Appendix 5.14-A

ComSearch Licensed Microwave
Search and Worst Case
Fresnel Zone – Horseshoe Shoal

Executive Summary – Wind Power GeoPlanner™

Licensed Microwave Search & Worse Case Fresnel Zone

Comsearch performed an analysis to evaluate the potential effects of the planned Nantucket Sound, MA wind turbine project area to existing microwave telecom systems.

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 four (4) microwave paths that intersect the Nantucket Sound project area (see Figure 1 and Table 1 below).

Comsearch then calculated a Worse 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.

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

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 and 3.

Two microwave paths were identified (see Table 2) to have a potential XY conflict with respect to one turbine: L14 - 130 (see Table 3).

When wind turbines need to be located inside a WCFZ, Comsearch offers and recommends a detailed interference study, which considers the vertical Z-height clearance objectives. Please contact Denise Finney at (703) 726 – 5650 for assistance.

NOTE: 130 turbines were considered in the analysis, each with a blade diameter of 104 meters. The coordinates provided are in NAD83.

Comsearch Contact:
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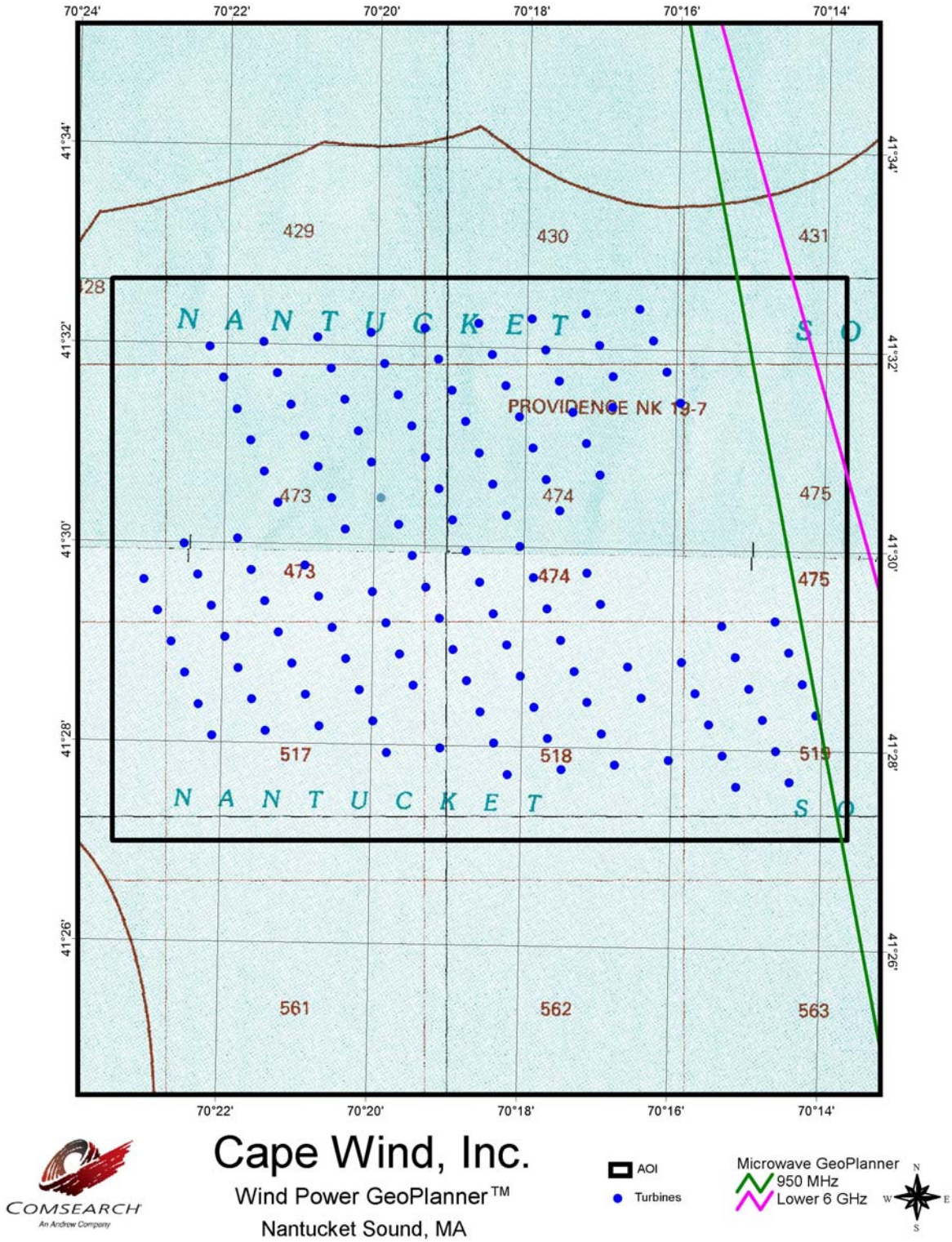

Figure 1 – Wind Power GeoPlanner™

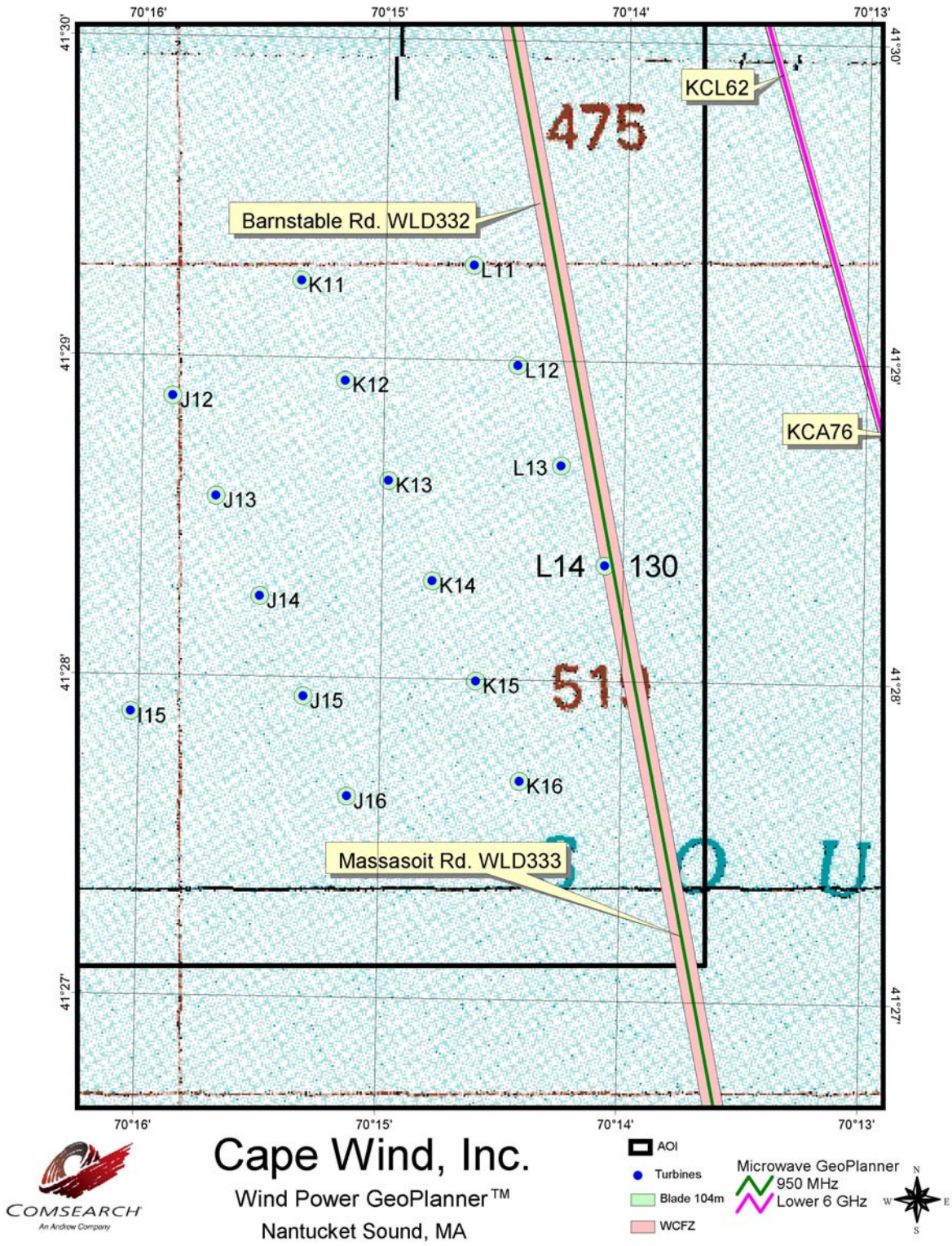

Figure 2 – Wind Power GeoPlanner™ & WCFZ Area 1 (by turbine name)

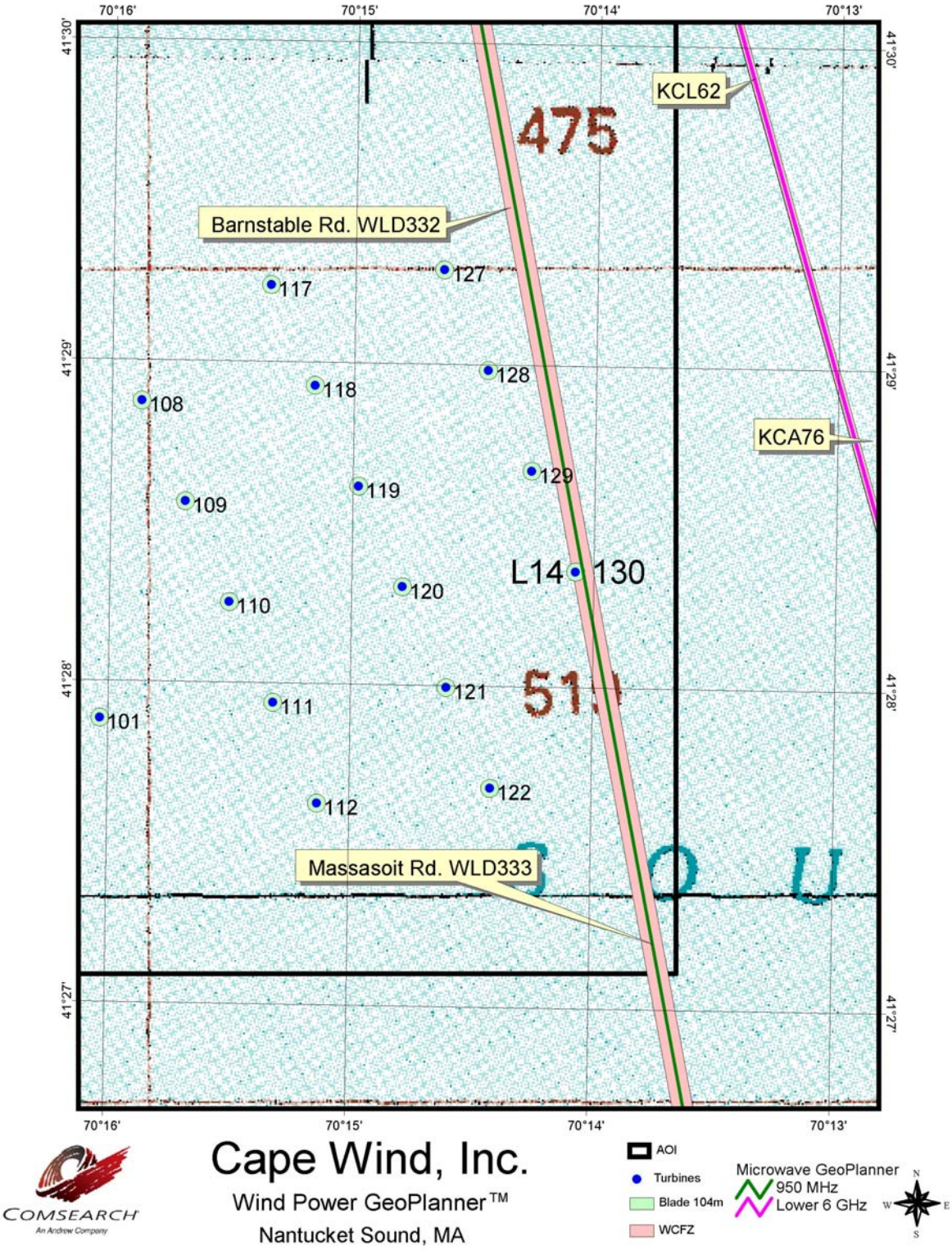

Figure 3 - Wind Power GeoPlanner™ & WCFZ Area 1 (by turbine ID number)

Name Site 1	Name Site 2	Status 1	Status 2	Call Sign Site 1	Call Sign Site 2	Band Name	Company Name Site 1	Company Name Site 2	WCFZ (m)
HYANNIS	NANTUCKET 1	LP	LP	KCL62	KCA76	Lower 6 GHz	Verizon New England Inc.	Verizon New England Inc.	22.67
HYANNIS	NANTUCKET 1	PE	PE	KCL62	KCA76	Lower 6 GHz	Verizon New England Inc.	Verizon New England Inc.	22.67
BARNSTABLE R	MASSASOIT RD	LP	LP	WLD333	RXONLY	950 MHz	Qantum of Cape Cod License Company	Qantum of Cape Cod License Company	58.71
BARNSTABLE R	MASSASOIT RD	LP	LP	WLD332	RXONLY	950 MHz	Qantum of Cape Cod License Company	Qantum of Cape Cod License Company	58.71

Table 1 – Microwave GeoPlanner Links Considered in Analysis

Name Site 1	Name Site 2	Status 1	Status 2	Call Sign Site 1	Call Sign Site 2	Band Name	Company Name Site 1	Company Name Site 2	WCFZ (m)
BARNSTABLE R	MASSASOIT RD	LP	LP	WLD333	RXONLY	950 MHz	Qantum of Cape Cod License Company	Qantum of Cape Cod License Company	58.71
BARNSTABLE R	MASSASOIT RD	LP	LP	WLD332	RXONLY	950 MHz	Qantum of Cape Cod License Company	Qantum of Cape Cod License Company	58.71

Table 2 – Microwave GeoPlanner Potential Cases

Turbine ID	Latitude (DMS)	Longitude (DMS)	Turbine Name
130	41 28 24.4302 N	70 14 04.3728 W	L14

Table 3 – Affected Turbines