

**Submitted 2/25/2014**

**Proposed Amendments to the Schoolcraft County Zoning Ordinance for:**

- **SECTION 102 (CCC): WINDMILLS OR WIND GENERATORS**
- **SECTION 508: WINDMILLS OR WIND GENERATORS**

*DRAFT*

## **Section 102 (CCC) WINDMILLS OR WIND GENERATORS**

An accessory structure designed and constructed or erected for the purpose of converting wind energy into mechanical or electrical power.

## **SECTION 508: ~~WINDMILLS OR WIND GENERATORS~~ WIND ENERGY SYSTEMS (WES'S)**

- (A) ~~Windmills or wind generators, as defined in Section 102 (CCC), are not principle permitted uses in any zoning district, but may be permitted in any district upon approval of a variance by the Zoning Board of Appeals, in compliance with Section 905: Variances, and in accordance with this Section 508.~~
- (B) ~~A site plan is required which satisfies, to the satisfaction of the Zoning Board of Appeals, all of the following:~~
- ~~(1) Setback — A windmill or wind generator shall maintain a horizontal setback from all property lines and public roads of not less than the height of the structure including blade tips.~~
  - ~~(2) Noise — The noise created by the windmill or wind generator when the drive blades are in motion shall not exceed 55 decibels on the "A" scale (db [A]), when metered at any property line of the parcel on which the mill or generator is placed.~~
  - ~~(3) Number of Units — To be decided by the Zoning Board of Appeals.~~
  - ~~(4) Blade Clearances — The minimum clearance of the blade tips shall not be less than twenty feet from the ground at the point where the tip, in its revolution, is closest to the ground.~~
  - ~~(5) — A decommissioning plan shall be presented, along with the site plan, which addresses the dismantling and removal of the structure when it is no longer useful or not longer in use. A bond may be required as part of this plan.~~
  - ~~(6) Structure Height — The total height of wind mill or wind generator shall not be more than (\*) feet above existing grade to the blade tip at its highest point during revolution. (\* To be decided by Zoning Board of Appeals.)~~
  - ~~(7) — A site plan shall have the certification of a registered professional engineer or manufacturer's certification that the tower design is sufficient to withstand wind load requirements for structures as established by the State of Michigan Building Code.~~
  - ~~(8) — Location of tower on-site and tower height, including blades.~~
  - ~~(9) — Underground utility lines within a radius equal to the proposed tower height, including blades.~~
  - ~~(10) — Dimensional representation of the various structural components of the tower construction, including the base and footings.~~
  - ~~(11) — Design data indicating the basis of design, including manufacturer's dimensional drawings, installation and operation instructions.~~
  - ~~(12) — Access to the tower shall be limited either by means of a fence six feet high around the tower base with a locking portal, or by limiting tower climbing apparatus to no lower than twelve feet from the ground.~~

- (13) ~~No windmill shall be installed in any location along the major axis of an existing microwave communications link where the operation of the windmill is likely to produce an unacceptable level of electromagnetic interference, unless the applicant provides sufficient evidence satisfactory to the Zoning Enforcement Officer indicating the degree of expected interference and the possible effect on the microwave communications link.~~
- (14) ~~Windmills shall be located or installed in compliance with the guidelines of the Federal Aviation Regulations with regard to airport approach zones (15.503) and clearance around VOR and DVOR stations.~~
- (15) ~~All sites proposed for windmills shall have sufficient access to unimpeded airflow for adequate operation in accordance to the Siting Handbook for Small Wind Energy Conversion Systems, PNL-2521, or other nationally recognized reference.~~
- (16) ~~No windmill shall be installed in a location where the impact on the neighborhood character is determined by the Zoning Board of Appeals to be detrimental to the general neighborhood character.~~
- (17) ~~If the windmill is to be interconnected to an electric utility distribution system, the applicant shall provide evidence of approval of the proposed interconnect by the Electric Company.~~
- (18) ~~Guy wires and anchors for towers shall not be located closer than ten feet to any property lines.~~
- (19) ~~All windmills shall be designed with an automatic brake to prevent over-speeding and excessive pressure on the tower structure.~~

## **Section 102 (CCC) WIND ENERGY SYSTEMS (WES'S)**

See all related definitions in Section: 508 (A)

### **SECTION 508: WIND ENERGY SYSTEMS (WES'S)**

**(A) Definitions – For purposes of this section, the following definitions shall apply:**

ANEMOMETER TOWER or MET means a freestanding meteorological tower containing instrumentation such as anemometers that is designed to provide present moment wind data.

AMBIENT means the sound pressure level exceeded 90% of the time (L90).

DB (A) means the sound pressure level in decibels. It refers to the "a" weighted scale defined by American National Standards Institute. It is a method for weighing the frequency spectrum to mimic the human ear.

DECIBEL means the unit of measure used to express the magnitude of sound pressure and sound intensity.

LEASE UNIT BOUNDARY means boundary around property leased or otherwise encumbered for purposes of a Wind Energy System, including adjacent parcels to the parcel on which the Wind Energy System tower or equipment is located. For purposes of setback, the Lease Unit Boundary shall not cross a road right-of-way.

ON-SITE WIND ENERGY SYSTEM means a land use for generating electric power from wind and is an accessory use that is intended to primarily serve the needs of the consumer at that site.

ROTOR means an element of a wind energy system that acts as a multi-bladed airfoil assembly, thereby extracting through rotation, kinetic energy directly from the wind.

SHADOW FLICKER means alternating changes in light intensity caused by the moving blade of a wind energy system casting shadows on the ground and stationary objects, such as but not limited to a window at a dwelling.

SOUND PRESSURE means an average rate at which sound energy is transmitted through a unit area in a specified direction. The pressure of the sound measured at a receiver.

SOUND PRESSURE LEVEL means the sound pressure mapped to a logarithmic scale and reported in decibels (dB).

UTILITY GRID WIND ENERGY SYSTEM means a land use designed and built to provide electricity to the electric utility grid by use of wind and includes accessory uses such as but not limited to an ANEMOMETER TOWER, electric substation, and related appurtenances.

WIND ENERGY SYSTEM means a land use for generating power by use of wind; use of a wind turbine generator and includes the turbine, blades, and tower as well as related electrical equipment. This does not include wiring to connect the wind energy system to the grid. See also ON-SITE WIND ENERGY SYSTEM and UTILITY GRID WIND ENERGY SYSTEM.

WIND SITE ASSESSMENT SYSTEM (WSAS) means a land use using a MET or ANEMOMETER TOWER to determine the wind speeds at a specific site and the feasibility of using that site for construction of a wind energy system.

**(B) On-site Wind Energy Systems (WESs or WES singular) Under Sixty Feet**  
**One on-site WES less than sixty (60) feet in height may be permitted without the necessity of an appeal only if all of the following standards are met:**

- (1) Zoning District. Forty (40) foot WESs may be located in any zoning district other than Residential 1, Residential 2, Town District, Lakeshore and River 1, Lakeshore and River 2, and Lakeshore 3. WESs between forty (40) feet and sixty (60) feet tall may only be permitted in the districts of Agricultural, Resource Production, and Timber Production as long as they contain the minimum lot size set forth in Section 301.
- (2) Minimum Site Area. The minimum site area for an on-site WES shall be as necessary to meet required setbacks and other applicable standards of this ordinance. If WESs are less than forty (40) feet in total height, lot sizes may not be less than five (5) acres in area and the lot width may not be less than four hundred (400) feet.
- (3) Setbacks. All on-site WESs shall be setback a distance equal to two times the height [of the WES] from the property line of the property on which the WES is located. The placement of a WES must be no less than four hundred (400) feet from any neighboring dwelling or business.
- (4) Maximum Height. The maximum height of an on-site WES shall not exceed sixty (60) feet from the ground to the top of the blade (at its highest point) or tower whichever is greater.
- (5) On-site WESs. On-site WESs are intended to primarily serve the needs of the consumer on the site of the WES and is designed primarily to serve the needs of a home, farm, or business. If the total height exceeds sixty (60) feet, a VARIANCE is required and must follow the procedures in of this zoning ordinance.
- (6) Maximum Noise Levels. Any proposed WES shall produce sound pressure levels that are no more than thirty-five (35) decibels as measured on the dB (A) scale at the property lines of the site in question and generated noises of the system shall not be greater than five (5) decibels above the ambient noise at the site of any neighboring dwelling. A manufacturer's specification sheet or similar data shall be provided documenting decibel levels.
- (7) Neighborhood Impact. No on-site WESs shall be installed in a location where the impact on the neighborhood character is determined by the Zoning Administrator to be detrimental to the general neighborhood character.

**(C) On-site Wind Energy Systems over Sixty Feet and Wind Site Assessment Systems**  
**On-site WESSs over sixty (60) feet and WSASSs shall require a VARIANCE granted by the Schoolcraft County Zoning Board of Appeals and may be permitted only if all of the following standards are met.**

- (1) Zoning Board of Appeals (ZBA) Review. Zoning Board of Appeals shall review the site plan and all applications for WESSs over sixty (60) feet and/or WSASSs.
- (2) Minimum Site Area. The minimum site area required will be determined by the Zoning Board of Appeals for an on-site WES, as it shall be necessary to meet all required setbacks and any other applicable standards of this ordinance.
- (3) Setbacks. All WESSs shall be set back a minimum distance that is equal to two times the height of the WES that will be erected. These setbacks must be maintained from all lot lines, high-water marks, public rights-of-way, easements, etc. It shall also be set back at least three thousand nine hundred sixty (3,960) feet from any neighboring dwelling or business. All WESSs shall be set back at least one mile (5280 feet) from scenic areas, parks, highways and recreational areas. All on-site WESSs shall be set back at least one-half mile (2640 feet) from state and national forests.
- (4) Maximum Height. The maximum height for on-site WESSs or WSASSs shall be one hundred fifteen feet (115) feet. The height is to be measured from the ground to the top of the blade (at its highest vertical position) or tower, whichever is greater.
- (5) Minimum Rotor Wind Vane or Blade Clearance. The lowest point of the arc created by rotating wind vanes or blades on a WES shall be no less than sixteen (16) feet from the closest grade level. Additional clearance may be required by the Zoning Board of Appeals if potential safety concerns are identified.
- (6) Maximum Noise Levels. Any proposed WES shall produce sound pressure levels that are no more than thirty-five (35) decibels as measured on the dB(A) scale at the property lines of the site in question and generated noises of the system shall not be greater than five (5) decibels above the ambient noise at the site of any neighboring dwelling. A manufacturer's specification sheet or similar data shall be submitted documenting decibel levels with any application for an on-site WES.
- (7) Maximum Vibrations. Any proposed WES shall not produce vibrations humanly perceptible beyond the property on which it is located.
- (8) Shadow Flicker. The facility shall be designed such that shadow flicker will not be visible on, or in, an existing off-site dwelling. Shadow flicker expected to be visible on a roadway or a portion of a residential parcel may be acceptable under the following circumstances:
  - 1) The flicker will not exceed 30 hours per year; and
  - 2) The flicker will not be visible within 100 feet from a structure designed for human occupancy; and
  - 3) The flicker will not be visible on a county primary road, or state or federal highway.



- (9) Transmission Lines. The on-site electrical transmission lines connecting the WES to the public utility electricity distribution system shall be located underground.
- (10) Interference with Commercial/Residential Reception. WESs shall be constructed and operated so that they do not interfere with television, microwave, Wi-Fi, navigational, radio reception or mobile phone reception.
- (11) Landscaping. Existing natural land forms on the site which effectively screen the base of the WES from adjacent property used for residential purposes shall be preserved to the maximum extent possible.
- (12) State or Federal Requirements. Any proposed WES shall meet or exceed any standards and regulations of the FAA, the Michigan Public Service Commission, National Electric Safety Code, and any other agency of the state or federal government with the authority to regulate WESs or other tall structures in effect at the time the permit is approved. Further it shall comply with all relevant federal and state laws.
- (13) Wildlife. Any proposed WES must adhere to the guidelines set forth by the U.S. Fish and Wildlife Service in "Land Based Wind Energy Guidelines".
- (14) Safety. All WESs shall have automatic braking, governing, or a feathering system to prevent uncontrolled rotation or over speeding. All WESs shall have lightning protection. Access to all WESs shall be limited either by means of a fence six (6) feet high around the tower base with a locking portal, or by limiting tower climbing apparatus to no lower than twelve (12) feet from the ground.
- (15) Visual Impact. All WESs shall meet the following requirements:
  - a. Each WES shall either be white or maintain a galvanized steel finish.
  - b. Each WES shall be sited on the property in a location that reduces to the maximum extent possible any adverse impacts on significant view corridors from adjacent properties, while at the same time maintaining contact with economically viable wind resources.
  - c. Each WES, except for anemometer towers, shall be monopole or mono-tube style construction (as distinguished from a lattice-style tower) and shall not utilize guy wires.
  - d. Each WES shall be designed to aesthetically complement the color and design of any existing WES within a one-mile radius.)
- (16) Complaint Resolution. The applicant shall develop a process to resolve complaints from nearby residents concerning the construction or operation of the project. The process may use an independent mediator or arbitrator and shall include a time limit for acting on a complaint. The process shall not preclude Schoolcraft County from acting on a complaint.
- (17) Unintended/misrepresented nuisances. Following construction and operation of the WES, should shadow flicker, noise levels, or vibrations exceed those projected by the developer, the WES shall not be operated until such nuisance is eliminated.

- (18) Neighborhood Impact. No on-site WES and/or WSAS shall be installed in a location where the impact on the neighborhood character is determined by the Zoning Board of Appeals to be detrimental to the general neighborhood character.

**(D) Grid Wind Energy System(s)**

**Utility Grid WESs applications and projects shall require a VARIANCE and may be permitted only if all of the following standards are met.**

- (1) Zoning Board of Appeals Review. The Zoning Board of Appeals shall review all applications for Utility Grid WES(s). Notification of the review shall be sent to all property owners within one mile of the property boundary where the Utility Grid WES is proposed.
- (2) Minimum Site Area and Location. The minimum site area for a WES shall be as necessary to meet required setbacks and any other applicable standards of this ordinance.
- (3) Neighborhood Impact. No Utility Grid WESs shall be installed in a location where the impact on the neighborhood character is determined by the Zoning Board of Appeals to be detrimental to the general neighborhood character.
- (4) Setbacks. All Utility Grid WESs shall be set back at least three thousand nine hundred sixty (3,960) feet from all lot lines, high-water marks, public/private right-of-ways, easements, neighboring dwellings and businesses. Also, all Utility Grid WESs shall be set back at least one mile (5280 feet) from scenic areas, parks, highways and recreational areas. All Utility Grid WESs shall be set back at least one-half mile (2640 feet) from state and national forests.
- (5) Height. The minimum vertical blade tip clearance from grade shall be forty (40) feet for a WES employing a horizontal axis rotor. The maximum height for Utility Grid WESs is two hundred feet (200) feet.
- (6) Maximum Noise Levels. Any proposed Utility Grid WES shall produce sound pressure levels that are no more than thirty-five (35) decibels as measured on the dB (A) scale at the property lines of the site and generated noises of the system shall not be greater than five (5) decibels above the ambient noise at the site of any neighboring dwelling. A noise report shall be submitted with any application for a WES. A noise report shall be prepared by a qualified professional and shall include the following, at a minimum:
  - a. A description and map of the project's noise producing features, including the range of noise levels expected, and the basis of the expectation.
  - b. Description and map of the noise sensitive environment, including any sensitive noise receptors, i.e. residences, hospitals, libraries, schools, worship, parks, areas with outdoor workers and other facilities where quiet is important or where noise could be a nuisance within two (2) miles of the proposed facility.
  - c. A survey and report prepared by a qualified engineer that analyzes the preexisting ambient noise (including seasonal variation) and the affected sensitive receptors located within two (2) miles of the proposed project site.



- Potential sensitive receptors at relatively less windy or quieter locations than the project shall be emphasized and any problem areas identified;
- d. A description and map of the cumulative noise impacts with any problem areas identified; and
  - e. A description of the project's proposed noise control features and specific measures proposed to mitigate noise impacts for sensitive receptors as identified above to a level of insignificance.
- (7) Maximum Vibrations. Any proposed Utility Grid WES shall not produce vibrations humanly perceptible beyond the property on which it is located.
- (8) Shadow Flicker. The applicant shall provide a shadow flicker model for any proposed WES. The model shall:
- a. Map and describe within a one-mile radius of the proposed project site the topography, existing residences, locations of other structures, wind speeds and directions, existing vegetation and roadways;
  - b. The model shall represent the most probable scenarios of wind constancy, sunshine constancy, wind directions and speeds, moon positions and reflection directions;
  - c. Calculate the locations of shadow flicker caused by the proposed project and the expected durations of the flicker at these locations;
  - d. Calculate the total number of hours per year of flicker at all locations;
  - e. Identify problem areas where shadow flicker will interfere with existing or future residences and roadways and describe proposed measures to mitigate these problems, including, but not limited to, a change in site location of the facility, a change in the operation of the facility, or grading or landscaping mitigation measures.
  - f. The facility shall be designed such that shadow flicker will not be visible on, or in, any existing dwelling. Shadow flicker expected to be visible on a roadway or a portion of a residential parcel may be acceptable under the following circumstances:
    - 1) The flicker will not exceed 30 hours per year; and
    - 2) The flicker will not be visible within 100 feet from a structure designed for human occupancy; and
    - 3) The flicker will not be visible on a county primary road, or state or federal highway.
- (9) Transmission Lines. The on-site electrical transmission lines connecting the Utility Grid WES to the public utility electricity distribution system shall be located underground.
- (10) Interference with Commercial/Residential Reception. Utility Grid WESs shall be constructed and operated so that they do not interfere with television, Wi-Fi, microwave, navigational, radio reception or mobile phone reception.
- (11) Landscaping. Existing natural land forms on the site which effectively screen the base of the WES from adjacent property used for residential purposes shall be preserved to the maximum extent possible.

- (12) State or Federal Requirements. Any proposed Utility Grid WES shall meet or exceed any standards and regulations of the FAA, the Michigan Public Service Commission, National Electric Safety Code, and any other agency of the state or federal government with the authority to regulate Utility Grid WESs or other tall structures in effect at the time the permit is approved. Certification that the applicant has complied with or will comply with all applicable state and federal laws and regulations including copies of all such permits and approvals that have been obtained or applied for at time of the application shall be required.
- (13) Wildlife. Any proposed Utility Grid WES must adhere to the guidelines set forth by the U.S. Fish and Wildlife Service in "Land Based Wind Energy Guidelines".
- (14) Safety. All WESs shall have automatic braking, governing, or a feathering system to prevent uncontrolled rotation or over speeding. All WESs shall have lightning protection. Access to all WESs shall be limited either by means of a fence six (6) feet high around the tower base with a locking portal, or by limiting tower climbing apparatus to no lower than twelve (12) feet from the ground.
- (15) Visual Impact. All Utility Grid WESs shall meet the following requirements:
- Each Utility Grid WES shall either be white or maintain a galvanized steel finish.
  - Each Utility Grid WES shall be sited on the property in a location that reduces to the maximum extent possible any adverse impacts on significant view corridors from adjacent properties, while at the same time maintaining contact with economically viable wind resources.
  - Each Utility Grid WES shall be monopole or mono-tube style construction (as distinguished from a lattice-style tower) and shall not utilize guy wires.
  - Each Utility Grid WES shall be designed to aesthetically complement the color and design of any existing WES within a one-mile radius.
  - Visual simulations of how the completed project will look from a minimum of four viewable angles shall be provided by the applicant.
- (16) Soil Conditions. A proposal for any Utility Grid WES tower shall be accompanied by a report of the soils present on the site based on soil borings, and a description of the proposed foundation size, materials, and depth.
- (17) Sign. A sign of no more than four (4) square feet in area displaying an address and telephone number for emergency calls and informational inquiries shall be posted at the WES site. The emergency telephone number shall allow a caller to contact a responsible individual to address emergencies at any time during or after regular business hours, on weekends and holidays. No Utility Grid WES tower or anemometer tower or site shall include any advertising sign.
- (18) Lighting. WESs shall not be artificially lighted, unless required by the FAA or other applicable governmental authority. If lighting is required, the lighting alternatives and design chosen:
- Shall be the lowest intensity allowable under FAA regulations.
  - Shall not be strobe lighting or other intermittent white lighting fixtures, unless expressly required by the FAA. Such intermittent lighting shall be alternated with steady red lights at night if acceptable to the FAA.

- c. May be a red top light that does not pulsate or blink.
  - d. All tower lighting required by the FAA shall be shielded to the extent possible and acceptable to the FAA to reduce glare and visibility from the ground.)
  - e. The Planning Commission may require design changes in order to lessen the visual clutter associated with the site location of multiple wind turbines with non-complementary, inconsistent design within sight of each other.
- (19) Complaint Resolution. The applicant shall develop a process to resolve complaints from nearby residents concerning the construction or operation of the project. The process may use an independent mediator or arbitrator and shall include a time limit for acting on a complaint. The process shall not preclude Schoolcraft County from acting on a complaint.
- (20) Unintended/misrepresented nuisances. Following construction and operation of the WES, should shadow flicker, noise levels, or vibrations exceed those projected by the developer, the WES shall not be operated until such nuisance is eliminated.
- (21) Site Plan Review. In addition to the VARIANCE standards and review, a site plan and a site plan review meeting the requirements of the Schoolcraft County Zoning Ordinance shall be required.
- (22) Additional requirements for Utility Grid WESs. The application shall also include:
- a. A copy of an Environment Analysis by a third party qualified professional to identify and assess any potential impacts on the natural environment including, but not limited to wetlands and other fragile ecosystems, historical and cultural sites, and antiquities. The applicant shall take appropriate measures to minimize, eliminate or mitigate adverse impacts and shall show those measures on the site plan. The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts.
  - b. A copy of the Avian and Wildlife Impact Analysis by a third party qualified professional to identify and assess any potential impacts on wildlife and endangered species. The applicant shall take appropriate measures to minimize, eliminate or mitigate adverse impacts, and shall show those measures on the site plan. The applicant shall identify and evaluate the significance of any net effects or concerns that will remain after mitigation efforts.
- (23) Maps shall be presented showing all of the following:
- a. The physical features and land uses of the project area, both before and after construction of the proposed project;
  - b. Project area boundaries;
  - c. The location, height, dimensions, color, and materials of all existing and proposed structures and fencing;
  - d. The location, grades, and dimensions of all temporary and permanent on site and access roads from the nearest county or state maintained road; and
  - e. All new infrastructures above ground related to the project.
- (24) Insurance. Proof of the applicant's public liability insurance shall be provided prior to issuance of a Zoning Permit. This insurance shall be maintained throughout the life of the project and proof provided upon the County's request.

- (25) Technical assistance. For wind energy systems and/or meteorological data regarded to be complex the Zoning Board of Appeals may require additional studies, information, and/or review. The applicant shall be required to reimburse the actual cost of any such independent review prior to a decision by the Zoning Board of Appeals.

**(E) Decommissioning Unused or Abandoned WESs**

Any WES that is not operated for a continuous period of twelve (12) months shall be considered abandoned. Any WES found to be unsafe, not in compliance with the standards set forth by the Zoning Board of Appeals, creating noise or shadow flicker in excess of the prescribed limit shall be found to be in violation of the permit and subject to penalty. The owner of any WES that is abandoned or in violation of the permit shall repair it to be in compliance or remove the entire unit within six (6) months of receipt of notice from the County of such abandonment or violation. In addition to removing the WES or anemometer tower, the owner shall restore the site of the WES to its original condition (as it was prior to installing the WES), subject to reasonable wear and tear. Any foundation associated with a WES shall be removed to grade. Failure to remove an abandoned WES within the six (6) month period provided in this subsection shall be grounds for the County to remove the WES at the owner's expense. The Schoolcraft County Zoning Board of Appeals shall require the applicant to provide a performance guarantee that is equal to the reasonable cost of removing the WES and attendant accessory structures as a condition of a permit given pursuant to this section.

**(F) Violations**

Any non-compliance circumstances shall be dealt with by the Zoning Administrator as described in *Section 908: Violations and Penalties*.