

Section 12 Noise

Carbon County does not have a noise code establishing regulations and standards regarding noise control and relies on the State of Montana noise statues. The State of Montana’s Noise Related Statues and Polices are found in Montana Code 23-1-126 which articulates a “Good Neighbor Policy” to seek a no impact upon adjoining private and public lands by preventing impacts on the adjoining land from “noxious weeds, trespass, litter, noise and light pollution, stream erosion and loss of privacy.” The A-weighted sound pressure level is often used to measure the sound level of noise associated within a given environment and is a composite of sounds from many sources. The State of Montana uses the “A” weighted sound pressure level to measure sound. A-weighted decibels are abbreviated dB(A) or dBA. The A-weighting curve has been widely adopted for environmental noise measurements and is standard in many sound level meters. The A-weighting system is used in any measurement of environmental noise (examples of which include roadway noise, rail noise, aircraft noise and wind turbine noise).

The State of Montana does not have a specific noise criteria for wind turbines. However the Montana code adopts the Federal Highway Administration noise impact manual and Montana Department of Transportation Noise Abatement Criteria (NAC) which establishes general sound levels above which abatement for traffic noise impacts should be consider. The NAC criteria are listed in Table 6 below:

**Table 6
Noise Abatement Criteria**

| dBa | Description of Activity Category |
|----------------|---|
| 57 exterior | Land on which serenity and quiet are an extraordinary significance and essential for the area to continue to serve its intended purpose, |
| 67 exterior | Picnic areas, retreat areas, playgrounds, parks, residences motels schools churches libraries |
| 72 exterior | Developed lands, properties or activities not included above. |
| 52 exterior | Residences, motels, hotels, schools churches libraries hospitals |

Sound pressure level, the sound observed at a particular location, at a receptor (i.e. residence, school or next location) can be modeled using software programs with inputs including the sound power level of wind turbines, ground attenuation, noise receptor height, etc. Mud Springs Wind Ranch established as a design goal the NAC 57 dBa for open areas and 45 dBA at any non-participating residence. Seventeen noise sensitive receptors near the Mud Springs Wind Ranch were evaluated for increased noise levels. Sensitive receptors included occupied residences and active Sage Grouse leks. Cumulative noise levels were calculated for all residential sensitive receptors within 4 miles of the wind turbines using the WindPro Version 2.7.473 noise calculation model. The WindPro software program is a modeling framework around calculation algorithms approved by ISO 9613-2 which cover the attenuation of sound in air and the propagation calculations. The model is a calculation tool that is generally recognized in the wind industry to predict sound pressure levels.

There are five turbine models being considered for the Project's competitive bid procurement program. The turbine with the highest noise from mechanical and wind blade rotation noise was selected for the model analysis. Also a 2.0 MW turbine was used in the model to simulate the greatest number of turbines and therefore the higher cumulative impact. Other parameters that are considered are the topographic conditions and the noise reflection and absorption nature of the area. Background noise levels were not considered. Site specific wind flow, wind direction and wind speed parameters were considered in the model based on the data obtained from the meteorological towers located in the Sage Creek Valley. The model assumed that the wind turbine generator was a Gamesa G114 on 100 meter towers. . Use of the Gamesa G114, 2.0 MW turbines is a conservative assumption which will generate a representative noise source. The Gamesa 2.0 MW, G114 turbines are typically at the high end of the spectrum of possible wind turbines with regard to noise generation and therefore the model results are considered conservative. The model calculates the noise source at the location of 120 turbines under a typical wind operation condition of 8 meter per second wind and projects the cumulative noise level at the location of sensitive receptors.

There are seven occupied residential structures within 5 miles of the projects which were reviewed for cumulative noise impacts. Three of these residences are participating parties (lessors) to the Mud Springs Wind Ranch development and have consented to increased noise levels through their easement agreements. The nearest non-participating residential locations are on Pryor Mountain road approximately 1.5 miles west of the nearest wind turbine generator and at the intersection of Railbed Road and Quarry Road approximately 1.6 miles south of the nearest wind turbine generator. The cumulative noise level projected for each residence was:

- Bowler Flat Ranch, Murry Residence:
 - Participating Party, Lessor
 - Located in Mud Springs Phase I lease area.
 - Projected Noise Level Impact: 45.1 dB(A)
- Loyning Ranch Residence:
 - Non-Participating Party,
 - Located south of Mud Springs Phase II lease area.
 - Projected Noise Level Impact: 37.5 dB(A)
- Olsen Ranch Residence:
 - Applicant is purchasing this property to be used as an Office .
 - Located in Mud Springs Phase II lease area .
 - Projected Noise Level Impact: 53.5 dB(A)
- Cothron Trailer House on Pryor Mountain Road
 - Cothron Property, Participating Party
 - Residence is adjacent to a turbine location.
 - Projected Noise Level Impact 53.2 dB(A)
- SE Partnership Ranch House On Sage Creek Road
 - Non Participating Party
 - Approximately 4.5 miles northeast of the nearest turbine location
 - Projected Noise Level Impact: 28.6 dB(A)
- Malcom Ranch House on Pryor Mountain Road
 - Participating Party
 - Approximately 2.5 miles Northwest of Mud Springs Phase 1 nearest turbine location.
 - Projected Noise Level Impact: 32.3 dB(A)
- Holdsworth Residence at Intersection of Quarry Road and Railbed Road
 - Non Participating Party
 - Approximately 3 miles south of nearest turbine location in Phase II.
 - Projected Noise Level Impact: 31.5 dB(A)
- Alvera Ranch House

Mud Springs CUP Application

- Non-Participating Party
- Located 1.2 miles east of Mud Springs Phase 1 nearest turbine location
- Project Noise Level Impact: 35.9 dB(A)

Historic Sage Grouse leks within 4 miles of the project area were also evaluated for cumulative noise effects. One historic lek that is considered active, known as Sage Creek 1, was found to have a cumulative noise level of 41.8 dB(A). An historic lek, known as Bowler 1 and 2, is located in an active circular irrigation field near a turbine location. The Bowler lek is not currently active and was projected to have a noise level of 55.2 dB(A). All other historic leks were found to have projected noise levels below 40 dB(A). See Attachment 9 for a copy of the Noise Study and a map of the projected noise counters relative to the sensitive receptors.

The noise model results shows that the sound propagation from the wind turbines proposed locations are expected to be below 45 dB(A) noise level for night time at all non-participating residences within 4 miles of the project. Noise levels will only be higher than the 45 dB(A) project design goal for residential exterior yard areas at the Murray residence, Cothron residence and Olsen residence. All three owners are participating parties to the Mud Springs Wind Ranch project and have signed wind energy development leases which contain waivers for visual and noise impacts. The projected noise levels at the Murry residence on Bowler Flat Ranch at 52.3 dB(A), the Cothron residence at 53.2 dB(A), and at the Olsen residence at 53.5 dB(A) are all below the 57 dB(A) criteria set by the State of Montana Department of Transportation for exterior areas of land on which serenity and quiet are essential for the area and slightly higher than the recommend 52 dB(A) level for residences.