



Executive Summary – Wind Power GeoPlanner™

Licensed Microwave Search & Worst Case Fresnel Zone

Comsearch performed an analysis to evaluate the potential effect of the planned Langdon II Wind in Cavalier County, North Dakota 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 1 microwave path that intersects 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.

$$Rn \cong 17.3 \sqrt{\frac{n}{FGHz} \left(\frac{d1d2}{d1 + d2} \right)}$$

Where,

Rn = First Fresnel Zone Radius, meters

n = The Number 1

FGHz = Frequency of Microwave Link, GHz

d1 = Distance to Wind Turbine from Microwave Station 1, km

d2 = Distance to Wind Turbine from Microwave Station 2, km

note: For WCFZ calculation d1 = d2

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 Figure 2 and 3.

The area was shown to have no potential XY conflicts between microwave paths and proposed turbines (See Figure 3).

Turbines: 28 turbines were considered in the analysis, each with a blade diameter of 77 meters. The coordinates provided were in NAD83.



Map Projection: The ESRI® Shapefiles contained in the enclosed GeoPlanner CD are in NAD 83 UTM Zone 14 projected coordinate system.

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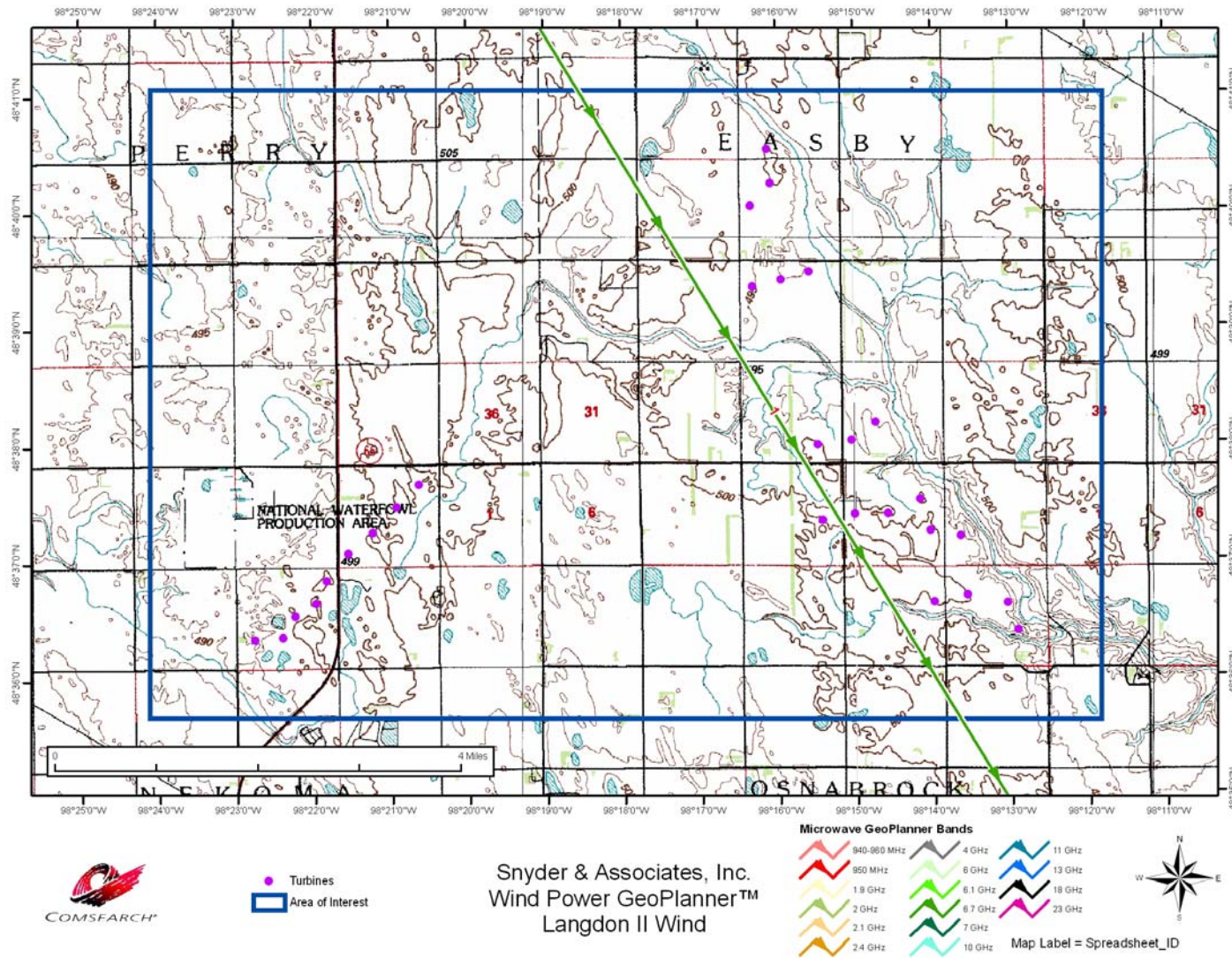


Figure 1 – Wind Power GeoPlanner™

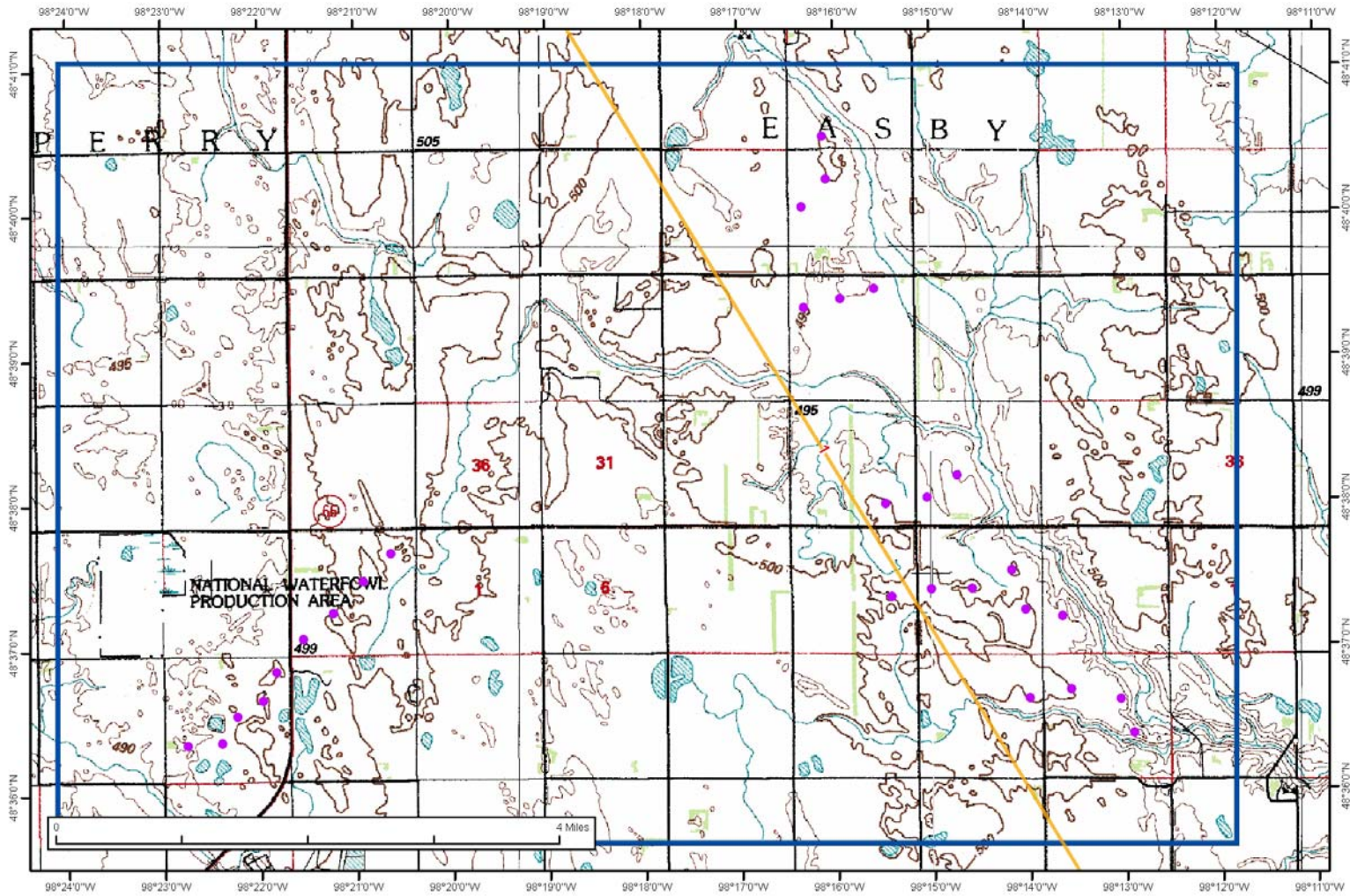


Figure 2 – Wind Power GeoPlanner™ & WCFZ

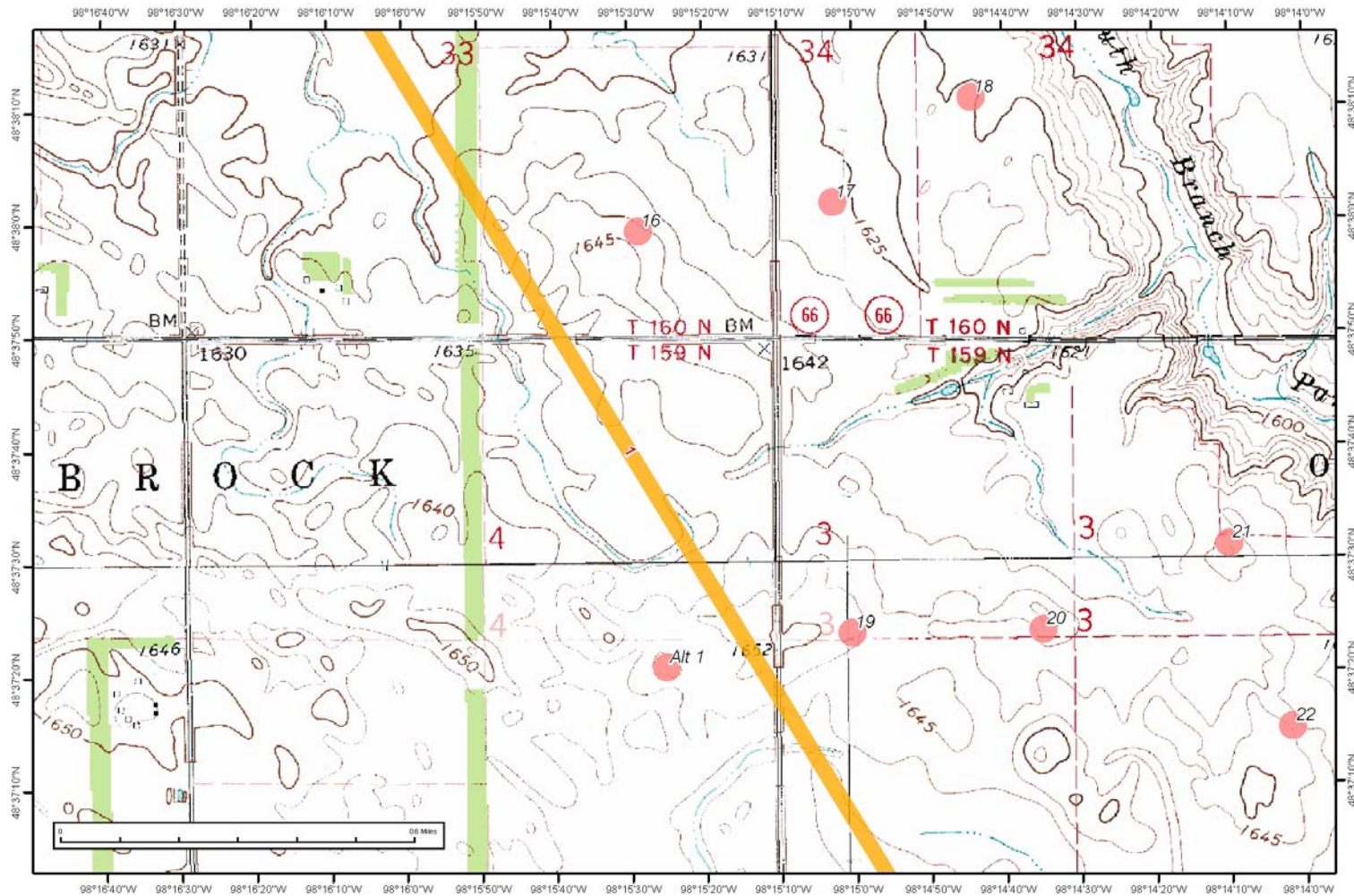


Figure 3 – Wind Power GeoPlanner™ & WCFZ



ID	Site 1	Site 2	Call Sign 1	Call Sign 2	Frequency Band	Licensee	WCFZ (m)
1	LANGDON	ADAMS	KPN81	KZC46	Upper 6 GHz	MINNKOTA POWER COOPERATIVE INC	21.96

***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)***