Wind Power GeoPlanner™

AM and FM Radio Report

Baron Wind Farm

Prepared on Behalf of
Baron Winds LLC

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A CommScope Company

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1. Introduction

Comsearch analyzed AM and FM radio broadcast stations whose service could potentially be affected by the proposed Baron Wind Farm project in Steuben County, New York.

2. Summary of Results

AM Radio Analysis

Comsearch found six database records[1] for AM stations within approximately 30 kilometers of the project, as shown in Table 1 and Figure 1. These records represent station WLEA, which broadcasts out of Hornell, New York, to the southwest of the project area of interest (AOI); station WDNY, broadcasting out of Dansville, New York, to the northwest; and station WABH, out of Bath, New York, to the southeast. All three stations are licensed separately for daytime and nighttime operations.

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 Nearest Turbine (km)
1	WLEA	LIC	1480	2.5	Daytime	42.287500	-77.646389	0.20	10.47
2	WLEA	LIC	1480	0.019	Nighttime	42.287500	-77.646389	0.20	10.47
3	WDNY	LIC	1400	0.88	Daytime	42.538611	-77.682500	0.21	11.20
4	WDNY	LIC	1400	1.0	Nighttime	42.538611	-77.682500	0.21	11.20
5	WABH	LIC	1380	10.0	Daytime	42.314444	-77.285833	2.17	24.26
6	WABH	LIC	1380	0.45	Nighttime	42.314444	-77.285833	2.17	24.26

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

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

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

[3] ERP = Transmit Effective Radiated Power.

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

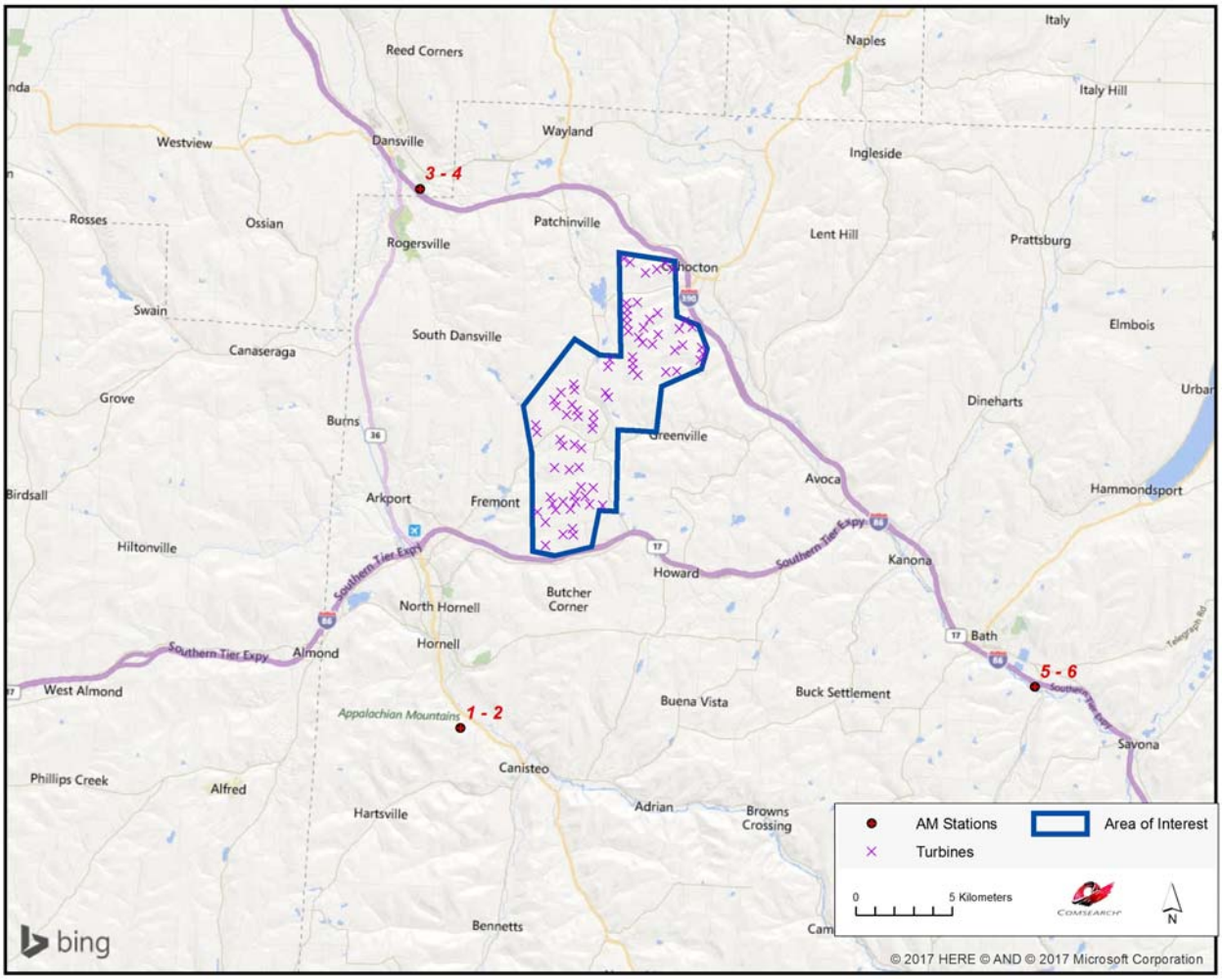

Figure 1: AM Radio Stations within 30 Kilometers of Project Area

FM Radio Analysis

Comsearch determined that there were thirty database records for FM stations within a 30-kilometer radius of the Baron Wind Farm project, as shown in Table 2 and Figure 2. Only twenty-four of these stations are currently licensed and operating, eleven of which are translator stations that broadcast with limited range.

WCIK is the only FM station operating within the project area of interest.

ID	Call Sign	Status[5]	Service[6]	Frequency (MHz)	Transmit ERP[7] (kW)	Latitude (NAD 27)	Longitude (NAD 27)	Distance to Nearest Turbine (km)
1	WCIK	LIC	FM	103.1	1.4	42.470472	-77.536306	0.22
2	WCKR	LIC	FM	92.1	2.55	42.343889	-77.626667	4.19
3	W236CP	LIC	FX	95.1	0.03	42.401667	-77.660278	4.99
4	WZHD	LIC	FM	97.1	3.9	42.401667	-77.660278	4.99
5	W248BC	LIC	FX	97.5	0.01	42.510833	-77.635000	6.81
6	W283BR	LIC	FX	104.5	0.01	42.510861	-77.635083	6.81
7	WDNY-FM	LIC	FM	93.9	0.57	42.512500	-77.635278	6.84
8	NEW	APP	FX	99.9	0.25	42.512500	-77.635278	6.84
9	W257AX	LIC	FX	99.3	0.01	42.350556	-77.690556	8.20
10	W257AX	CP	FX	99.3	0.075	42.350556	-77.690556	8.20
11	NEW	APP	FX	106.9	0.25	42.288056	-77.646111	10.41
12	WKPQ	LIC	FM	105.3	43.0	42.292222	-77.674167	11.14
13	WSQA	LIC	FM	88.7	4.5	42.267222	-77.631944	12.23
14	W226AP	LIC	FX	93.1	0.02	42.267222	-77.631944	12.23
15	W294AW	LIC	FX	106.7	0.06	42.560278	-77.697222	13.21
16	W239BK	LIC	FX	95.7	0.099	42.354722	-77.363889	16.54
17	W280EB	LIC	FX	103.9	0.034	42.278056	-77.769722	17.84
18	W284BX	LIC	FX	104.7	0.0054	42.278056	-77.769722	17.84
19	WVIN-FM	LIC	FM	98.3	4.5	42.318333	-77.357500	18.73
20	W229AR	CP MOD	FX	100.3	0.15	42.318333	-77.357500	18.73
21	W293CE	LIC	FX	106.5	0.09	42.357361	-77.321500	18.93
22	WALF	LIC	FM	89.7	0.2	42.254722	-77.786944	20.57
23	WETD	LIC	FM	90.7	3.2	42.260278	-77.797500	20.86
24	W260BE	CP MOD	FX	96.1	0.19	42.620472	-77.254472	25.41
25	W265BX	LIC	FX	100.9	0.25	42.573222	-77.877528	27.51

[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.

ID	Call Sign	Status[5]	Service[6]	Frequency (MHz)	Transmit ERP[7] (kW)	Latitude (NAD 27)	Longitude (NAD 27)	Distance to Nearest Turbine (km)
26	WQRW	LIC	FM	93.5	1.1	42.190278	-77.821389	27.60
27	WZKZ	LIC	FM	101.9	1.0	42.190278	-77.821389	27.60
28	WCIY	LIC	FM	88.9	0.68	42.745556	-77.426111	27.70
29	W283BF	CP	FX	104.5	0.24	42.746389	-77.426389	27.78
30	WNBL	LIC	FM	107.3	0.65	42.746389	-77.426389	27.78

Table 2: FM Radio Stations within 30 Kilometers of Project Area

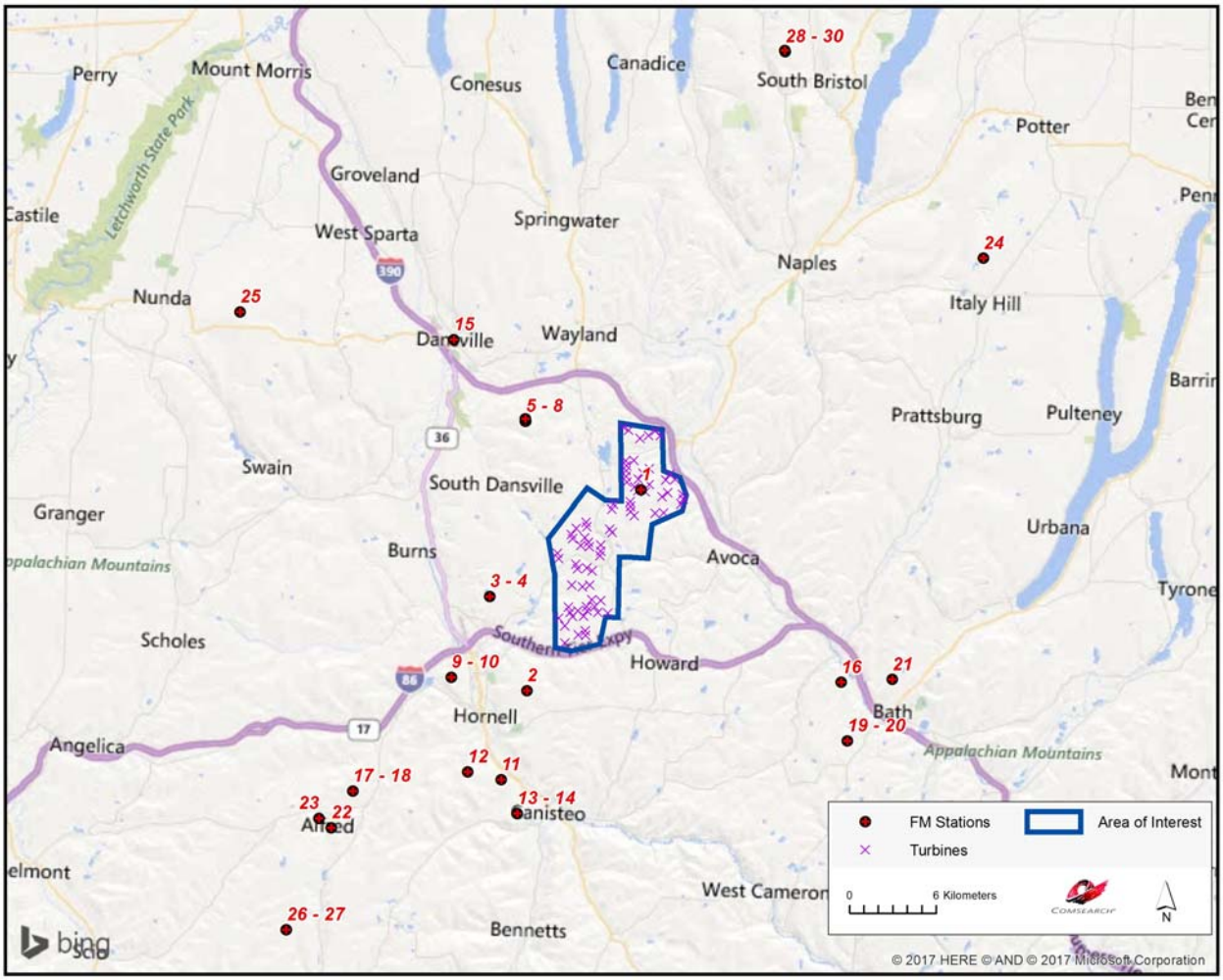

Figure 2: FM Radio Stations within 30 Kilometers of Project Area

Due to its close proximity to the proposed wind turbines, Comsearch used aerial imagery to verify the location of FM station WCIK[8]. The station's actual location was identified at 42.437963° N, 77.534093° W (NAD 83), approximately 187 meters northeast of the location defined by the coordinates listed on the station's FCC license (see Figure 3). This places WCIK within approximately 266 meters of the nearest turbine in the Baron Wind Farm project, T26.

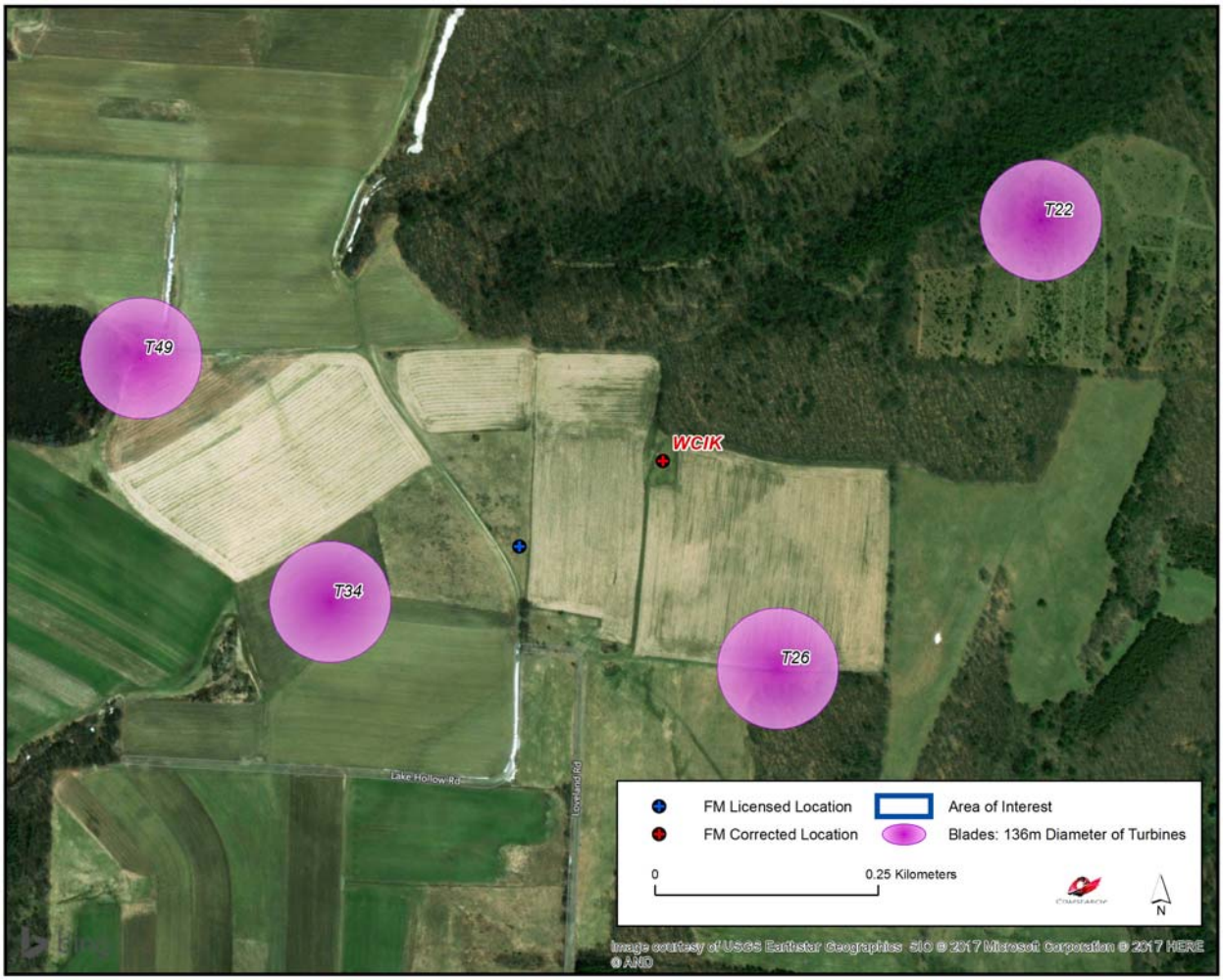

Figure 3: Location of FM Station WCIK with Respect to Location Listed on FCC License

[8] A small amount of variance between a station's actual geographic coordinates and those reported on the station's license is fairly typical.

3. Impact Assessment

The exclusion distance for AM broadcast stations varies as a function of the antenna type and broadcast frequency. For directional antennas, the exclusion distance is calculated by taking the lesser of 10 wavelengths or 3 kilometers. For non-directional antennas, the exclusion distance is simply equal to 1 wavelength. Potential problems with AM broadcast coverage are only anticipated when AM broadcast stations are located within their respective exclusion distance limit from wind turbine towers. The closest AM station to the Baron Wind Farm project, WLEA, is more than 10.4 kilometers from the nearest turbine. As there were no stations found within 3 kilometers of the project, which is the maximum possible exclusion distance based on a directional AM antenna broadcasting at 1000 KHz or less, the project should not impact the coverage of local AM stations.

The coverage of FM stations is generally not susceptible to interference caused by wind turbines, especially when turbines are sited in the *far field* region of the radiating FM antenna in order to avoid the risk of distorting the antenna's radiation pattern. The closest operational station to the Baron Wind Farm project, WCIK, is located approximately 266 meters from the nearest turbine (T26). After considering the rotational sweep of the turbine blades (68 meters), the total separation distance between the station antenna and the tip of turbine blades reduces to 198 meters. At distances less than 500 meters, radiation pattern distortion could become a factor. Signal attenuation is also possible, but can be difficult to quantify without precise field measurements.

Station WCIK and its proximity to the proposed turbines are depicted below in Figure 4. There are three proposed turbines whose blade sweep is inside the near field of station WCIK: T22, T26, and T34.

The next closest FM station to the project, WCKR, is more than 4.1 kilometers from the nearest turbine and well out of range of impact.

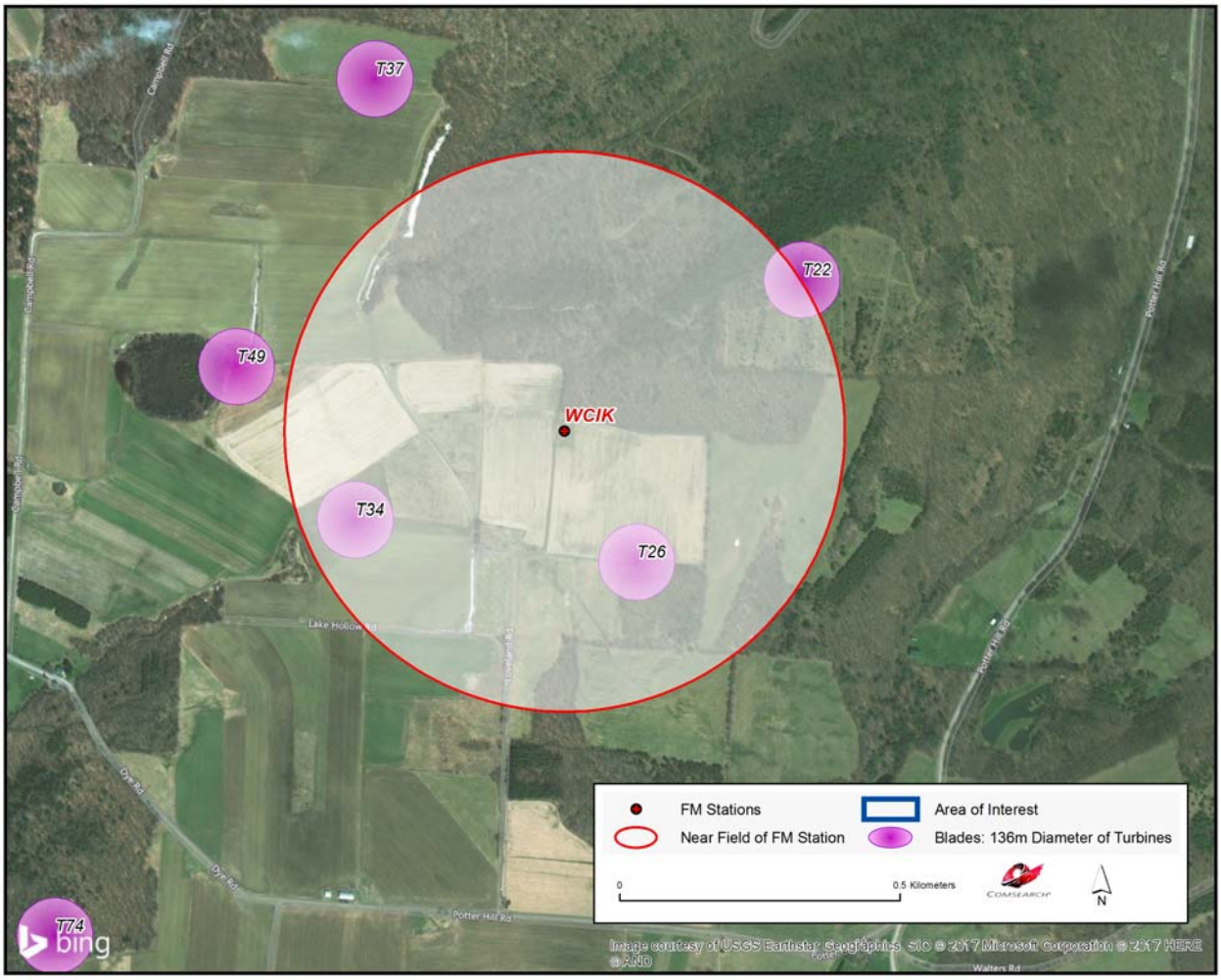

Figure 4: FM Station WCIK and Adjacent Wind Turbines

4. Recommendations

Since our analysis did not identify any impact to the AM broadcast stations, no recommendations or mitigation techniques are required for this project.

With regard to the FM broadcast stations, WCIK was found to be potentially obstructed by wind turbines T22, T26, and T34. Since FM radio operates in the VHF frequency band, signals can propagate over large distances despite partial obstructions between the broadcast station and FM receiver. Furthermore, FM radio uses frequency modulation, whereas signal perturbations due to wind turbines affect primarily the signal amplitude and phase (i.e., multipath). Notwithstanding these signal characteristics, it is recommended that the aforementioned turbines be relocated to the far field region of station WCIK, while accounting for the blade length, in order to minimize the risk of distorting the radiation pattern of the FM station antenna.

In addition, a baseline drive test measurement of the existing FM coverage of WCIK should be performed to determine the actual signal strength in potentially impacted areas prior to the construction of the wind energy facility. Following the construction, a similar drive test measurement could then be performed to determine the actual impact of the wind turbines. In the event that significant signal attenuation is observed after construction, a possible mitigation is to raise the FM antenna to a higher radiation center on the same tower. This is a tenable solution if the tower has sufficient height and space above the existing antenna installation.

If the same tower cannot be used, then another solution could involve the installation of an auxiliary broadcast antenna in order to fill in coverage in weak-signal areas impacted by the wind turbines after they are installed. Any relocation of the station's antenna or changes to its operation will require costs for hardware, space acquisition, administration, planning, lost operation time and coordination with the FCC.

5. Contact

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