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## 2.12 Communication Facilities

Any structure may interfere with communications signals if it is located between a system transmitter and a receiver. Wind turbines in general have the potential to create line of sight blockage in point-to-point microwave links, alter propagation characteristics of nearby communications facilities, and impact the electromagnetic characteristics of surrounding communications facilities. To evaluate the potential for the Project to impact existing communication signals, the Applicant contracted Comsearch to conduct a Licensed Microwave Search and Worst Case Fresnel Zone (WCFZ) Analysis (Appendix L1), a Television Broadcast Off-Air Reception Analysis (Appendix L2), and an Analysis of AM and FM Broadcast Station Operations (Appendix L3). Comsearch excluded other forms of communication from the analysis for this Project, including cellular/mobile, land mobile radio (LMR), satellite reception, and radar for the following reasons:

- *Mobile Phones (cellular and personal communications system [PCS]):* Telephone mobile communications in the cellular and PCS frequency bands are minimally affected by the presence of wind turbines, because the blockage caused by wind turbines is not destructive to the propagation of the signals in these frequency bands. In addition, these systems are designed so that if the signal from (or to) a mobile unit cannot reach one cell, it will search and reach one or more other cells in the network. Therefore, local obstacles are not normally a problem for these systems, whether they are installed in urban areas near large structures and buildings or in a rural area near a wind energy facility.
- *LMR:* An LMR system is a collection of portable and stationary radio units designed to communicate with one another over predefined frequencies. In typical LMR systems, a central dispatch console or base station controls communications to the disparate handheld or mobile units in the field. Typical LMR system users include public safety organizations (e.g., police departments, fire departments, and medical personnel), as well as the private sector for activities like construction, building maintenance, and site security. LMR systems typically operate using single channel, 15-kilohertz (kHz) bandwidth, analog FM radio frequencies. Wind turbine operation does not significantly interfere with signals in this frequency band. LMR systems often rely on connections to fixed systems, such as the public switched telephone network (PSTN) or cellular networks, to provide the sufficient range of communications for the mobile users. Cellular networks as described above are not significantly impacted by the operation of wind turbines, thus extended coverage LMR systems will also not encounter significant interference problems.
- *Satellite Television:* Satellite reception is unaffected by the presence of the wind turbines as long as the earth station antennas have a clear view of the satellite and are not obstructed by the wind turbines. An antenna on the ground would have a direct line-of-

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site to the satellites in the sky. Satellites orbit the earth at heights hundreds of miles from the earth's surface to eliminate drag caused by the earth's atmosphere, which causes antennas on the ground to be pointed high with respect to the earth's horizon. Since the turbines were sited with setbacks of 1,200 feet from any house, lines-of-site should not be obstructed from wind turbines and satellite reception should not be impacted.

- *Radar:* The National Defense Authorization Act of 2006 called for the Secretary of Defense to examine the effects of wind farms on military readiness. The Department of Defense (DOD) issued a report in 2006 that includes an assessment of wind farms' effects on the operations of military radar installations and of technologies that could mitigate any adverse effects on military operations. The report concluded that wind turbine towers and blades could interfere with radar functions if located within the line-of-sight of the radar. Currently, a study of whether a wind farm will have an impact upon military radar is undertaken by the FAA as part of their Aviation Hazard Review. This review is not initiated for a given project until a few months prior to construction, as a final permitted layout is required for the FAA to conduct their review. This necessarily occurs after the SEQR process is complete, as a layout cannot be permitted in New York until SEQR findings have been issued.

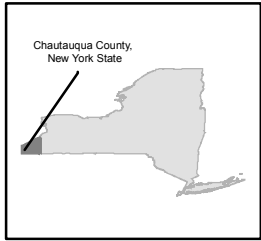
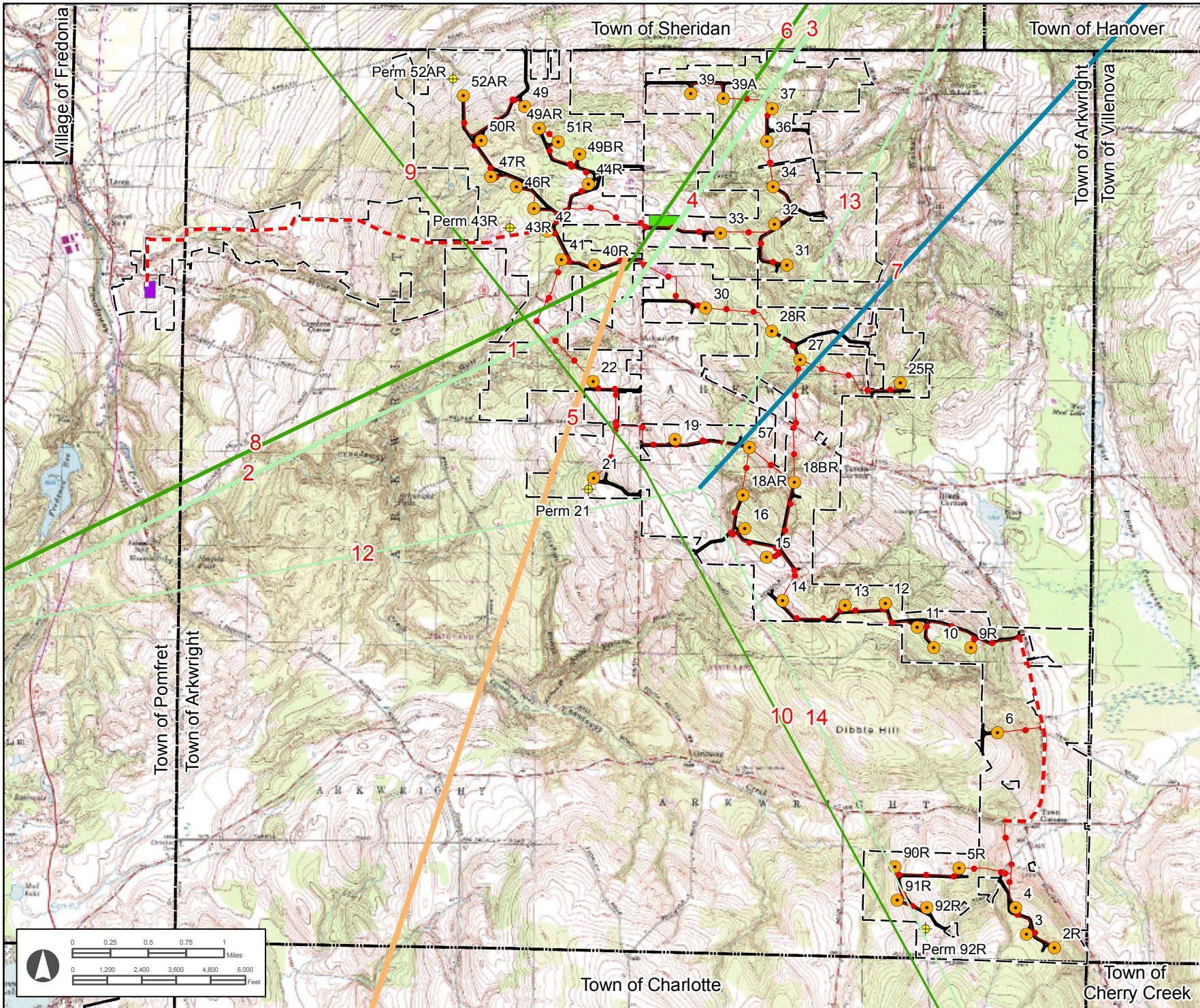
### ***2.12.1 Existing Conditions***

The following sections discuss the existing conditions within the Project Area with regard to microwave, television, and AM/FM communications.

#### ***2.12.1.1 Microwave Analysis***

Microwave telecommunication systems are wireless point-to-point links that communicate between two sites (antennas) and require clear line-of-sight conditions between each antenna. Comsearch identified licensed, non-federal microwave systems within an area of interest identified by the Applicant early in the Project planning stage. Comsearch's GeoPlanner™ database contains point-to-point microwave paths in the 900 megahertz (MHz) to 40 gigahertz (GHz) frequency range. Each microwave path is represented by a line and includes features such as licensee contact information, coordinates, equipment types, and frequency. The search area encompassed the proposed Project Area, as well as regions north and west of the Project Area. The analysis identified 14 microwave paths that intersect the search area. The majority of the paths cross the search area to the south and east (Figure 1 and Table 1 in Appendix L1). Figure 2.12-1 shows that 13 of the 14 microwave paths intersect the Project Area. The Applicant used the analysis provided by Comsearch while deciding on a Project layout in order to avoid siting wind turbines in the paths of microwave systems.





- Permanent Met Towers
- Turbines
- Overhead Collection System
- Underground Collection System
- Access Roads
- Laydown Yard
- Substation
- Wind Overlay Zone
- Town Boundary
- Microwave GeoPlanner Bands**
- 2.1 GHz
- 6.1 GHz
- 6.7 GHz
- 7 GHz
- 940-960 MHz

SOURCE:  
 MICROWAVE PATHS  
 COMSEARCH LICENSED  
 MICROWAVE SEARCH

TOPO  
 USGS 7.5 MINUTE QUADRANGLES  
 DUNKIRK, 1978; FORESTVILLE, 1978;  
 CASSADAGA, 1978; HAMLET, 1978



TETRA TECH EC, INC.

NEW GRANGE WIND FARM  
 CHAUTAUQUA COUNTY,  
 NEW YORK

FIGURE 2.12-1  
 MICROWAVE PATHS

NEW GRANGE WIND FARM LLC  
 FEBRUARY 2008



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In addition to identifying non-federal government microwave transmitters, Comsearch contacted the National Telecommunications and Information Administration (NTIA) to request a search for transmitters operated by the U.S. government, which are not listed in public records. The letter is included in Appendix A of this DEIS. A response from the NTIA has not been received at the time of this DEIS, but will be included in the FEIS.

#### *2.12.1.2 Television Analysis*

Off-air stations are television broadcasters that transmit signals that can be received from terrestrially located broadcast facilities directly on a television receiver. Early in the Project planning process, the Applicant contracted Comsearch to identify all of the off-air television stations within a 100-mile radius of the Project, which covered a search area far greater than the Project Area (Appendix L2); although the television stations most likely to produce off-air coverage to the Chautauqua County, New York area would be those stations at a distance of 40 miles or less. Of the television stations identified by Comsearch, a total of 40 stations were found within 40 miles or less (36 United States stations and 4 Canadian stations).

Comsearch also conducted an analysis to examine the coverage of the off-air television stations and the communities in the area that could potentially have degraded television reception because of the location of the wind turbines (Appendix L2). To determine the existing quality of off-air television reception for the Project Area (and surrounding communities), Comsearch conducted on-site television broadcast off-air measurements on January 16, 2008. To provide broad coverage of their study area, Comsearch selected ten test site locations by analyzing a Federal Communications Commission (FCC) database to determine the television broadcasting in the region and to identify areas/communities that may potentially be affected by the Project (i.e., interrupted off-air television reception). See Figure 1.2-1 of Appendix L2 for test site locations. The results of the off-air reception analysis for each of the ten test sites, including the number of channels received (both analog and digital), the quality of the channels received, and the number of major networks received, is detailed below in Table 2.12-1.

The Comsearch report concluded that existing television reception conditions in most of the Project Area have low signal strength because of the distance to the major transmission points and because the signals are subject to ghosting and fading due to the hilly terrain. The report found that seven full-power analog channels and ten low-power translators provide limited coverage to the area. The residents of the Project Area rely on television transmissions mainly from the greater Buffalo, New York area. Residents in the far western and northern communities receive transmissions from Erie, Pennsylvania, as well. The television transmitter in Jamestown, New York, is close to the Project Area and was the only broadcast station received at all test locations. The Canadian stations out of Toronto are detectable at most test locations. However, none of the Canadian stations had signal levels suitable for viewing. Comsearch observed that off-air television antennas are installed on most homes in the Project Area and that satellite

dishes are installed on some homes. Additionally, cable television is available in all communities, with cable headers present on major roads and most minor roads.

**Table 2.12-1. Summary of Results from the Off-Air Television Reception Analysis**

ID	Site	Analog Channels Received	Analog Channels Suitable for Viewing	Digital Channels Received	Digital Channels Suitable for Viewing	Major Networks Represented
1	Inside Area of Interest	15	12	7	5	ABC, CBS, FOX, NBC, PBS
2	Inside Area of Interest	8	3	7	1	ABC, CBS, FOX, NBC, PBS
3	Inside Area of Interest	18	12	10	5	ABC, CBS, FOX, NBC, PBS
4	Inside Area of Interest	2	0	0	0	CBS, PBS
5	Inside Area of Interest	13	5	0	0	CBS, FOX, NBC, PBS
6	Fredonia	11	5	10	0	ABC, CBS, FOX, NBC, PBS
7	Lily Dale	11	5	0	0	FOX, NBC, PBS
8	Cherry Creek	6	2	3	0	ABC, CBS, NBC, PBS
9	South Dayton	6	2	3	2	ABC, CBS, FOX, PBS
10	Sheridan	13	9	6	5	ABC, CBS, FOX, NBC, PBS

### 2.12.1.3 AM/FM Stations

Comsearch performed an analysis to identify AM and FM broadcast stations within 15 miles of the Project Site (Appendix L3). The results show that there is one AM station 8.8 miles from the planned center of the Project Site (Table 1 and Figure 1 in Appendix L3). Comsearch also determined that there are 15 FM stations within 15 miles of the center of the Project Site (Table 2 and Figure 2 in Appendix L3). One of the FM stations is a full-power station (greater than 10 kilowatts [kW]) and is not yet operational. Three of the stations are medium-power FM stations (between 1 and 10 kW). Two of the stations are low-power stations (between 100 Watts (W) and 1 kW). Eight of the stations are very low-power stations (less than 100 W). One of the stations in the database listing did not have a transmit power designated.

The full-power FM station in the area is owned by the Family Life Ministries. The three medium power FM stations are owned by the Seneca Nation of Indians, Community Public Radio, and a commercial broadcaster. One of the low-power FM stations is owned by the New York Thruway Authority, and the other is owned by the State of New York University. The very low-power FM stations are owned and operated by either business, religious or educational organizations. All

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of the FM station antennas are located at distances greater than 1.92 miles of the center of the Project Site, with 14 of the 15 stations located greater than 4.66 miles away.

### ***2.12.2 Anticipated Impacts***

The following sections present the anticipated impacts to existing telecommunications resources in the Project Area associated with construction and operation of the Project.

#### ***2.12.2.1 Construction***

Temporary communications interference as a result of Project construction may occur. Cranes used during construction activities (and the individual turbine components being raised by the cranes) can cause temporary obstruction of microwave links, as well as some degradation to television and radio signals. However, since individual turbines have been sited outside of the WCFZ, the potential for microwave interference by equipment assembling and erecting these turbines is expected to be minimal. Any impact on television reception caused by construction equipment would be temporary, as assembly and erection is typically completed within one to two days per turbine.

#### ***2.12.2.2 Operation***

The following sections describe in further detail the anticipated operation impacts to microwave, television, and radio, as well as other telecommunications systems in the Project Area.

##### ***2.12.2.2.1 Microwave Communication Systems***

To assure an uninterrupted line of communications, a microwave link should be clear, not only along the axis between the center point of each antenna, but also by a mathematical distance around the center axis known as the WCFZ. A WCFZ was calculated for each of the 13 microwave paths identified within the Project Area. Since the proposed Project layout was determined with consideration for WCFZ setbacks, no turbines are located in a WCFZ.

The WCFZ calculation includes only a horizontal analysis for each microwave path (i.e., its width). An analysis of the vertical limits of the WCFZ, to determine if the microwave path is actually above or below the proposed height of the turbines, was not conducted. Such an analysis, which considers vertical Z-height clearance objectives, would only be necessary if wind turbines needed to be located inside a WCFZ. Since the proposed Project layout was determined with consideration for WCFZ setbacks, no turbines are located in a WCFZ, and subsequently, a vertical analysis is not necessary.

##### ***2.12.2.2.2 Television Communication Systems***

Based upon the data collected at each of the ten test sites, existing conditions show that signal strength is low and subject to ghosting and fading. The placement of the turbines inside the area of interest might further reduce the low-quality off-air television reception. However, television reception from cable or via satellite will not be affected by the presence of wind turbines.

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After the wind energy facility is built, measurements can be made at all sites where signal blockage, multipathing, ghosting and/or electromagnetic noise is reported and/or suspected. These measurements can be compared to the baseline measurements reported by Comsearch to determine whether the degraded affects are the result of the presence of the wind turbines.

#### *2.12.2.2.3 AM/FM Stations*

Operation of the Project is not expected to affect AM and FM systems. Degradation of AM broadcast coverage due to the presence of wind turbines does not occur when the antenna is located more than 2 miles away. Since the only AM station within 15 miles of the Project is located 8.8 miles away, the Project will not degrade the AM signal. For FM signals, the minimum separation distance between the turbines and antennas varies depending on the signal strength. The very low-power FM stations are designed for very limited coverage. Normally this is a church parking lot or a small community. The low-power FM stations usually cover a college campus or a small town church community with special broadcasting for a limited audience. The separation distance is 0.5 mile for very low-power stations, 1.5 miles for low-power stations, and 2.5 miles for medium and full-power stations. The closest station to the Project is 1.92 miles away and is one of the very low-power stations, which have a coverage area less than 0.5 mile. The other 14 stations are all located more than 4.66 miles away.

#### *2.12.2.2.4 Military Radar*

As indicated above, the DOD report on wind farms and radar concluded that wind turbine towers and blades could interfere with radar functions if located within the line-of-sight of the radar. The impact of the Project on military radar will be determined through the Project's FAA Aviation Hazard review process. Currently, the FAA consults with the DOD on whether a proposed wind farm could potentially impact any nearby radar facilities important to national security. Based upon the FAA consultation, the Project could be requested to initiate a detailed radar study of the wind farm with the DOD.

#### *2.12.2.2.5 Other Forms of Communication*

During operation of the wind turbines, there are no anticipated impacts to mobile phones or LMR systems.

### ***2.12.3 Mitigation Measures***

#### *2.12.3.1 Construction*

If disruption to existing communication systems should occur as a result of Project construction, the disruptions will be temporary, and will only occur during the erection of specific turbines. Because turbine installation/crane activity will occur at different locations and at different times during the construction period, any degradation/disruption to existing communications will not represent a constant interference to a given television/radio reception area or microwave signal. To reduce minor potential impacts, turbine erection will be performed as efficiently and as quickly as possible (under favorable conditions, a turbine can be erected in one to two days).



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### *2.12.3.2 Operation*

#### *2.12.3.2.1 Microwave Communication Systems*

Interference with microwave communication systems is not anticipated. The proposed layout has been prepared using the known microwave paths as a constraint to site wind turbines outside of the WCFZ. Therefore, the proposed layout of the Project will not result in any significant interference to existing microwave telecommunication systems. Beyond this, additional mitigation is not necessary and is therefore not proposed.

#### *2.12.3.2.2 Television Communication Systems*

If Project operation results in any impacts to existing off-air television coverage, the Applicant will address and resolve each individual problem, as necessary. This will be accomplished through the Complaint Resolution Procedure outlined in Appendix N. Mitigation actions could include adjusting existing receiving antennas, upgrading the antenna, or providing cable or satellite systems to the affected households. In addition, the Applicant can mitigate turbine-related contrast variation (shimmering) by outfitting households using analog televisions with digital converters to make use of digital broadcast signals. Many stations already broadcast with both analog and digital signals, and the FCC has mandated the transition of all full-power off-air television broadcasts from analog signals to digital signals by February 2009 (NTIA 2008).

#### *2.12.3.2.3 AM/FM Stations*

If Project operation results in any impacts to existing AM and FM coverage, the Applicant will address and resolve each individual problem, as necessary. This will be accomplished through the Complaint Resolution Procedure outlined in Appendix N.

#### *2.12.3.2.4 Military Radar*

As reported at the AWEA conference held on April 24, 2006 (AWEA 2006) and based upon the results of similar government studies conducted in Great Britain (BWEA 2003), interactions between military radar and wind turbines are highly solvable. There are engineering, hardware and software mitigation efforts that can be implemented to reduce or eliminate the effects of wind turbines on radars. In the most extreme situation, turbine locations could be eliminated. If the FAA and DOD detect a possible conflict with military radar, the Applicant will work to solve the conflict to the satisfaction of the federal agencies involved. Implementation of the potential remedies would not increase the environmental impacts of the Project.

#### *2.12.3.2.5 Other Communication Systems*

No impacts to other communication systems are anticipated. However, if there is a report of diminished communications services (e.g., mobile phone coverage, LMR operations, or satellite reception) after the turbines are installed, the Complaint Resolution Procedure outlined in Appendix N is designed to address those concerns. Mitigation for diminished phone coverage

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can be accomplished by adding antennas to the system. Mitigation for reported changes to LMR coverage includes repositioning affected repeaters or adding repeaters to the LMR system.