

Section 2.02 Definitions (NEW)

Shadow Flicker (Incidental): Shadow flicker that occurs as a wind turbine is pausing operations at the beginning of a flicker event.

Tone or Tonal Sound: Any sound which can be distinctly identified through the sensation of pitch. Internationally accepted technical standards, such as the ISO 1996-2, can be used to evaluate the degree of tonality. Through sound measurements, a tone can be identified by completing a frequency analysis of the sound: a sound is tonal if the sound level at a certain frequency is above the sound level at neighbouring frequencies on both sides of that certain frequency by, typically, five decibels or more.

Section 17.70 Utility Grid Wind Energy Systems

1. All conversion systems shall be equipped with manual and automatic overspeed controls to limit rotation of blades to speed below the designed limits of the conversion system. The certified registered engineer and authorized factory representative shall certify that the rotor and overspeed control design and fabrication conform to current engineering practices at the time of application. No changes or alterations from certified design shall be permitted unless accompanied by a certified registered engineer's and the authorized factory representative's statement of certification.
2. All electrical compartments, storage facilities, wire conduit and interconnections with utility companies will conform to national and local electrical codes.
3. A visible warning sign of "High Voltage" will be placed at the base of all conversion systems. The sign shall have at a minimum six (6) inch letters with 3/4-inch stroke. This sign shall include a 24 hour emergency phone number.
4. All towers or poles must be unclimbable by design or protected by anti-climbing devices such as:
 - a. Fences with locking portals at least six (6) feet high
 - b. Anti-climbing devices twelve (12) feet from base of pole
5. Tubular towers are required for wind turbine generators.
6. Engineering data concerning construction of the tower base must be submitted with an application and site plan. The base of the wind turbine must be constructed in such a manner that upon removal of said tower, the soil will be restored to its original condition to a depth of 4 feet.
7. "Up wind turbines" are required.
8. Constant velocity turbines are preferred. Variable speed turbines must submit additional data concerning noise when their revolutions per minute exceed 25 rpms.
9. Visual appearance shall be limited by the use of paint color and finishes that minimize visibility and reflectivity and create a consistent appearance among turbines and turbine components.
 - a. Color shall be RAL 9001, or similar muted soft white or gray.
 - b. At the time of application, a paint sample shall be provided for all visible turbine components to demonstrate consistent appearance in paint finish and color.
 - c. Coatings shall be defined according to ISO 2813:2014 (or most recent version utilized at the time of turbine production) at a viewing angle of 60 degrees with a gloss rating of less than or equal to 30 gloss units.

- d. All turbine components shall meet a gloss rating specification of equal to or less than 30 gloss units throughout special land use or shall be recoated at the owner's expense within 180 days of a determination of non compliance.
 - e. The Planning Commission, or designated staff, shall ensure verification of paint finishes and gloss rating prior to the erection of the turbine components, at the expense of the wind energy system owner, through a third party qualified tester using ISO 2813:2014 (or most recent version utilized at the time of turbine production) to demonstrate compliance.
 - f. If the Planning Commission determines that additional testing of the paint finish is needed at any point during the duration of the special land use to confirm compliance with the 30 gloss unit maximum, testing shall be completed, at the expense of the wind energy system owner, by a third party qualified tester selected by the Planning Commission. Testing shall follow ISO 2813:2014 (or most recent version) to demonstrate compliance.
10. No advertising of any kind shall be allowed on the wind turbine.
11. The electrical wires used to connect the turbine tower to its step-up transformer shall be installed at a depth of 48 inches or more below ground.
- 12. Avian Study Required.**
- a. At the time of application, the applicant shall submit a wildlife study, completed by a qualified professional, to assess the potential impacts of the proposed wind energy system upon bird and bat species. The wildlife study shall include the results of an environmental review request from the Michigan Department of Natural Resources, a literature review for threatened and endangered species and for birds and bats, the results of supplemental environmental surveys conducted by the applicant to provide information related to critical flyways, migratory routes, feeding areas, and/or nesting sites for protected species. It is the intent of this ordinance to reasonably consider and protect avian and bat species, not just those that are endangered or threatened. The applicant must identify any plans for post-construction monitoring and studies. The analysis shall also include an explanation of potential impacts and proposed mitigation plans, if necessary.
 - b. A qualified, third party review of the applicant's wildlife studies and/or environmental surveys may be required by the Planning Commission.
 - c. The Planning Commission may require a post-construction bird and bat mortality study completed by a third-party professional selected by the Planning Commission. The timing of such a study shall be specified as a condition of the special land use.
 - d. A wind development application shall adhere to and comply with all guidelines and recommendations made by the United States Fish and Wildlife Service (USFWS) regarding the siting, design, and operation of a wind energy system. The application shall include documentation of all studies, consultations, and recommendations made by or with the USFWS regarding the placement of wind turbine generators and operation of the wind energy system.
13. The compatibility of the tower structure with the rotors and other components of the conversion systems shall be certified by a certified, registered engineer and by the authorized factory representative. In addition, the lowest point of the blade shall be a minimum of eighty (80) feet above the ground.

14. Height and Setback Requirements.

- a. Wind energy generators may exceed the height limitations of the zoning district in which they are located, subject to the limitations provided in this subsection 14.
 - b. In the case of a "pooling of parcels," no wind turbine generator shall be located such that the distance between the center of the base of the tower and any outside boundary line of the area comprising the special land use in which the pooled parcels are located is less than four times the height of the wind turbine generator, as measured from the ground at the center of the base of the tower to the highest reach of the blade.
 - c. In the case of a single (unpooled) parcel, no wind turbine generator shall be located such that the distance between the center of the base of the tower and any property line is less than four times the height of the wind turbine generator, as measured from the ground at the center of the base of the tower to the highest reach of the blade.
 - d. No wind turbine generator shall be located such that the distance between the center of the base of the tower and the nearest point of any existing building designed or used for human occupancy or assembly (including but not limited to a dwelling, school, foster care facility, church and the like) is less than three times the height of the wind turbine as measured from the ground at the center of the base of the tower to the highest reach of the blade.
 - e. No wind turbine generator shall be located such that the distance between the center of the base of the tower to the nearest point of any existing building or structure that is not designed or used for human occupancy or assembly (including but not limited to a garage, other accessory building, barn, storage building and the like) or road right-of-way is less than one and one half times the height of the wind turbine generator, as measured from the ground at the center of the base of the tower to the highest reach of the blade.
 - f. No wind turbine generator shall be located such that the distance between the nearest point of the blade (while in rotation) and the nearest boundary line of any individual land parcel comprising the pooled parcel is less than 50 feet; provided, however, that the Planning Commission may approve a lesser setback distance if written consents for such lesser distance are obtained from the owners of all lands located, in whole or in part, within one rotor-diameter of the wind turbine generator measured from the center of the base of the wind turbine generator. In determining whether such lesser setback may be approved, the Planning Commission shall consider the technical needs of the applicant, the feasibility of alternate locations, the nature and proximity of nearby buildings and structures, and the potential for adverse impacts that noise, shadow flicker, and other features may have on adjacent land uses.
 - g. All wind turbine generators shall fully comply with Article XV Airport Overlay District.
 - h. No wind turbine generator shall be located such that the distance between the center of the base of the tower to the nearest point of any existing gas transmission, distribution, or gathering line is less than two times the height of the wind turbine generator, as measured from the ground at the center of the base of the tower to the highest reach of the blade.
15. The certified registered engineer and authorized factory representative shall certify that the construction and installation of the conversion system meets or exceeds the manufacturer's construction and installation standards.

16. Maintenance and Operation.

- a. A wind energy system must be maintained and kept in operational working order or shall be removed by the owner of the wind energy system. Any wind energy system, or part of a wind

energy system such as a wind turbine generator, that has not produced electrical energy for 12 consecutive months shall be deemed to be abandoned; provided, however, that the owner or operator of the wind turbine may apply to the Planning Commission, not less than three months prior to the expiration of said 12-month period, for one additional extension of up to twelve months upon establishing, to the satisfaction of the Planning Commission, that the lack of production was caused by reasons beyond the control of the owner or operator. In determining whether such abandonment has occurred, the Planning Commission or County Zoning Administrator may request, and the operator, system owner, or property owner shall provide written documentation accurately indicating the amount of electrical energy produced by the wind energy system during said 12-month period. It shall be the obligation of the wind energy system owner to remove the abandoned wind energy system.

1. To ensure that an abandoned wind energy system is removed, a performance bond or letter of credit, in an amount determined by the Planning Commission to be sufficient to cover the entire cost of removal, shall be submitted by the applicant prior to the issuance of the special land use. To assist the Planning Commission in determining the amount of the performance bond or letter of credit, the applicant may submit information regarding the estimated cost to remove a wind energy system.
 2. The performance bond or letter of credit shall be conditioned upon the timely and faithful performance of the requirements of this ordinance and the special land use. The performance bond or letter of credit shall remain in effect for the duration of the special land use. The amount of the performance bond or letter of credit shall be adjusted at least every three years to reflect changes in the estimated cost of removal, based on the most recent inflation index for the cost of comparable services, as published by the U. S. Bureau of Labor Statistics, or other applicable federal agency or other commonly accepted index.
 3. If the wind energy system owner fails to remove the wind energy system as required by this Section, then the County is entitled to use the proceeds from the performance bond or letter of credit to have the wind energy system removed. Such removal by the County shall not relieve the owner of the wind energy system from its removal obligation.
- b. A condition of the performance bond or letter of credit shall be written notification by the issuing company or institution to the County Zoning Administrator when the performance bond or letter of credit is about to expire or be terminated.
 - c. The wind energy system owner or operator shall provide the County Zoning Administrator with a copy of the yearly maintenance inspection.
 - d. Failure to keep the performance bond or letter of credit in effect while a wind energy system or weather testing tower is in place will be a violation of the special land use approval. If a lapse in the performance bond or letter of credit occurs, the County will use all available remedies including revocation of the special land use approval.
 - e. If there is a mechanical failure resulting in an abnormal sound emission, release of a pollutant, or a public safety hazard, the Zoning Administrator shall be notified of the event the next day of business following the event. The applicant shall provide the County at the time of application an operational procedure for this event, a mitigation strategy, and appropriate emergency contact information. A written report describing the failure and the owner's response to the failure shall be submitted to the Zoning Administrator within 10 business days of the event. Sound emitted from a wind turbine generator that is the result of a mechanical failure or lack of maintenance may

not be subject to the complaint resolution procedure outlined in Section 17.70 (24). Emergency contact information and a turbine reference number shall be placed in an appropriate location near the site of the turbine, such as at the gate for the access road, so it can be viewed without trespassing on private property.

17. **Noise levels.**

a. Sound Level Limits.

1. Any single 10-minute LA_{eq} A-weighted equivalent sound level measured at the property line of an unpooled (single) parcel (as defined in subsection 19 hereof) upon which there is an occupied building or dwelling shall not exceed 45 dBA. If the unpooled parcel does not have an occupied principal building or dwelling on it, the 45 dBA sound limit may be exceeded at the property line; provided that when an occupied principal building or dwelling is built on such unpooled parcel after the special land use permit has been issued, any 10-minute LA_{eq} shall not exceed 45 dBA measured at the nearest wall of the occupied building or dwelling located on the unpooled parcel and in compliance with the minimum required front, side and rear yard setbacks then in effect within the zoning district in which the occupied building or dwelling is located.
2. On a pooled parcel, the ten-minute LA_{eq} sound level measured at the wall of an occupied building nearest to the wind turbine or turbines shall not exceed 55 dBA.
3. These sound level limits are to be evaluated using the A-weighted equivalent sound level (LA_{eq}) descriptor. The LA_{eq} is measured using a ten-minute time interval.
4. The sound level limits listed above apply to the contribution from the wind energy system only and do not include contributions from background ambient sounds.
5. In the event audible noise due to wind energy system operations contains a tone, such as from a gearbox or generator, the standards for audible noise set forth in the subparagraph 1 and 2 of this subsection shall be reduced from 0 to 6 dBA depending on the severity of the tone as determined by ISO 1996-2, see Sections 17.70 17.b.2.d and 17.70 17.b.3.f.

b. Studies Required.

1. **Preconstruction Noise Background Survey.** The applicant shall provide a noise background study at the time of application which indicates L_{eq} , L_{10} , and L_{90} ten-minute sound levels using A-weighting. For applications submitted after the effective date of this ordinance, the applicant shall submit proposed measurement locations to the Planning Commission in advance of the survey for review and approval. Measurement procedures should generally follow the most recent versions of ANSI S12.18, and ANSI S12.9, Part 3 (with or without an observer present) guidelines. The selected test locations shall be described with GPS coordinates or some other level of detail such that the location can be used by others to repeat or verify sound measurements. Measurements shall be taken using an ANSI or IEC Type 1 Precision Integrating Sound Level Meter. The study must include a minimum of a four day (96-hour) testing period, including one Sunday, and produce data that includes a variety of ground and hub height wind speeds, at low (between 4 and 7 m/s) medium (7-10 m/s) and high (10m/s or more and/or capable of producing maximum power). The noise background study shall report for the period of monitoring topography, temperature, weather patterns, sources of ambient sound, and prevailing wind direction. The study shall include a map showing proposed wind turbine locations, pooled and unpooled parcels, and all occupied buildings.

2. **Sound Modeling Study.** A predictive sound study of turbine noise shall accompany an application to verify that ordinance requirements can be met for dBA sound levels. Due to the statistical uncertainty of sound propagation models, environmental factors, and variable wind shear, sound modeling shall demonstrate that the wind energy system will not exceed 40 dBA (10 min- LA_{eq}) at the property line of any unpooled parcel and 50 dBA (10 min- LA_{eq}) at the dwelling of a pooled parcel.
- a. The applicant shall present the maximum Sound Power Level of the proposed turbine on both the dBA and dBC scales, and will calculate the difference [dBC-dBA] in decibels and compare it to the 20 decibel threshold in IEC 61400-11:2002+A1:2006, as an indicator of whether the turbine is likely to produce low-frequency noise that could create annoyance.
 - b. For assessing potential low frequency or vibration problems, refer to Section 17.70 17.3.e
 - c. The sound modeling must follow the most recent version of International Standard, ISO 9613-2 "Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation."
 - d. The sound modeling study shall use wind turbine sound power levels determined according to the most recent version of IEC 61400 – Part 11. The model of wind turbine generator proposed for the development shall not be tonal as determined by the most recent version of IEC 61400- Part 11.
 - e. The sound study shall include a map with sound contour lines for dBA sound emitted from the proposed wind energy system. The study shall include a map (at 1:200 or better) showing sound contours at 5 dBA intervals, proposed wind turbine locations, pooled and unpooled parcels, and all occupied buildings. The predicted values must include cumulative sound levels created by all existing, approved, and proposed turbines. The sound study and accompanying map shall extend out to the 30 dBA sound contour line or 1 mile from a wind turbine generator, whichever is closer to the nearest wind turbine.
 - f. The applicant shall identify each operational component of a wind turbine (other than the spinning blades) that will produce a sound that will be audible at the property line of an unpooled parcel.
 - 1) For each operational component that is identified, the applicant shall also provide:
 - i. The maximum instantaneous volume of the noise, in dBA, that will be received at the property line of an unpooled parcel, along with the modeling results to support that projection.
 - ii. The characteristics of the noise, in terms of frequency of occurrence, when it will occur, duration, tonal quality, and range of volume. In addition to a written description, the applicant shall provide a recording or video of the various operational sounds or some other form of demonstration.
 - iii. The measures, if any, the applicant is proposing to implement in order to mitigate the sound.
 - 2) The Planning Commission may require the applicant to implement measures to mitigate and/or eliminate an operational sound (other than the spinning blades).
 - 3) Failure to submit information on all predictable, audible operational sounds of the wind turbines (such as yawing, cooling fans, hydraulics or cooling systems, etc.) may result in a violation of the special land use.

3. **Post Construction Sound Survey.** Documentation of sound pressure level measurements shall be provided to the Zoning Administrator by a third-party qualified professional selected by the Planning Commission and at the expense of the wind energy system owner within 12 months of the commencement of the operation of the project. The post construction study shall be performed at the same locations as the pre-construction study unless additional or alternative locations are required by the Planning Commission. The study should generally follow the procedures in the most recent versions of ANSI S12.9 Part 3 (with an observer present) and ANSI S12.18. All sound pressure levels shall be measured with instruments that meet ANSI or IEC Type 1 Precision integrating sound level meter performance specifications. In addition to measuring A-weighted sound levels, at least one monitoring location shall collect one-third octave band data down to 1 Hertz. As part of the study, octave band data must be measured as addressed in Section 17.70.17.e.
- a. **Testing Procedures:** The post construction test shall verify that equivalent sound level limits in dBA are in compliance with the standards of this ordinance. The compliance test procedure will use an alternating series of turbine-on and turbine-off 10-minute LA_{eq} measurements when wind speeds are fairly constant. The testing shall result in a minimum of ten (10) ten-minute LA_{eq} data points per testing location obtained when the wind energy system is operating at maximum sound power. Measured levels (turbine-on and turbine-off) for similar hub height wind speeds (within 1.5 m/s) will be compared to determine the sound level from only the wind turbines. The firm conducting the study shall collect LA_{90} and LA_{10} data. The wind energy system owner shall assist the County and third-party qualified professional by turning off selected wind turbines and providing necessary logistical support for testing on-demand. During a testing period identified by the County, the wind energy system owner shall park or pause wind turbine operations for an "off" period within two hours of a request made by the third-party professional. During the on-off testing all wind turbine operations will be parked or paused within 8,000 feet of a test location to eliminate the background noise contribution from the wind energy system.
 - b. **Test Locations:** The test locations shall take into consideration noise complaints on file with the County (as indicated in Section 17.70 (24)) and may require additional study locations as deemed necessary by the Planning Commission. The firm conducting the post-construction sound survey shall consult with the Planning Commission, or their representative, prior to conducting the study to agree on the compliance testing locations. The study shall delineate pooled and unpooled parcels as well as occupied buildings.
 - c. **Non-Compliance:** Should the sound study indicate a non-compliant measurement, the owner of the wind energy system will be required to obtain compliance through mitigation or other measures.
 - d. **Wind Rose Chart.** The applicant shall submit a Wind Rose Chart at the time of the application. This is a chart or graph that describes 12 months (or more) of wind data collected from the proposed project area. This graph or chart will demonstrate direction, duration, and intensity of the wind. These data will be for each height of wind sensor mounted on the meteorological tower.
 - e. **Low Frequency Sound and/or Vibration.** The applicant shall provide acoustic modeling at the time of application to assess potential low frequency or vibration problems. The modeling study of low frequency sound and vibration shall demonstrate meeting: (1) ANSI S12.9/Part 4 Annex D threshold for minimal annoyance and beginning of rattles from outdoor low frequency noise as summarized

in Section 2.2.2 of the March-April, 2011 Noise Control Eng. article by O'Neal, et al. and (2) the ANSI S12.2 sound level limits for moderately perceptible vibration and rattles within homes as modified to equivalent outdoor sound limits in Table 2 of the March-April, 2011 Noise Control Eng. Journal article by O'Neal, et al.. The ANSI S12.2 interior sound level limits for low frequency sound and perceptible vibration within homes, as modified to equivalent outdoor sound limits in Table 2 of the March-April, 2011 Noise Control Eng. Journal article by O'Neal, et al. shall be utilized to determine if outdoor sound levels will create perceptible vibration or low frequency problems indoors. If the post-construction sound survey outdoor octave band sound level measurements reveal that low frequency sound from wind turbines at the exterior of an unpooled, occupied or non-occupied building may create a vibration or low frequency noise problem, then further studies should be conducted to assess the problem. The further studies shall use the above referenced standards (ANSI S12.2 and ANSI S12.9/Part 4 Annex D). If the further study indicates that the low frequency sound/vibration exceeds acceptable levels, mitigation may be required by the Planning Commission. Mitigation may include operational changes to the turbine, modifications to the subject building or buildings, or other measures as determined by the Planning Commission.

- f. **Tonality:** If a tone is observed from a turbine during the post construction sound survey or at a later date (such as due to a malfunctioning gearbox), a defined assessment of the level of tonality shall be conducted utilizing an accepted international standard, such as ISO 1996-2, by an independent, third party sound consultant selected by the Planning Commission at the expense of the wind energy system owner. A tonal audibility value adjustment (from 0 to 6 dB) will be added to the measured 10-minute LAeq sound level at the testing location of either a pooled or unpooled parcel in accordance with Section 17.70. 17.a.5. For tonality arising from a mechanical failure or lack of maintenance, see section 17.70 (16.e).

18. FAA Lighting.

Lighting required by the Federal Aviation Administration (FAA) shall be the minimum amount of lighting necessary, at the lowest light intensity and slowest pulse allowed. Lighting required by the FAA is not subject to the lighting requirements in the Standards for Granting Site Plan Approval, Section 18.05 (11).

19. Pooling of Parcels.

- a. If two or more parcels of land are included in the special land use, they shall be pooled into a single unit (the "pooled unit") for purposes of the special land use, in accordance with this paragraph 19.
- b. The applicant shall attach to its application the pooling instrument and copies of all leases, easements or other instruments which constitute the applicant's land use rights for all parcels comprising the pooled unit, and which together with the pertinent facts in the application and site plan establish that the applicant will not be required to release or terminate its lease, easement, or other land use rights with respect to any parcel being pooled for the purpose of obtaining a single special use permit for the duration of the special land use if and to the extent that such a release or termination would result in a conflict with or a violation of the special land use permit or any other provisions of this zoning ordinance. The pooling instrument shall be executed and recorded by the applicant with the County Register of Deeds prior to the issuance of the special land use.
- c. The pooling instrument shall be the form of a declaration of pooling, and shall contain the content thereof, as prepared and furnished by the County for use by all applicants requesting a special land use, with the appropriate land descriptions provided by the applicant and other specific references applicable to the lands involved. The form of declaration of pooling furnished by the

County shall include a statement that the lands are being pooled for the purpose of operations under the approved special land use and shall have the legal effect of imposing the terms of the special land use upon each parcel of land comprising the pooled unit.

- d. The form of declaration of pooling furnished by the County, as completed by the applicant with the relevant legal descriptions and other matters specific to the lands involved, shall be subject to final approval by the Planning Commission prior to the instrument being recorded with the Register of Deeds,
- e. The form of declaration of pooling furnished by the County shall by its terms run with the land so as to be binding upon and inure to the benefit of all successors and assigns of the applicant and the owners of the parcels comprising the pooled unit. It shall be enforceable by the County, the applicant, and the owners of the parcels comprising the pooled unit.
- f. As a condition of the special land use, the Planning Commission may require the applicant to submit a last owner of record search, at the applicant's expense, certified to the date of the special land use application or, as determined by the Planning Commission, to the date of recording of the applicable pooling instrument, lease, easement or other recorded instrument, by an approved title examiner or title insurance company, covering the proposed pooled unit, and disclosing the then owners of the lands comprising the pooled unit.
- g. Neither the applicant nor the property owner, may release or terminate the declaration of pooling, or other pooling instrument, or any lease, easement or other instrument executed in compliance with the special land use, as to the entire pooled unit or any part thereof, for the duration of the special land use, in whole or in part, if and to the extent that such a release or termination would result in a conflict with or a violation of the special land use or other applicable provision of this zoning ordinance.
- h. The applicant shall record with the Register of Deeds a memorandum of the special land use permit issued with respect to all parcels pooled as part of the special land use obtained hereunder. The memorandum shall consist of the form of memorandum prepared and furnished by the County for use by applicants for the special land use, and shall contain the content thereof as prepared by the County, except for legal descriptions and other references specific to the lands involved, which shall be included by the applicant. Prior to the memorandum being recorded with the Register of Deeds, the applicant shall submit to the Planning Commission for approval, consistent with the provisions of this Section, the proposed memorandum as completed by the applicant with the land descriptions and other references specific to the land involved.

20. Signal Interference.

Through the appropriate placement of wind turbine generators, the applicant shall design to eliminate any interference such as, but not limited to, internet (Wi-Fi or satellite), AM or FM radio, cell phones, 911, satellite television, emergency systems, and digital television. Post-construction signal interference caused by the wind energy system shall be mitigated by the wind energy system owner at their expense.

- a. An application shall include a Licensed Microwave Search and Worst Case Fresnel Zone_(WCFZ) analysis.
- b. The application shall include an interference mitigation plan. The plan shall describe mitigation measures and procedures to eliminate interference from the wind energy system. The plan shall address various forms of interference and corresponding mitigation measures employed before and after construction of the wind energy system. The plan must include relevant maps and modeling showing all known television, internet, emergency services, radio broadcast, or other signal paths along with proposed wind turbine locations.

21. **Shadow Flicker.**

- a. **Flicker Study.** A shadow flicker study shall be required, and shall be submitted by the applicant with the application. The purpose of the shadow flicker study is to examine the duration and location of shadow flicker on unpooled parcels. The model study area shall include all land extending a minimum of 20 rotor diameters in all directions from a wind turbine generator. The model shall be calculated using the following minimum inputs: turbine locations, shadow flicker receptor locations, existing topography, rotor diameter and hub height, joint wind speed and direction distribution (wind rose table, and hours of sunshine (long term monthly references)). The model shall calculate the locations and durations of shadow flicker caused by the proposed wind energy system within the study area, and the total number of hours anticipated per year of shadow flicker. The application shall include estimates for shadow flicker to the nearest tenth of an hour, on a daily basis for each receptor. Assumptions regarding the percentage of time that shadow flicker is likely to occur shall be clearly explained and subject to approval of the Planning Commission. The shadow flicker study shall include a map that indicates the extent of shadow flicker, pooled and unpooled parcels, and all potential shadow flicker receptors.
- b. **Shadow Flicker Limits.** Shadow flicker shall not be allowed on an unpooled occupied building or dwelling, except for shadow flicker that is defined as incidental. Shadow flicker is measured at the nearest external wall or walls of an occupied building or dwelling located on an unpooled parcel. If an occupied building or dwelling is built on an unpooled parcel after the issuance of a special land use permit for a utility grid wind energy system and the occupied building or dwelling is in compliance with the minimum required front, side and rear yard setbacks then in effect within the zoning district in which the occupied building or dwelling is located, the owner of the wind energy system shall adhere to the above permissible shadow flicker limit at the nearest external wall or walls of such occupied building or dwelling.
- c. **Mitigation and Mitigation Plan.** A shadow flicker detection/abatement system is required on each wind turbine generator. An equivalent type of system may be used, but only with prior approval by the Planning Commission. Shadow detection systems must be kept in good working order for the entire duration of the special land use. Shadow flicker mitigation measures for each receptor modeled to receive flicker shall be described in a mitigation plan and submitted with the application. Flicker mitigation measures may include but are not limited to, turbine siting changes, flicker detection/abatement system operations and procedures, grading, modifications to a dwelling and/or landscaping. If landscaping is used as a mitigation procedure, the planting of mature trees shall be required. The Planning Commission may require a performance guarantee, in the case of landscaping and/or other mitigation measures, to assure the long term viability and effectiveness of the mitigation.
- d. **Post-Construction Flicker Mitigation.** Should a dwelling or occupied structure on an unpooled parcel receive shadow flicker that was not indicated in the shadow flicker study, the owner of the wind energy system shall perform an additional flicker study and mitigation plan for the affected property and submit it to the Zoning Administrator for review prior to implementing mitigation measures.

22. **Roads.**

The utilization of roads and the road right of way for the construction of a wind energy system must meet the requirements set forth by the Mason County Road Commission.

23. **Performance Review.**

The Planning Commission shall require a performance review of the special land use on a three-year basis or as it may be required. The three-year time period commences after the first turbine of the wind energy system becomes operational. The Planning Commission shall provide the performance review

and the County shall perform, where reasonably practicable, investigation regarding a complaint or other matter requiring a performance review. In its sole discretion, the County may require the assistance of an independent third party due to the specialized nature of the complaint, conflicting evidence, or other condition. The reasonable cost of an independent third-party consultant shall be at the expense of the wind energy system owner. Failure to maintain compliance with Section 17.70 of this ordinance shall result in enforcement action which may include the termination of the special land use, or portions of the special land use. The purpose of the performance review is to evaluate the status of:

- a. **Compliance with Special Land Use.** Compliance with the conditions set forth by the special land use, such as specific mitigation measures or operation procedures.
- b. **Ownership Change.** Changes in ownership or operation of the wind energy system.
- c. **Avian or Bat Mortality.** A significant avian or bat mortality event that exceeds projected impacts described in the Wildlife Study as required in Section 17.70 (12) of this ordinance.
- d. **Other.** Other matters as determined by the Planning Commission.
- e. **Unresolved and/or repeated complaints.** A complaint taking longer than thirty (30) days to resolve may require a performance review unless otherwise specified in the ordinance. If after the performance review and further investigation, the Planning Commission verifies that alleged ordinance violations are the result of the operation or condition of the wind energy system, the owner/operator shall eliminate the non-compliance by mitigation or other measures which may include temporary operational changes. The Planning Commission shall establish the effective date of the mitigation measure based on the nature of the mitigation.
- f. As a condition of the Planning Commission conducting a performance review, the complainant shall be required to allow County staff, the wind energy system owner or designated staff, or other authorized personnel such as an engineer or acoustic professional, on the property of the complainant for further investigation and testing.
- g. Actions taken by the Planning Commission to terminate or modify the Special Land Use, portions of the Special Land Use, or the conditions of the Special Land Use shall require a public hearing and notification to the wind energy system owner pursuant to the conditions of the original permit and in accordance with Section 25.05 of this ordinance.

24. Complaint Resolution.

The purpose of this section is to provide the public with a mechanism to file a complaint with the wind energy system owner and the Zoning Administrator and receive a timely response from the wind energy system owner regarding alleged wind energy system ordinance violations. The applicant shall submit procedures which it intends to implement for receiving, acting upon, and resolving complaints or allegations that the wind energy system is not in compliance with this ordinance.

- a. Complaint resolution procedures must be presented at the time of application and must meet the approval of the Planning Commission prior to approval of a special land use. Those procedures, at a minimum, shall:
 1. Require the system owner to accept complaints regarding non-compliance with the ordinance from all property owners within the project boundary and up to one mile radius of a wind turbine generator.
 2. Provide a telephone number and mailing address at which the operator can be contacted for purposes of submitting complaints or allegations of non-compliance.
 3. Require that all such complaints or allegations be submitted in writing.

4. As a condition of the system owner acting on the complaint, require that a complainant allow the wind energy system owner or designated staff, or other authorized personnel such as an engineer or acoustic professional, on the property of the complainant for further investigation and testing.
 5. Set forth information that must be included in the complaint or allegation.
 6. Require that a complaint is acknowledged in writing by the wind turbine owner to both the complainant and the Zoning Administrator within five (5) business days of receipt of said complaint.
 7. Set forth the number of days, not to exceed thirty (30), in which the operator shall investigate and resolve any and all complaints or allegations, either by way of correction or formal denial of non-compliance.
 8. Require the operator to advise the Zoning Administrator in writing of the resolution of any complaint or allegation of non-compliance within thirty (30) days of its receipt of the same.
- b. Any complaint not resolved within thirty (30) days shall result in a performance review by the Planning Commission as described in Section 17.70 (23). Resolution or mitigation of a complaint that involves construction, landscaping, testing or other significant alteration/operational condition that is dependent on seasonal or other conditions may exceed thirty (30) days if approved by the Planning Commission.
 - c. It shall be a violation of this ordinance to modify the approved complaint resolution procedures without the prior approval of the Planning Commission.