

*Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH*

Adopted November 10, 2015; Eff. November 27, 2015

*ADOPTED BY HURON COUNTY BOARD OF COMMISSIONERS, TUESDAY, NOVEMBER 10, 2015
RESOLUTION IN ORDINANCE FORM NO. 15-154, ZA 2015 -04 WITH EFF. DATE NOVEMBER 27, 2015*

**ARTICLE X. HURON COUNTY WIND ENERGY CONVERSION FACILITY OVERLAY ZONING
ORDINANCE**

SECTION 1. PURPOSE AND INTENT

The purpose of this Article is to provide a regulatory scheme for the designation of properties suitable for the location, construction and operation of Wind Energy Conversion Facilities (Wind Energy Facilities) in Huron County, to meet the needs of the County's citizens for energy and other natural resources, places of safe residence, recreation, industry, trade, service, tourism, and other uses of land, to ensure that use of the land is situated in appropriate locations and relationships, to facilitate adequate and efficient provision for water, energy, recreation, including habitat for wildlife, and other public service and facility requirements; and to promote and protect the health, welfare, safety, and quality of life of the general public, and to ensure compatible land uses in the vicinity of the areas affected by wind energy facilities. A Wind Energy Facility Overlay District shall be considered a map amendment, wherein lands so classified shall become pre-qualified for a Wind Energy Facility with construction of such facility approved pursuant to Section 5 Wind Energy Facility Site Plan Review, of this Article. It is further recognized that a Wind Energy Facility Overlay District is intended as an agricultural preservation measure.

SECTION 2. DEFINITIONS

As used in this Article, the following terms shall have the meaning indicated:

Airport Zoning Ordinance shall mean the Huron County Memorial Airport Zoning Ordinance.

Ambient Sound shall mean the all-encompassing sound associated with a given environment, being usually a composite of sound from many sources near and far, as defined by ANSI S12.9 Part 3.

A-weighted sound level shall mean the sound pressure level in decibels as measured on a sound level meter using the A-weighting network, a method for weighting the frequency spectrum to mimic the human ear. Expressed as dB(A) or dBA.

ANSI shall mean the American National Standards Institute. The current revision of each referenced standard shall be used.

ASTM shall mean the American Society for Testing and Materials.

Background Sound shall mean the all-encompassing sound associated with a given environment without contribution from the source or sources of interest, as defined by ANSI S12.9 Part 3.

Board of Commissioners shall mean the Huron County Board of Commissioners.

Commission shall mean the Huron County Planning Commission.

County (County Zoned Township) shall mean the County of Huron.

*Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH*

Adopted November 10, 2015; Eff. November 27, 2015

Continuous Background Sound shall mean background sound measured during a measurement period, after excluding the contribution of transient background sounds, as defined by ANSI S12.9 Part 3.

Decibel: see **Sound Pressure Level and Sound Power Level**

Downwind shall mean a position where the direction of the wind vector is within an angle of $\pm 45^\circ$ of the direction connecting the center of the sound source and the center of the specified receiver area, as defined by ANSI S12.18.

End of Useful Life shall mean the Wind Energy Conversion Facility, or a portion thereof, such as one or more individual wind turbines, that have not produced electrical energy for twelve (12) consecutive months.

Equivalent A-weighted Continuous Sound Level shall mean the level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound, denoted as $L_{eq} A$, and expressed as dBA.

FAA shall mean the Federal Aviation Administration.

FERC means the Federal Energy Regulatory Commission.

Frequency shall mean the number of oscillations or cycles per unit of time, expressed as Hertz (Hz).

Hertz means the frequency of sound expressed by cycles per second.

Hub Height shall mean, when referring to a Wind Turbine, the distance measured from ground level to the center of the turbine hub.

IEC means the International Electrotechnical Commission. The current revision of each referenced standard shall be used.

ISO means the International Organization for Standardization. The current revision of each referenced standard shall be used.

INCE means the Institute of Noise Control Engineering.

Inhabited means to live or reside in.

Inhabited Structure means a structure designed for human occupancy and provides complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

MET Tower shall mean a meteorological tower used for the measurement of wind speed.

Michigan Tall Structure Act (Act 259 of 1959) shall govern the height of structures in proximity to airport related uses and is included as a standard in this Article by reference.

NERC means the North American Electric Reliability Corporation.

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

Noise Sensitive Facility means an inhabited structure, school, hospital, church, public library, or other area designated by the Planning Commission.

Non-participating parcel means a parcel of real property which is not under lease or other property agreement with a Wind Energy Conversion Facility (WECF) owner/operator.

Octave Band shall mean the frequency interval where the upper frequency is twice the lower frequency.

One-Third Octave Band shall mean the frequency interval where the upper frequency is the lower frequency times the cube root of two.

Participating parcel means a parcel of real property which is under lease or other property agreement with a Wind Energy Conversion Facility (WECF) owner/operator.

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.

SCADA shall mean supervisory control and data acquisition, a computer system for gathering and analyzing real time data.

Shadow Flicker shall mean 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 Power shall mean the rate per unit time at which sound energy is radiated, expressed as watts (W).

Sound Power Level shall mean ten times the logarithm to the base 10, of the ratio of a given sound power to the reference sound power of 1 picowatt, expressed as decibels (dB).

Sound Pressure shall mean the difference at a given point between the pressure produced by sound energy and the atmospheric pressure, expressed as pascals (Pa).

Sound Pressure Level shall mean twenty times the logarithm to the base 10, of the ratio of the root-mean-square sound pressure to the reference pressure of twenty micropascals, expressed as decibels (dB). Note that, unless expressed with reference to a specific weighing network (such as dBA), the unit dB shall refer to an un-weighted measurement.

Tip Height means the distance measured from ground level to the furthest vertical extension of the rotor and blade.

Transient Background Sound shall mean background sound associated with one or more sound events which occur infrequently during the basic measurement period, a measurement interval with or without the source operating, as defined by ANSI S12.9 Part 3.

Wind Energy Conversion Facility (WECF) or Wind Energy Facility shall mean an electricity generating facility consisting of one or more wind turbines under common ownership or operation control, and includes substations, MET Towers, cables/wires and other buildings accessory

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

to such facility, located on private land which is under lease or other property agreement with a WECF owner/operator, whose main purpose is to supply electricity to off-site customers(s). It includes substations, MET towers, cables and wires and other buildings accessory to such facility. Wind Energy Conversion Facility accessory structures shall comply with the requirements of the Agricultural (AGR) zoning district in addition to the area, height, bulk and placement provisions as required by Article IX, Schedule of Regulations, of this Ordinance.

Wind Energy Facility Site Permit is a zoning permit issued upon compliance with standards of this Article.

Wind Energy Facility Site Plan Review is the process used to review a proposed Wind Energy Facility.

Wind Energy Overlay Districts are districts created by the Huron County Board of Commissioners, upon receiving a recommendation of the Planning Commission, by identifying specific areas within the Agricultural District best situated for development of wind energy facilities and adopting specific provisions that apply in that area in addition to other provisions of the zoning ordinance.

Wind Turbine shall mean a wind energy conversion system which converts wind energy into electricity through the use of a wind turbine generator, and includes the turbine, blade, tower, base and pad transformer, if any; provided that such a system shall only be a wind turbine for purposes of this Article if it both has a total height greater than 150 feet and nameplate capacity of greater than 100 kilowatts.

SECTION 3. REGULATORY FRAMEWORK

3.1 Zoning

A Wind Energy Facility may be constructed on land that is zoned Agricultural and within an area designated as a Wind Energy Facility Overlay District on the official zoning map for the County, subject to provisions and standards of Section 5 Wind Energy Facility Site Plan Review of this Article.

3.2 Principal or Accessory Use

Wind Energy Facility and related accessory uses may be considered either principal or accessory uses. A different existing use or an existing structure on the same parcel shall not preclude the installation of a Wind Energy Facility or a part of such facility on such parcel. Wind Energy Facilities that are constructed and installed in accordance with the provisions of this Article shall not be deemed to constitute the expansion of a nonconforming use or structure. Wind Energy Facilities shall be reviewed and approved pursuant to Section 5 of this Article.

After designation as a Wind Energy Overlay District, new structures and uses within the “overlay” area shall be limited to those uses identified within Article IV. Agricultural District and wind energy facilities, subject to any additional standards of this Article.

SECTION 4.0 APPLICABILITY

A Wind Energy Conversion Facility (WECF) or Wind Energy Facility (WEF) shall be permitted in Agricultural Districts with a Wind Energy Facility Overlay District Classification. Wind Energy Facility Site Plan Review standards shall be used when reviewing an application for wind energy facility permit.

SECTION 4.1 PRIOR APPROVALS

Wind Energy Conversion Facilities which had site plan review applications pending before the Planning Commission on or before February 10, 2015, and which subsequently received site plan approval are exempt from the provisions of this Article X and such facilities shall be constructed and operated in accordance with the provisions of Article X: Huron County Wind Energy Conversion Facility Overlay Zoning Ordinance dated June 1, 2010.

SECTION 5.0 WIND ENERGY FACILITIES SITE PLAN REVIEW PROCEDURE (Adopted as of November 10, 2015)

The following process shall be utilized when reviewing an application for a Wind Energy Facility Permit: Within an Agricultural District, a Wind Energy Facility Overlay District shall be created based on “attributes” and “limitations” identified in the Huron County Master Plan. A “Wind Energy Overlay District” classification is a prerequisite to developing a Wind Energy Facility. It is the intent of this “overlay district” to identify agricultural land eligible for commercial, large-scale wind energy conversion facilities and, at the same time, provide for maximizing and preserving agricultural activity.

5.1 Site Plan Review Required.

Wind Energy Conversion Facilities shall not be located, constructed, erected, altered, or used without first obtaining a Wind Energy Facilities Permit pursuant to this Article. The Wind Energy Facilities Site Plan must be reviewed and approved by the Huron County Planning Commission pursuant to standards contained herein, and in conjunction with Article XIV Section 14.28. An applicant proposing a Wind Energy Facility must submit the following site plan materials:

1. Survey of the property showing existing features such as contours, large trees, buildings, structures, roads (rights-of-way), utility easements, land use, zoning district, ownership of property, and vehicular access;
2. Plan(s) showing the location of proposed turbine towers, underground and overhead wiring (including depth of underground wiring), access roads (including width), substations and accessory structures;
3. A description of the routes to be used by construction and delivery vehicles and of any road improvements that will be necessary in the County to accommodate construction vehicles, equipment or other deliveries, and an agreement or bond which guarantees the repair of damage to public roads and other areas caused by construction of the Wind Energy Facility;
4. Engineering data concerning construction of the tower and its base or foundation, which must be engineered and 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 from established ground level;
5. Anticipated construction schedule;
6. Description of operations, including anticipated regular and unscheduled maintenance;
7. Digital versions of all planning and construction documents required pursuant to Section 5.1 Site Plan Review. Digital submittals are in addition to paper plans and do not replace any current submission requirements. Digital versions shall be submitted in PDF (Adobe Acrobat/Portable Document File) format.

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

8. Plan(s), permits, and/or data showing compliance with the Huron County Memorial Airport Zoning Ordinance.

5.2 Application Fee: An applicant for a Wind Energy Facility shall remit an application fee to the County in the amount specified in the fee schedule adopted by resolution of the Huron County Board of Commissioners. Payment shall be made at time of application submission.

5.3-Application Material. The following shall be included and/or be utilized as standards when preparing, submitting and reviewing an application for a Wind Energy Facility.

A. Avian Analysis. The applicant shall submit an avian study to assess the potential impact of proposed Wind Energy Facilities upon bird and bat species. The avian study shall at a minimum report on a literature survey for threatened and endangered species, and any information on critical flyways. The applicant must identify any plans for post-construction monitoring or studies. The analysis should also include an explanation of potential impacts and propose a mitigation plan, if necessary. The applicant shall include documentation pertaining to compliance with the U.S. Fish and Wildlife Service voluntary Land-Based Wind Energy Guidelines, as amended. Developer shall provide affidavit of delivery (i.e. USPS Return Receipt) of any documentation requested by the U.S. Fish and Wildlife Service and the applicant's response.

B. Visual Appearance; Lighting; Powerlines. The applicant shall use measures to reduce the visual impact of wind turbines to the extent possible, utilizing the following:

1) Wind turbines shall be mounted on tubular towers, painted a non-reflective, non-obtrusive color. The appearance of turbines, towers and buildings shall be maintained throughout the life of the wind energy facility pursuant to industry standards (i.e., condition of exterior paint, signs, landscaping, etc.). A certified registered engineer and authorized factory representative shall certify that the construction and installation of the wind energy conversion system meets or exceeds the manufacturer's construction and installation standards.

2) The design of the Wind Energy Facility's buildings and related structures shall, to the extent reasonably possible, use materials, colors, textures, screening and landscaping that will blend facility components with the natural setting and then existing environment.

3) Wind Energy Facilities shall not be artificially lighted, except to the extent required by the FAA or other applicable authority, or otherwise necessary for the reasonable safety and security thereof.

4) Wind turbines shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the Wind Energy Facility.

5) The electrical collection system shall be placed underground within the interior of each parcel at a minimum burial depth of five (5) feet. The communication system shall be placed underground within the interior of each parcel at a minimum burial depth of four (4) feet. The final location of the electrical collection system installation shall be identified by GPS location. The actual installed burial depth of underground wiring shall be verified by the developer of the wind energy facility. The developer shall provide certification from the installing contractor of the actual installed burial depth of all underground wiring. Such certification shall be under the penalty of perjury. The collection system may be placed overhead adjacent to County roadways, near substations or points of interconnection to the electric grid or in other areas as necessary.

6) **Shadow Flicker:** The allowable shadow flicker measured at the nearest external wall or walls of participating inhabited structures shall be limited to a maximum of **30** hours per year. Shadow flicker measured at the nearest external wall or walls of non-participating inhabited structures shall be limited to **30** hours per year. In the event shadow flicker from the Wind Energy Facility exceeds the limits stated above, a waiver to said limits may be approved provided that the following has been accomplished:

- (a) Written consent from the affected property owner(s) has been obtained stating that they are aware of the Wind Energy Facility and the shadow flicker limitations imposed by this Article, and that consent is granted to allow shadow flicker limits to exceed the maximum limits otherwise allowed; and
- (b) A shadow flicker impact easement shall be recorded with the Huron County Register of Deeds office which describes the benefitted and burdened properties and which advises all subsequent owners of the burdened property that shadow flicker limits in excess of those otherwise permitted by the ordinance may exist on or at the burdened property.

C. Setbacks, Separation and Security. The following setbacks and separation requirements shall apply to all wind turbines within a Wind Energy Facility;

1) **Inhabited structures:** On a participating parcel, each wind turbine shall be set back from the nearest inhabited structure a distance of no less than 1320 feet. Regarding a non-participating parcel, each wind turbine shall be set back from the nearest inhabited structure a distance of no less than 1640 feet. A lesser setback may be approved pursuant to Section 5.1 of this Article if the intent of this Article would be better served thereby. A reduced setback shall be considered only with written approval from the owner of the inhabited structure. Where a turbine within a Wind Energy Facility is located in the vicinity of a school, hospital, church, public library, city, village, or self-zoned township, a setback of 1320 feet from the structure and/or boundary shall be required. Where a turbine location is proposed nearer to an inhabited structure than allowed by this section, an easement shall be established on the affected parcel(s), recorded with the Huron County Register of Deeds.

2) **Property line setbacks:** Excepting locations of public roads (see below), drain rights-of-way and parcels with inhabited structures, wind turbines shall not be subject to property line setbacks on participating parcels within the Wind Energy Facility Overlay District. Along the border of the Wind Energy Facility Overlay District, there shall be a setback distance equal to 1320 feet measured from the nearest wind turbine. Wind turbines and access roads shall be located so as to minimize the disruption to agricultural activity and, therefore, the location of towers and access routes is encouraged along internal participating property lines. Where a turbine location is proposed nearer to a non-participating internal property line than one and one-half (1.5) times the tip of the blade at its highest position [max height 499'], an easement shall be established on the abutting parcel(s).

3) **Public Roads:** Each wind turbine shall be set back from the nearest public road a distance no less than 500 feet or 1.5 times its Hub Height, whichever is greater, determined at the nearest boundary of the underlying right-of-way for such public road.

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

4) Communication and electrical lines: Each wind turbine shall be set back from the nearest above-ground public electric power line or telephone line a distance no less than 500 feet or 1.5 times its Hub Height, whichever is greater, determined from the existing power line or telephone line.

5) Tower separation: Turbine/tower separation shall be based on 1) industry standards, and 2) manufacturer certification. At a minimum, there shall be a separation between towers of not less than 3 times the turbine (rotor) diameter; and, the Wind Energy Facility shall be designed to minimize disruption to farmland activity. Documents shall be submitted by the developer/manufacturer confirming specifications for turbine/tower separation.

6) Following the completion of construction, the applicant shall certify that all construction is completed pursuant to the Wind Energy Site Permit and, in addition, that appropriate security will be in place to restrict unauthorized access to Wind Energy Facilities.

7) Shoreline Protection: A Wind Energy Turbine/Tower shall be located at least three (3) miles from the ordinary high water mark of the Lake Huron/Saginaw Bay shoreline, as established by the Michigan Department of Environmental Quality MCL 324.32502.

D. Wind Turbine/Tower Height (Total Height): The total height of a wind turbine shall be a maximum of 499 feet. The applicant shall demonstrate compliance with the Michigan Tall Structure Act (Act 259 of 1959, as amended) and FAA guidelines as part of the approval process.

E. Sound (developed by Acoustics by Design)

1) The audible sound from a Wind Energy Facility at a Noise Sensitive Facility may not exceed the Equivalent A-weighted Continuous Sound Level (L_{eq}) limits set forth in Table 1, measured in accordance with the methodology described in Sections (6) and (7).

Table 1 –Equivalent A-weighted Continuous Sound Level (L_{eq}) Limits

Zone	Time	Equivalent A-weighted Continuous Sound Level (dBA)
Participating parcel	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
Non-participating parcel	7 a.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	45

2) In the event audible noise from the operation of the Wind Energy Facility contains a prominent discrete tone, the limits set forth in Table 1 shall be reduced by five (5) dBA. For a prominent discrete tone to be identified as present, the equivalent-continuous sound pressure level in the one-third octave band of interest is required to exceed the arithmetic average of the equivalent-continuous sound pressure level for the two adjacent one-third octave bands by five (5) dB for center frequencies of five hundred (500) Hz and above, by eight (8) dB for center frequencies between one hundred and sixty (160) Hz and four hundred (400) Hz, or by fifteen (15) dB for center frequencies between twenty five (25) and one hundred and twenty-five (125) Hz as specified by ANSI S12.9 Part 3, Annex B.

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

- 3) Any noise level falling between two whole decibels shall be rounded to the nearest whole number.
- 4) In the event the noise levels resulting from the Wind Energy Facility exceed the criteria listed above, a waiver to said levels may be approved provided that the following has been accomplished:
 - (a) Written consent from the affected property owner(s) has been obtained stating that they are aware of the Wind Energy Facility and the noise limitations imposed by this Article, and that consent is granted to allow noise levels to exceed the maximum limits otherwise allowed; and
 - (b) A noise impact easement shall be recorded in the Huron County Register of Deeds office which describes the benefitted and burdened properties and which advises all subsequent owners of the burdened property that noise levels in excess of those otherwise permitted by the ordinance may exist on or at the burdened property.
- 5) **Sound Modeling Study** – The applicant shall provide a predictive sound modeling study of all turbine noise for a Wind Energy Facility to verify that ordinance requirements can be met for the Equivalent A-weighted Continuous Sound Level limits in Table 1. The sound modeling must follow International Standard, ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.” The sound modeling study shall use the maximum apparent wind turbine sound power levels as determined by measurement according to IEC 61400 – Part 11, or as determined by analytical calculations according to the manufacturer, plus 2 dB to each frequency band. The sound power source shall be modeled at hub height. Modeling shall include topographical information and assume hard ground (G=0) for all large areas of pavement and water, and mixed ground (G=0.5) for all other land. The sound modeling study shall include a map with all proposed wind turbine locations, all Noise Sensitive Facilities, and all participating and non-participating parcels. The sound study map shall be overlaid with sound contour lines extending out to the 30 dBA sound contour line, at 5 dBA intervals from the center of the proposed Wind Energy Facility.
- 6) **Post Construction Sound Survey** – The applicant shall complete a post construction sound survey within 12 months of the commencement of the operation of the project. The applicant shall be able to determine compliance with the Equivalent A-weighted Continuous sound level limits set forth in Sections (1) and (2). The measurements and the reporting of the data shall be conducted in accordance with Section (6)(a) through Section (6)(c). The survey shall address noise complaints on file with the County and may require additional measurement locations as deemed necessary by the Planning Commission. Should the sound survey indicate a non-compliant measurement, the owner of the Wind Energy Facility will be required to obtain compliance through mitigation or other measures.

(a) **Methodology**

- i) Refer to Section (8) for measurement personnel and instrumentation requirements.
- ii) A calibration check shall be performed and recorded before and after each measurement period.
- iii) The nighttime measurement period shall be 2 hours minimum and shall be continuously observed by a trained attendant. Sound level data shall be aggregated in 10-minute measurement intervals within the nighttime compliance measurement period (nighttime: 10:00 pm to 7:00 am).

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

- iv) The daytime measurement period shall be 2 hours minimum and shall be continuously observed by a trained attendant. Sound level data shall be aggregated in 10-minute measurement intervals within the daytime compliance measurement period (daytime: 7:00 am to 10:00 pm). Because compliance with nighttime noise limits presumes compliance with the less stringent daytime noise limits, this requirement may be waived by the Planning Commission.
- v) Compliance will be demonstrated when the Equivalent A-weighted Continuous Sound Level of every twelve representative 10-minute measurement interval is less than or equal to the Equivalent A-weighted Continuous sound level limits as set forth in Sections (1) and (2) of this rule. Representative intervals are defined as:
 - a. Periods complying with the general method for routine measurements of ANSI S12.18. Measurements shall be made either downwind as defined in ANSI S12.18, or if the atmospheric conditions are such that the direction of the wind vector is within an angle of ± 45 degrees of the annual prevailing wind direction.
 - b. Periods where the concurrent turbine hub-elevation wind speeds are sufficient to generate within 1 dB of the maximum continuous rated sound power from the nearest wind turbine to the measurement location.
 - c. Periods where ground level gusts are equal to or less than 7 m/s (15.66 mph).
- vi) The sound level measured in each 10-minute measurement interval above may be corrected for transient background sound and continuous background sound, according to ANSI S12.9 Part 3.

(b) Measurement Locations

- i) The measurement locations shall be chosen by the developers' Measurement Personnel and by the Planning Commission prior to the Post Construction Sound Survey.
- ii) The measurement locations shall be performed at Noise Sensitive Facilities in close proximity to one or multiple wind turbines and/or locations which have modeled sound levels closest to limits identified in Table 1. A 3:1 ratio (wind turbines to measurement locations) will be used to determine the number of measurement locations, with a minimum of 8 measurement locations. The measurement locations shall include, but are not limited to, the following:
 - a. A minimum of four measurements of different non-participating parcels. The measurement location shall be at the Noise Sensitive Facility, measured 50 feet from the façade nearest the closest wind turbine of the Wind Energy Facility.
 - b. A minimum of two measurements of different participating parcels. The measurement location shall be at the Noise Sensitive Facility, measured 50 feet from the façade nearest the closest wind turbine of the Wind Energy Facility.
 - c. Any measurement location determined necessary by the Measurement Personnel and Planning Commission. If both parties agree, a measurement location deemed unnecessary may be omitted from the required locations.

**Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH**

Adopted November 10, 2015; Eff. November 27, 2015

- iii) The microphone shall be positioned at a height of 5 feet \pm 1 foot above the ground, and oriented in accordance with the characteristics of the microphone so that the frequency response is as flat as possible.
 - iv) To the greatest extent possible, measurement locations should be located away from potential contaminating sources of noise such as major highways, industrial facilities and urban areas.
 - v) To the greatest extent possible, measurement locations shall be at the center of unobstructed areas that are maintained free of vegetation and other structures or material that is greater than 2 feet in height for a 50-foot radius around the sound monitoring equipment.
 - vi) To the greatest extent possible, measurement locations should be at least 50 feet from any known sound source.
 - vii) Meteorological measurements of the surface wind speed and direction shall be collected using anemometers at a height of 6.6 foot \pm 0.7 foot above the ground, near each noise measurement location. Care should be taken to avoid noise measurement contamination from the anemometer operation.
- (c) **Reporting of Measurement Data** Measurement Reports shall be submitted to the Planning Commission within 45 days of completion of the post-construction survey and shall include, at a minimum, the following:
- i) A narrative description of the sound from the Wind Energy Facility for the compliance measurement period result.
 - ii) A narrative description of the sound measurements collected.
 - iii) A map showing the wind turbine locations, noise measurement locations, and all Noise Sensitive Facilities.
 - iv) The dates, days of the week and hours of the day when measurements were made.
 - v) The wind direction and speed, temperature, precipitation, and sky condition for each 10-minute measurement interval. Meteorological measurements of the wind speed and direction will be reported at both the surface height, and at hub level (to be provided by the Wind Energy Facility from the closest wind turbine), based on five second integration intervals. Both the average and maximum wind speeds for each 10- minute measurement interval shall be reported.
 - vi) The wind energy output for each 10- minute measurement interval for the closest wind turbine.
 - vii) Identification of all measurement equipment by make, model and serial number.
 - viii) All meteorological, sound, windscreen and audio instrumentation specifications and calibrations.
 - ix) All A-weighted equivalent sound levels for each 10-minute measurement interval.
 - x) All 1/3 octave band linear equivalent sound levels for each 10-minute measurement interval and identification of tonal periods.

- xi) All attendant's notes and observations.
- xii) All concurrent time stamped turbine operational data including the date, time and duration of any noise reduction operation or other interruptions in operations if present.
- xiii) All periods removed from the data due to temperatures above or below manufacturer specifications, wind speeds above ANSI S12.18 limits.
- xiv) All corrections for transient background and continuous background sound according to ANSI S12.9 Part 3. All methodology, data, field notes, and calculations shall be included. Audio recordings may be submitted for identification of intrusive noise events. Audio collection shall occur through the same microphone/sound meter as the measurement data. Audio recordings shall be time stamped (hh:mm:ss), at an adequate quality for identifying events, and in mp3 format.
- xv) All other information determined necessary by the Planning Commission.

7) Measurement of the Sound from Routine Operation of the Developments – Measurements of the sound from routine operation of completed Wind Energy Facilities are generally necessary only for specific compliance testing purposes in the event that community complaints result from operation of the development, for validation of an applicant's calculated sound levels when requested by the Planning Commission, or for enforcement by the Department. The applicant shall be able to determine compliance with the Equivalent A-weighted Continuous sound level limits set forth in Sections (1) and (2). The measurements and the reporting of the data shall be conducted in accordance with Section (7)(a) through Section (7)(c). Should the measurements indicate a non-compliant measurement, the owner of the Wind Energy Facility will be required to obtain compliance through mitigation or other measures.

(a) **Methodology** - Refer to Section (6)(a).

(b) **Measurement Locations**

- i) Measurement locations shall be conducted at the property of the complainant and chosen by the Measurement Personnel and by the Planning Commission beforehand. The measurement locations shall include, but are not limited to, the following representative locations:
 - a. A minimum of one measurement location at the Noise Sensitive Facility of the complainant, measured 50 feet from the façade nearest the closest wind turbine of the Wind Energy Facility.
 - b. Any measurement location determined necessary by the Measurement Personnel and Planning Commission.
- ii) The microphone shall be positioned at a height of 5 feet \pm 1 foot above the ground, and oriented in accordance with the characteristics of the microphone so that the frequency response is as flat as possible.
- iii) To the greatest extent possible, measurement locations should be located away from potential contaminating sources of noise such as major highways, industrial facilities and urban areas.

- iv) To the greatest extent possible, measurement locations shall be at the center of unobstructed areas that are maintained free of vegetation and other structures or material that is greater than 2 feet in height for a 50-foot radius around the sound monitoring equipment.
 - v) To the greatest extent possible, measurement locations should be at least 50 feet from any known sound source.
 - vi) Meteorological measurements of the surface wind speed and direction shall be collected using anemometers at a height of 6.6 foot \pm 0.7 foot above the ground, near each noise measurement location. Care should be taken to avoid noise measurement contamination from the anemometer operation.
- (c) **Reporting of Measurement Data** Measurement Reports shall be submitted to the Planning Commission within 45 days of completion and shall include, at a minimum, the following:
- i) Refer to Section (6)(c)(i) through Section (6)(c)(xv)

8) **General Sound Survey Methodology**

- (a) **Measurement Personnel.** Measurements shall be supervised by personnel who are independent of the Wind Energy Facility, well qualified by training and experience in measurement and evaluation of environmental sound, and are Board Certified members of the Institute of Noise Control Engineering (INCE).
- (b) **Measurement Instrumentation.** Measurement devices shall comply with the following requirements:
 - i) A sound level meter or alternative sound level measurement system used shall meet all of the Type 1 performance requirements of American National Standard Specifications for Sound Level Meters, ANSI S1.4.
 - ii) An integrating sound level meter (or measurement system) shall also meet the Class 1 performance requirements for integrating/averaging in the International Electrotechnical Commission Sound Level Meters, IEC Publication 61672-1.
 - iii) A filter for determining the existence of tonal sounds shall meet all of the Class 1 performance requirements of American National Standard Specification for Octave- Band and Fractional Octave-Band Analog and Digital Filters, ANSI S1.11.
 - iv) An acoustical calibrator shall be used of a type recommended by the manufacturer of the sound level meter and that meets the Type 1 performance requirements of American National Standard Specification for Acoustical Calibrators, ANSI S1.40.
 - v) A microphone windscreen shall be used of a type that meets or exceeds the recommendations of manufacturer of the sound level meter.
 - vi) The sound level meter shall have been calibrated by a laboratory within 24 months of the measurement, and the microphone's response shall be traceable to the National Bureau of Standards.

- vii) The sound level meter shall be used with the fast meter response and sampling frequency of one sample per second.
- viii) Anemometer(s) used for surface wind speeds shall have a minimum manufacturer specified accuracy of ± 1 mph providing data in five second integrations.
- ix) Compass used for surface wind direction shall have a minimum manufacturer specified accuracy of $\pm 3^\circ$ providing data in five second integrations.
- x) Thermometer used for surface temperature shall have a minimum manufacturer specified accuracy of $\pm 2^\circ\text{C}$ providing data in five second integrations.
- xi) A digital recording device used to store the time waveform of the sound pressure levels shall comply with the requirements of ANSI/ASA S1.13.

G. Minimum Ground Clearance

The blade tip of any Wind Turbine shall, at its lowest point, have ground clearance of not less than seventy-five (75) feet.

H. Signal Interference

No Wind Energy Facility shall be installed in any location where its proximity with existing fixed broadcast, retransmission, or reception antennas for radio, television, or wireless phone or other personal communication systems would produce electromagnetic interference with signal transmission or reception. No Wind Energy Facility shall be installed in any location along the major axis of an existing microwave communications link where its operation is likely to produce electromagnetic interference in the link's operation.

I. Safety

- 1) All collection system wiring shall comply with all applicable safety and stray voltage standards.
- 2) Wind Turbine towers shall not be climbable on the exterior.
- 3) All access doors to wind turbine towers and electrical equipment shall be lockable.
- 4) Appropriate warning signs shall be placed on wind turbine towers, electrical equipment, and Wind Energy Facility entrances.

5.4–Site Plan Approval, Amendments, Expiration and Revocation.

A Wind Energy Conversion Facility Site Plan shall be permitted to be approved, approved with conditions, or denied. Site plans must also comply with Article XIV, Section 14.28 Site Plan Review (All Districts). An approved site plan and/or “conditionally approved” site plans are valid for 12 months from date of approval by the planning commission. The approved site plan shall be considered exercised once a building permit has been issued and substantial construction commenced. Any amendments to an approved site plan, accompanied by supporting documentation, shall be submitted to the planning commission prior to permit issuance. The planning commission shall review the amendment and may grant, deny or amend such amendment as deemed necessary. An approved site plan shall be revoked if the applicant fails to comply with conditions imposed by the planning commission, Article X provisions, and Section 14.28 of this Ordinance.

SECTION 6.0 CERTIFICATION. Operation of a wind energy facility shall require certification of compliance; a certification report from the wind facility's owner/operator is required within twelve (12) months of the facility's initial operation (start-up) date. The post-construction certification report shall confirm the project's compliance with provisions of this code as well as all other all applicable laws and conformity with wind industry practices.

"As Built List"

1. "As-built" construction plans
2. Digital version
3. Paper Copy

SECTION 7.0 INSPECTIONS. The applicant (owner/operator) shall submit annual reports to the Planning Commission or its designated officer confirming continued compliance with applicable county codes or ordinances. This requirement shall not preclude the county from undertaking a separate compliance report, where confirmation of data provided by the facility's operator is desired. The cost of a county-sponsored report shall be reimbursed to the county by the facility's owner/operator through an escrow fund established pursuant to the 'schedule of fees for wind energy facilities', adopted from time-to-time by the Board of Commissioners.

SECTION 7.01 COMPLAINT RESOLUTION. The Michigan Zoning Enabling Act allows a local unit of government to enact through ordinance regulations to achieve specific land management objectives and avert or solve specific land use problems; see MCL 125.3201(3). The Thumb area has been designated as a primary wind zone area and as a result it is anticipated that Huron County will experience substantial growth in wind energy facilities. In light of the foregoing, the County has developed a process for the resolution of complaints unique to wind energy systems. A description of a complaint resolution process shall be established by an applicant of a wind energy facility permit as part of its initial application for zoning approval. The process is intended to facilitate resolution of complaints concerning the construction or operation of the wind energy facility from nearby residents and/or property owners. The process may use an independent mediator or arbitrator and shall include a time limit for acting on a complaint. A complaint resolution process approved through a wind energy facility permit shall be prepared utilizing, at a minimum, guidelines which are established by resolution of the Board of Commissioners after recommendation by the Planning Commission; and, said process shall not preclude the county from pursuing any and all appropriate legal action on a complaint.

SECTION 7.02 FALSE REPORT OF OFFICIAL COMPLAINT. Any person who intentionally makes a false complaint or intentionally causes a false report of a complaint or violation of Article X to the official in charge of enforcing the Wind Energy Facility Overlay Zoning Ordinance, knowing the report is false, is guilty of a civil infraction, and upon a finding of responsibility is subject to a fine of up to \$500.00 for each violation and all costs associated with the investigation and prosecution thereof.

*Wind Energy Facility Overlay Zoning
Revised Ordinance V5_PH*

Adopted November 10, 2015; Eff. November 27, 2015

SECTION 8.0 DECOMMISSIONING.

The applicant shall submit a plan describing the intended disposition of the Wind Energy Facilities and/or individual wind turbines at the end of their useful life, and shall describe any agreement with the landowner regarding equipment removal upon termination of the lease. A performance bond or equivalent financial instrument shall be posted in an amount determined by the County (to be utilized in the event the decommissioning plan needs to be enforced with respect to tower removal, site restoration, etc.). The bond shall be in favor of Huron County, and may be provided jointly as a single instrument for multiple townships within a single wind farm, provided that any such single instrument shall be in an amount of at least \$1 million and shall contain a replenishment obligation. The replenishment obligation shall be satisfied with other additional documentation determined by the County, if the bond is not replenishable. The County reserves the right to review the decommissioning plan every 5 years, and revise requirements as necessary.

SECTION 9.0.

A moratorium adopted by the Huron County Board of Commissioners, adopted April 14, 2015, effective May 1, 2015, for a 90 day period, with a provision for a one-time 90 day extension, which became effective on July 30, 2015, which expired on October 27, 2015, and is no longer in effect due to the sunset provision.