Table of Contents

1. Introduction - 1 -
2. Project Overview - 1 -
3. Summary of Results - 2 -
4. Impact Assessment - 2 -
5. Conclusions - 7 -
6. Contact Us - 8 -
1. Introduction

Our communication signals assessment was performed for Sustainable Energy Developments to identify all FCC-licensed wireless signals operating near the proposed wind turbine. This assessment is useful in the planning stages of the wind energy facility to identify potential impact to communications systems and possible mitigation strategies if necessary.

2. Project Overview

Project Information
Name: SUNY Canton
County: St. Lawrence
State: New York
Number of Turbines: 1
Blade Diameter: 100
Hub Height: 83

Figure 1: Area of Interest
3. Summary of Results

The wireless communication sites identified in the study area were derived from a variety of sources including the FCC’s Antenna Structure Registration (ASR) database, Universal Licensing System (ULS), and Comsearch’s proprietary microwave path database. In addition, SUNY Canton’s FCC licenses were provided by the customer. The data\(^1\) was imported into GIS software and the locations mapped in the area of interest defined by the customer.

In total, five communication antennas\(^2\) were identified near the wind project area using the data sources described above. The communication antennas are located on a variety of structure types such as guyed towers, monopoles or rooftops. No microwave paths were found to intersect the proposed turbine site. A 2.5 GHz Broadband Radio Service (BRS) geographic service area (GSA) was identified close to the area of interest. The BRS band is used for high speed broadband services, primarily the network deployed by Clearwire.

Because broadcast and media services may be impacted beyond the immediate project area, an extended search of broadcast antennas was performed. One FM translator station was found approximately 3 kilometers from the proposed turbine site. No AM or TV station transmitters were found in the potential area of impact.

4. Impact Assessment

Our study identified five VHF and UHF communication antennas (see Table 1 and Figure 2), one FM translator station and one Broadband Radio Service GSA near the proposed turbine site. The communication signals output by these antennas include paging, land mobile, FM radio, and mobile broadband service. Point-to-point microwave licenses were also identified near the turbine site but none of the paths cross through the area of interest. The potential impact for each of the wireless services is discussed below.

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\(^1\) Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch’s data license notification and agreement located at [http://www.comsearch.com/files/data_license.pdf](http://www.comsearch.com/files/data_license.pdf).

\(^2\) Please note that this report analyzes communication sites from data sources available to Comsearch. Unidentified sites may exist due to unlicensed or federal government systems, mobile phone operators with proprietary locations, erroneous data on the FCC license, and other factors beyond our control.
Figure 2: VHF/UHF Communication Antennas near SUNY Canton Turbine Site

<table>
<thead>
<tr>
<th>ID</th>
<th>Callsign</th>
<th>Service Type</th>
<th>Licensee</th>
<th>Antenna Height AGL (m)</th>
<th>Latitude (NAD83)</th>
<th>Longitude (NAD83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WQHK376</td>
<td>Paging / Land Mobile</td>
<td>Canton Fire Department</td>
<td>37.2</td>
<td>44.602278</td>
<td>-75.176944</td>
</tr>
<tr>
<td>2</td>
<td>KLM759</td>
<td>Land Mobile</td>
<td>David M. Speer</td>
<td>21.0</td>
<td>44.604500</td>
<td>-75.177139</td>
</tr>
<tr>
<td>3</td>
<td>KLI938</td>
<td>Paging</td>
<td>SUNY Canton (Police Dept)</td>
<td>11.0</td>
<td>44.603944</td>
<td>-75.184917</td>
</tr>
<tr>
<td>4</td>
<td>WQKJ250</td>
<td>Mobile Relay</td>
<td>SUNY Canton</td>
<td>5.5</td>
<td>44.604444</td>
<td>-75.182222</td>
</tr>
<tr>
<td>5</td>
<td>WQIA359</td>
<td>Paging</td>
<td>SUNY Canton College of Technology</td>
<td>27.0</td>
<td>44.603944</td>
<td>-75.184361</td>
</tr>
</tbody>
</table>

Table 1: Summary of VHF/UHF Communication Antennas
VHF/UHF Land Mobile and Mobile (Cellular) Telephone
For the land mobile radio (LMR) and mobile telephone services located near the area of interest, close proximity and turbine blade radius do not typically degrade coverage and therefore should not limit the turbine placement except from an electromagnetic interference standpoint. From an electromagnetic standpoint, a setback distance of 77.5 meters should be used to meet FCC emission requirements. This distance is based on the frequency band of operation (below 1 GHz) and criteria set forth in Part 15 of the FCC rules.

Wind turbines do not typically degrade coverage of these systems since the VHF and UHF mobile systems operate at a low frequency where the signal is not significantly influenced by the turbine structure. Additionally, these systems are designed to operate in an environment with clutter such as trees, buildings, and other physical obstructions, including turbines.

Mobile phone systems are designed with multiple base transmitter stations covering a specific area. Since mobile telephone signals are designed with overlap between adjacent base transmitter sites in order to provide handoff between cells, any minimal signal attenuation caused by wind turbines does not materially degrade the reception because the end user may be receiving signals from multiple transmitter locations. For example, if a particular turbine attenuates the signal reception into a mobile phone, the phone may receive an alternate signal from a different transmit location, resulting in no disruption in service. Land mobile and mobile phone systems that are implemented in urban areas near large structures and buildings often have to combat even more problematic signal attenuation and reflection conditions than areas containing a wind energy turbine facility.

VHF/UHF Paging
Based on the VHF and UHF frequencies utilized for the paging networks licensed to SUNY Canton and Canton Fire Department, no impact on the paging receivers should occur after the installation of the wind turbine. This conclusion is based on the fact that at 154.22 MHz, 155.745 MHz and 462.775 MHz, little to no attenuation is expected from the wind turbine. Since there is only one turbine planned for this project, the probability of an obstructed path is low. In situations where the turbine is directly between the transmitter and paging receiver, the signal should still be sufficiently strong enough for reliable service.

FM Radio
FM stations’ coverage when they are at the heights above the wind turbine blades and/or at distances greater than 4 kilometers from wind turbines are typically not subject to degradation. There is one FM translator station in the assessment area, W261BN, with a construction permit to operate approximately 3 kilometers from the turbine site (see Figure 3). The antenna height for W261BN is 10 meters. At this height the antenna for the FM station is below the minimum tip height\(^3\) of the wind turbine blades. This will give the FM station sufficient clearance of the wind turbine blades so that its coverage throughout the area should not be affected.

\(^3\) Minimum and maximum blade tip heights are determined by the hub height plus or minus the rotor radius.
Broadband Radio Service
The Broadband Radio Service at 2.5 GHz is licensed by 35-mile radius Geographic Service Areas (GSAs). In Canton, New York there is one GSA licensed to the Board of Cooperative Educational Service (BOCES) District of St. Lawrence and St. Lewis Counties (see Figure 4). This licensee is leasing its spectrum to Clearwire, who is in the process of deploying a 4G mobile broadband network. Similar to mobile telephone services, Clearwire’s network is designed with multiple base transmitter stations covering a specific area. Since these signals are designed with overlap between adjacent base transmitter sites in order to provide handoff between service areas, any signal blockage caused by a wind turbine would not materially degrade the reception because the end user may be receiving signals from multiple transmitter locations.
Figure 4: Geographic Service Area for 2.5 GHz Incumbent

Point-to-Point Microwave
For point-to-point microwave paths, line-of-sight (LOS) is used as the criteria when identifying potential obstructions. As long as the proposed turbine location, buffered by the blade radius, is sited outside the worst case Fresnel zone there should be no impact on microwave transmissions. Our microwave search identified no point-to-point microwave paths transmitting through the project area (see Figure 5).

EMI / EMC impact
A wind turbine structure can be considered an unintentional radiator of RF emissions if in close proximity to RF transmissions. Part 15 of the FCC Regulations cover the allowed emissions from unintentional radiating devices and the field strength limits for these emissions is given in Paragraph 15.109 of these regulations. From these field strength values Comsearch derived the distance to the communication services in-and around the SUNY campus from the proposed wind turbine. These distances were derived in the past while performing
calculations of interference coupling from wind turbines to various communication services. Using the distances calculated the separation distances between the proposed SUNY wind turbine and the communication services' components in the area were found to be great enough so that electromagnetic interference will not occur.

Figure 5: Microwave Paths near the SUNY Canton Turbine Site

5. Conclusions

No impact on wireless communication services is anticipated from the SUNY Canton turbine site due to obstruction of signals or electromagnetic interference. The location of the communication antennas are either of sufficient distance from the proposed turbine site or the frequencies of operation should allow the communication signals to operate without degradation in service.
6. Contact Us

For questions or information regarding the Communication Signals Assessment, please contact:

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