORTH AMERICA ONC	3.63
24	LIMA	VAN WERT	WNTS208	KBV76	Upper 6 GHz	AMERICAN ELECTRIC POWER SERVICE CORP.	21.74
25	TRANSMITTER	RECEIVER	WPNF782	RXONLY	950 MHz	PATHFINDER COMMUNICATIONS CORP	48.03
26	DELPHOS	CAIRO	WPNH392	WLN597	10 GHz	ALLTEL Communications, LLC	10.10
27	VAN WERT	DELPHOS	WPNH393	WPNH392	Upper 6 GHz	ALLTEL Communications, LLC	15.53
28, 29	NEW HAVEN	MAGNAVOX	WPOR240	WPOR241	Lower 6 GHz	Centennial Michiana License Company LLC	15.43
30, 31	NEW HAVEN	HICKSVILLE	WPOR240	WPOS957	Lower 6 GHz	Centennial Michiana License Company LLC	18.62
32	HICKSVILLE	DEFIANCE	WPOS957	WPOS956	Lower 6 GHz	Centennial Michiana License Company LLC	20.25
33, 34	HICKSVILLE	EDGERTON	WPOS957	WPQP466	Lower 6 GHz	Centennial Michiana License Company LLC	16.66
35	MILAN	PAULDING	WPQX475	WNEH649	Lower 6 GHz	INDIANA MICHIGAN POWER COMPANY	17.97
36	HILLEGAS	LAGOON	WPTV439	WPTS970	Upper 6 GHz	Allen County Indiana	11.59
37	WBCJ TWR	WYBR RLY TWR	WPXI431	RXONLY	950 MHz	TAYLOR UNIVERSITY BROADCASTING INC.	62.85
38, 39	WYBR RLY TWR	WBCL STUDIO	WPXI433	RXONLY	950 MHz	TAYLOR UNIVERSITY BROADCASTING INC.	44.05
40	WYBR RLY TWR	WBCJ TWR	WPXK611	RXONLY	950 MHz	TAYLOR UNIVERSITY BROADCASTING INC.	62.85
41	AYESVILLE TW	FAIRVIEW WT	WQCP603	RXONLY	940-960 MHz	Defiance County Communications Center	48.18
42	AYERSVILLE	SHERIFF DEPT	WQCT670	RXONLY	940-960 MHz	Defiance County Communications Center	43.16
43	JEFF MIDDLE	LANDECK	WQCV460	WQCV461	18 GHz	Delphos City School District	4.92
44	ANTWERP TS	PLEASNT BEND	WQEL946	KLZ78	Lower 6 GHz	INDIANA MICHIGAN POWER COMPANY	21.71
45	ANTWERP TS	MILAN	WQEL946	WPQX475	Lower 6 GHz	INDIANA MICHIGAN POWER COMPANY	16.20
46	ALLEN	VAN WERT	WQET481	RXONLY	2.4 GHz	Allen County Office of Homeland Security	36.64
47, 48	EACS	HARDING HS	WQGT586	WQGP721	18 GHz	East Allen County Schools	5.17
49 - 51	EACS	WOODLAND HS	WQGT586	WQGT619	18 GHz	East Allen County Schools	6.46
52	EACS	LEO HIGH SCH	WQGT586	WQGT637	18 GHz	East Allen County Schools	8.34
53	EACS	LEO HIGH SCH	WQGT586	WQGT637	11 GHz	East Allen County Schools	10.77



ID	Name Site 1	Name Site 2	Call Sign Site 1	Call Sign Site 2	Band Name	Licensee	WCFZ (m)
54	LEO HIGH SCH	CEDARVILLE E	WQGT637	WQGU466	18 GHz	East Allen County Schools	3.96
55	HARLAN ES	WOODLAND HS	WQGU444	WQGT619	18 GHz	East Allen County Schools	5.81
56	MONROEVILLE	HERITAGE HS	WQGU461	WQGT623	18 GHz	East Allen County Schools	5.75
57	HOAGLAND ES	HERITAGE HS	WQGU470	WQGT623	18 GHz	East Allen County Schools	3.73

Table 1 – Microwave GeoPlanner Links Considered in Analysis
(See enclosed mw_geopl.xls for more detailed information and GP_dict_matrix_description.xls for field description)