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February 10, 2010

Via FedEx

Ohio Power Siting Board
Docketing Division
180 E. Broad Street
10th floor
Columbus, OH 43215

Re: Hardin North Project
Case Number 09-277-EL-BGN

Dear Sir or Madam:

Enclosed please find an original and 11 copies of JW Great Lakes Wind LLC's Historic Architecture Survey Approach and Cooperative Agreement, which are exhibits to the Joint Stipulation and Recommendation filed with the Board on February 9, 2010 in the above-referenced matter. Kindly time stamp one copy and return it to me in the self-addressed, postage-prepaid envelope I have enclosed for your convenience.

Please contact me should you have any questions.

Sincerely,

MCMAHON DEGULIS LLP



David E. Nash

This is to certify that the images appearing are an accurate and complete reproduction of a case file document delivered in the regular course of business.
Technician Sm **Date Processed** FEB 11 2010

DEN:jmc
Enclosures

cc: William L. Wright, Esq. (all via email only, w/ enclosures)
Larry R. Gearhardt, Esq.
Christina E. Grasseschi, Esq.

09-277-EL-B6W
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**Historic Architecture Survey Approach
JW Great Lakes Wind, LLC, Hardin County North Wind Farm
Washington Township, Hardin County, Ohio
JW Great Lakes Wind, LLC
February 1, 2010**

1.0 INTRODUCTION

The primary research goals for this study are to determine the likelihood of the presence or absence of historical structures within and near the project area where wind turbines will be erected, to characterize the historical architecture by sampling the most representative examples in the area, and to determine the impact of the wind farm upon them. The architecture survey is designed to allow OPSB Staff to evaluate the minimum adverse impact of the project on the surrounding area, as suggested in their Staff Report (p. 24). Based upon research conducted to date, the Project area and surrounding area is believed to contain no properties that may be adversely affected by development of the wind farm. However, to test this hypothesis survey of the APE will be conducted.

Research to date has revealed no properties with OHI forms are located within the footprint of the wind farm. A total of 136 OHI properties fall within a 5 mile history/architecture study area. Many unevaluated structures are present within the 5 mile APE; however most are associated with the towns of Ada and Dunkirk that range from 2.0 to 4.5 miles distant from the turbines or are isolated homes and farmsteads similar distances from the proposed turbines.

Only 9 structures are within the project boundary. Most of the structures demonstrated a significant amount of physical alterations that do not complement the original building designs. Recent renovations include replacement siding, doors, windows, and roofing materials, and several properties had entranceways and windows covered or bricked in. The extent of the alterations varied greatly from structure to structure. Additional study is proposed to characterize representative structures within the APE.

The previous background research was conducted to develop an understanding of the level of historical structures likely to exist in the area. The literature review submitted with the OPSB application (BHE 2009) outlines the historical research, some of which is summarized below. Based upon this site specific background information, a sampling scheme was developed that will allow representative structures to be targeted for further data collection to determine the likelihood of eligible properties and the effect upon them.

2.0 SITE HISTORY

2.1 EURO-AMERICAN HISTORY OF HARDIN COUNTY AND WASHINGTON TOWNSHIP

2.1.1 Hardin County

The proposed wind farm area is located within Washington Township, Hardin County. The northwestern corner of the state of Ohio was not readily open for settlement by Euro-Americans until the early 1800s. As part of the 1795 Treaty of Greenville, Native Americans lost their rights to land across much of Ohio, but they were able to keep the land that includes present-day Hardin County. In 1817, however, the Treaty of the Maumee Rapids (also

known as the Treaty of the Wyandot and the Fort Meigs Treaty) opened most of northwest Ohio to Euro-American settlement. A few years later, in 1820, Hardin County was established from land that formerly belonged to Logan County. The county was not formally organized until 1833, with the county seat located at Kenton. The county was named after Colonel John Hardin, a Revolutionary War veteran who was killed in 1792 while on a mission of peace in what is now Shelby County (Howe 1888).

In 1840, the population of the county was 4,538 (Howe 1888). The entry of the railroad into the county in the late 1840s spurred the development of several communities, including Dola (originally North Washington) and Dunkirk in 1852, and Ada (originally Johnston) in 1853. By 1880, the population had increased to 27,023; according to the Ohio Department of Development, Hardin County's population has remained at a level between 27,000 and 32,000 people.

Hardin County has remained rural in nature throughout its existence. Cropland accounts for 80 percent of current land use. The population as of 2007 was 31,650, with nearly 44 percent of the population living in the towns of Kenton and Ada (Ohio Department of Development 2007).

2.1.2 Washington Township

Washington Township was organized in late 1835 or early 1836 with 36 one-mile square sections. Much of Washington Township was covered by the Hog Creek Marsh, a large, 8,000-acre marsh in the western portion of the township, while the rest of the original land cover was woodland. The current landscape of Washington Township can be characterized as flat and dominated by agricultural fields, with scattered farmsteads located along the county roads. This landscape has probably changed little in appearance since the drainage of Hog Creek Marsh in the late 1800s.

The first settlers in the township arrived between 1832 and 1840. The only community in Washington Township is the village of Dola, originally platted in 1852 as North Washington. The Pittsburgh, Fort Wayne & Chicago Railroad (later the Pennsylvania Railroad) was constructed in the township beginning in 1852, but it was not truly finished until about 1862, when the sections of the railroad grade in the Hog Creek Marsh were finally stabilized enough that the tracks no longer sank into the marsh. In 1840, the population of Washington Township was 203 people; it increased to 1,291 people by 1880 (Howe 1888).

3.0 SITE REVIEW

3.1 INTRODUCTION

For history/architecture resources, the study area was defined as the footprint of the proposed construction activities for the wind farm, plus a buffer zone extending 5 miles (8-km) from the boundary of the footprint. This buffer zone takes into account the visual impacts that the wind farm might have on surrounding properties. Photosimulations were created in the project vicinity and submitted with JWGL's original OPSB application. (See Attachment)

A literature review that included an on-site inspection was conducted in April 2009 to identify previously documented history/architecture or archaeological resources located within their respective study areas and previous history/architecture or archaeological investigations that

had taken place in the vicinity of the proposed wind farm. The study area contains a high number of frame homes of vernacular buildings from the late nineteenth to early twentieth centuries. Some of the more common recognizable architectural styles observed include Italianate, Colonial Revival, and Four Square variants. Most of the wood-frame structures observed have been heavily altered with replacement doors, windows, roofing, and siding. This research provides information on the expected types and settings of properties in the region.

3.2 NATIONAL REGISTER OF HISTORIC PLACES (NRHP)

A review of the project and surround 5 mile area revealed only one property that is listed in the NRHP, the Ada Pennsylvania Passenger Station and Railroad Park, located at 112 East Central Avenue. The Ada passenger station and park was listed in the NHRP on August 8, 1998, under Criterion A and Criterion C—under Criterion A for its association with events that have made a significant contribution to the broad patterns of our history; and under Criterion C for embodying distinctive characteristics of a type, period, and method of construction in the Stick Style. This property also reflects the broad patterns of industry and transportation in northwestern Ohio.

3.3 HISTORIC BRIDGES

No historic bridges are located within the history/architecture study area.

3.4 HISTORIC CEMETERIES

A review of the Ohio Historic Inventory (OHI) revealed that no cemeteries were located within the boundaries of the wind farm. However, numerous historic cemeteries were found to be within the history/architecture study area. A brief listing is provided including the Ohio Genealogical Society's (OGS) numerical identification number (Table 1).

Table 1. Historic cemeteries in the history/architecture study area.

Portion of the study area	Historic cemeteries
Northern portion	An American Indian Burial Ground (unsubstantiated) (OGS 14630) The McEroy Cemetery (OGS 4900) The Jones-Helms-Krider Cemetery (OGS 4936), The Eagle Creek Cemetery (OGS 4847) The Williamstown Cemetery (OGS 4825)
Western portion, near the town of Ada	The Ada Mausoleum (OGS 4896) The Old Washington Cemetery (OGS 4901) The Woodlawn-Old Washington Cemetery (OGS 4904)
Southern portion	The Hunterville Cemetery (OGS 4870) The Obenour Cemetery (OGS 4872) The Foit-Gramlick Cemetery (OGS 14612) The Smith Cemetery (OGS 4939)
Central portion, near the unincorporated community of Dola	The Wagoner Cemetery (OGS 4940) The Dola-Washington Township Cemetery (OGS 4937)
Eastern portion, near the	The Waggoner Cemetery (OGS 14633)

Portion of the study area	Historic cemeteries
town of Dunkirk	The Fry Farm-Lynch Cemetery (OGS 4860) The Dunkirk Cemetery (OGS 4859) The Sorgen Cemetery (OGS 4863)

3.5 HISTORICAL MAPS AND ATLASES

The literature review yielded three historical maps—two USGS topographic maps from 1907 and one 1879 atlas map of Washington Township.

For the most part, the maps show a sparsely inhabited landscape, with scattered farmsteads along the section line roads. The exceptions include the towns of Ada, North Washington (now Dola), and Dunkirk, and a fairly high number of farmsteads along modern County Highway 14. Within the wind farm boundary, 18 farmsteads appear on the 1879 atlas map, but only nine appear to correlate with currently existing farms. The 1907 USGS maps show a total of 30 structures within the wind farm boundaries, of which 9 appear to still be present.

3.5.1 Summary

Based on the review of the project and surrounding area, only one site on the National Register of Historic Places is within 5 miles of the project area. Photosimulation shows only 3 turbines are visible from the registered site (Photosimulation 5 in OPSB Application). Unlike many wind farms where turbines are sited on the highest land, the Hardin County North wind farm is located almost entirely within an historic wetland, Hog Creek Marsh. Therefore the turbines will be located on elevations that are slightly below the surrounding area that will serve to slightly reduce the visual impact compared to many other wind farms.

No historic bridges or cemeteries are within the project area. The project area is sparsely populated with only 9 residences within the Project boundary. Most of the structures demonstrated a significant amount of physical alterations that do not complement the original building designs. Recent renovations include replacement siding, doors, windows, and roofing materials, and several properties had entranceways and windows covered or bricked in. The extent of the alterations varied greatly from structure to structure.

Community acceptance of the proposed project has been positive. No negative feedback was received regarding visual impacts at the Applicant's informational meeting on June 30, 2009 where a video simulation of an aerial wind farm tour was shown. The Applicant's booth at the Hardin County Fair in 2009 drew many local citizens and no negative comments about the appearance of the Facility or wind turbines in general were received. The Project is an agricultural area where tall facilities such as silos and grain elevators are accepted as part of the architecture on working land. Turbines, while much taller, are often similarly viewed by agricultural communities who often accept them as a part of an agricultural landscape.

The greatest visibility will be on site. The unincorporated community of Dola is the closest settlement. The view is already dominated by very tall concrete silos. The villages of Dunkirk and Ada are 2 - 4.5 miles from the facility. Photosimulation 7 in OPSB Application shows at 2.77 miles, turbines have no more impact than power poles along public roads.

At the OPSB public hearing held January 27, 2010, no negative comments were received from the public. Despite several opportunities, no community concern has been expressed about wind turbines adversely affecting the community interpretation of its history.

Overall, research into the literature, historic records, on-site inspection, and public input revealed no evidence that this location or the proposed project is considered by the community as adversely affecting their visual or cultural environment by installation of turbines. The intensity of the additional data gathering has been designed to be commensurate with these factors.

4.0 RESEARCH APPROACH

4.1 PROJECT AREA

4.1.1 Description

The Project area contains only 9 homes or farmsteads. A high number of frame homes of vernacular buildings from the late nineteenth to early twentieth centuries exist within the project and general area. Some of the more common recognizable architectural styles observed include Italianate, Colonial Revival, and Four Square variants. Most of the wood-frame structures observed have been heavily altered with replacement doors, windows, roofing, and siding (Photos 1, 2, 3).



Photo 1. Farmhouse at 9224 CR 14, facing southeast



Photo 2. Farmhouse at 9389 CR 14, facing northwest



Photo 3. Farmhouse at 2257 CR 113, facing west

4.1.2 Visibility

Turbines will be close to these homes and highly visible within this area.

4.2 THE UNINCORPORATED COMMUNITY OF DOLA

Dola, Ohio, is a small unincorporated settlement with a population of 456, located near the eastern terminus of the proposed Hardin County Wind Farm footprint. The skyline of Dola is dominated by a series of large concrete grain elevators that are situated near the center of town (Photo 4), which may block a view of some of the turbines proposed to be erected north of Dola. No previously documented OHI properties for Dola were found. Most of the structures appear to date from the late nineteenth to early twentieth century and are of vernacular construction. These structures exhibit a moderate to severe amount of alteration including replacement doors, windows, siding, and roofing. A few surviving single-family dwellings were observed that appear to be relatively unmodified. One notable example of a standing structure in Dola is a late nineteenth-century wood-frame church that had survived relatively unscathed until its historic integrity was disrupted by recent conversion to a garage/storage facility (Photo 5).

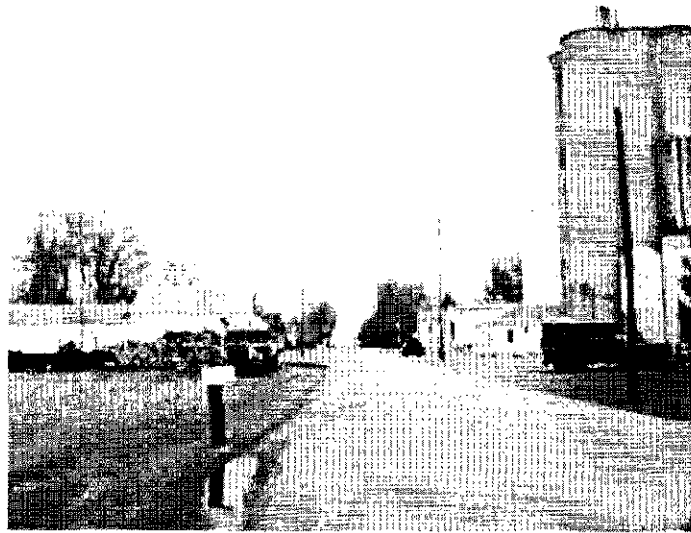


Photo 4. Main Street, Dola, facing south



Photo 5. Former church on Anthony Street, Dola, facing northwest

4.2.1 Visibility

Due to its proximity to the proposed wind farm, turbines will be visible to inhabitants of Dola to the north and the west. (Photosimulation 4 in OPSB Application).

4.3 THE VILLAGE OF DUNKIRK

4.3.1 Description

The town of Dunkirk, Ohio, is situated *near* the eastern periphery of the history/architecture study area around the Hardin County Wind Farm. As of the 2000 census, Dunkirk had a population of 952. No previously documented OHIs were on file at the OHPO for properties in this town. Dunkirk retains a high percentage of mid-to late-nineteenth century buildings, many of which are brick Italianate structures. The downtown commercial district of Dunkirk features several late nineteenth century examples of Italianate and Romanesque Revival storefronts (Photo 6). Some of these structures have been heavily altered, including replacement windows and doors. Some of the observed modifications to these structures included the alteration of window and door placements. While most of Dunkirk is dominated by structures of vernacular style, there are several examples of high style late Victorian architecture.

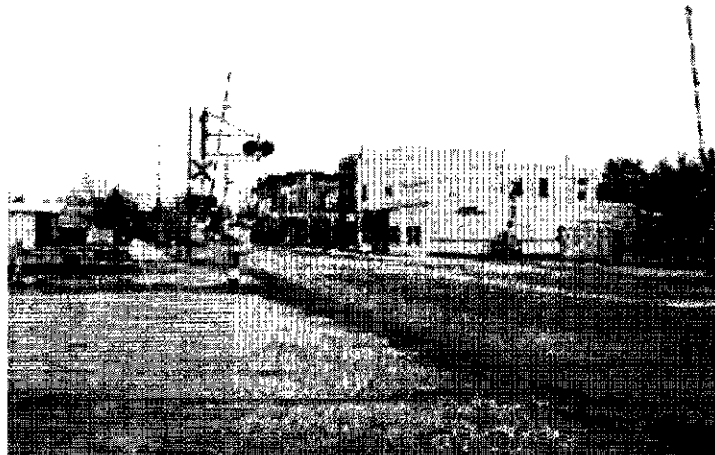


Photo 6. Main Street, Dunkirk, facing northeast

4.3.2 Visibility

Dunkirk is 2 miles from the nearest turbine and some turbines will be visible to the north and west of the village. In some locations photosimulations show that no turbines will be visible due to the distance from the village and structures within the village blocking a view of the turbines (Photosimulation 3 in OPSB Application).

4.4 THE VILLAGE OF ADA

4.4.1 Description

The only community in Liberty Township is the town of Ada, originally platted in 1853 as Johnston, and located in the western part of the township. The population of Liberty Township in 1840 was 170 people, which increased dramatically to 3,295 people by 1880, likely because of the town of Ada and the 1871 establishment of Ohio Northern University (Howe 1888). Ada is a town of approximately 3,500 people located near the western edge of the history/architecture study area. This town features a high percentage of surviving Victorian architecture and is home to Ohio Northern University. A total of 57 previously documented OHIs were listed for the town of Ada, including the NHRP-listed property Ada Pennsylvania Passenger Station and Railroad Park.

While the town of Ada does possess a number of relatively unmodified historic structures, including the Ada station and most of its churches, most of the built environment has been heavily altered (Photo 7). Streetscape observation of Main Street demonstrates that nearly all of the first-story levels of the commercial structures in downtown Ada have been heavily modified. Many of the single-family dwellings on the secondary streets have been subjected to typical replacement of doors, windows, and siding. However, it appears that many brick structures in the town have survived relatively unmodified. The dominant architectural style of the previously documented 57 OHI properties in Ada is Italianate, accounting for 23 of the 57.



Photo 7. Main Street, Ada, Presbyterian Church (OHI HAR-165-1) facing northwest

4.4.2 Visibility

Depending on the location in the village, it is approximately 2.25 - 4.5 miles distant from the nearest proposed turbine. While visible at this distance, wind turbines will not dominate the landscape as demonstrated by the Photosimulation from the Ada Train Depot (Photosimulation 5 in OPSB Application). The east side of Ada that is east of the train depot is occupied by an industrial park. Like Dunkirk, many locations will be prevented from visual contact with wind turbines due to taller buildings, trees, and structures blocking the view, i.e. Ada water towers (Photo 8).



Photo 8. View from Ada Train Depot parking lot facing east.

4.5 STUDY DESIGN

The project will involve a tract of land where as many as 27 V-90 wind turbines will be sited. In general, the turbines will be positioned with approximately 2000 feet of space between each turbine. At wind power electricity-producing installations, the V-90 is mounted on a tubular steel tower. The towers will be 100 meters, or approximately 328 feet, high. An overall tower height of 492 feet which includes 50 meters of blade height, has been used to guide the scope below, in terms of thinking about what the likely visual effects of the towers will be and what magnitudes of visual effect will occur at what distance.

The Study Area

The proposed turbines will have a direct impact on their proposed footprint. The literature review showed that the turbines will have little visual impact on towns 2 to 5 miles away from the nearest turbine, with most of the properties located within three towns. As a result, this revised scope proposes a study area that includes the actual footprint of the turbines and areas within the towns of Dola, Dunkirk, and east side of Ada near train depot.

Survey Methodology

Hardlines Design Company (HDC) will fill out a survey table for all properties built 1960 or before in the footprint area. In addition, the most significant and high-integrity properties will be covered with an OHI form/electronic I-form application. These properties could include dwellings, farmsteads, schools, and churches that have the highest level of integrity and that represent significant property types in the area.

5.0 REPORT

HDC will complete a survey report with National Register eligibility recommendations of the properties that received OHI forms/electronic I form applications. The OHI forms and photos will be presented in appendices. OHI forms will be filled out using the I-form application, except for any update and short forms, which will most likely be completed using an MS Word template.

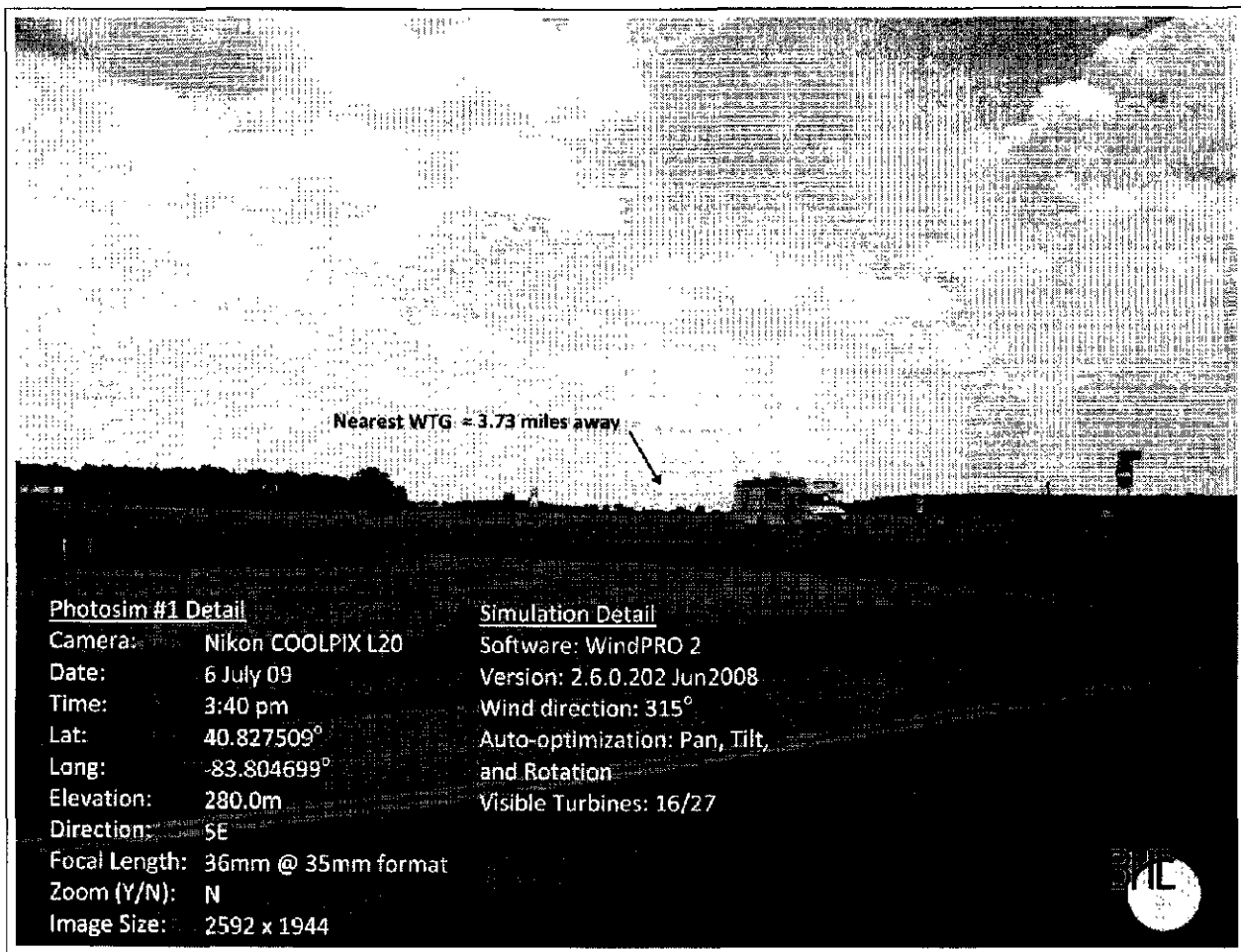
6.0 LITERATURE CITED

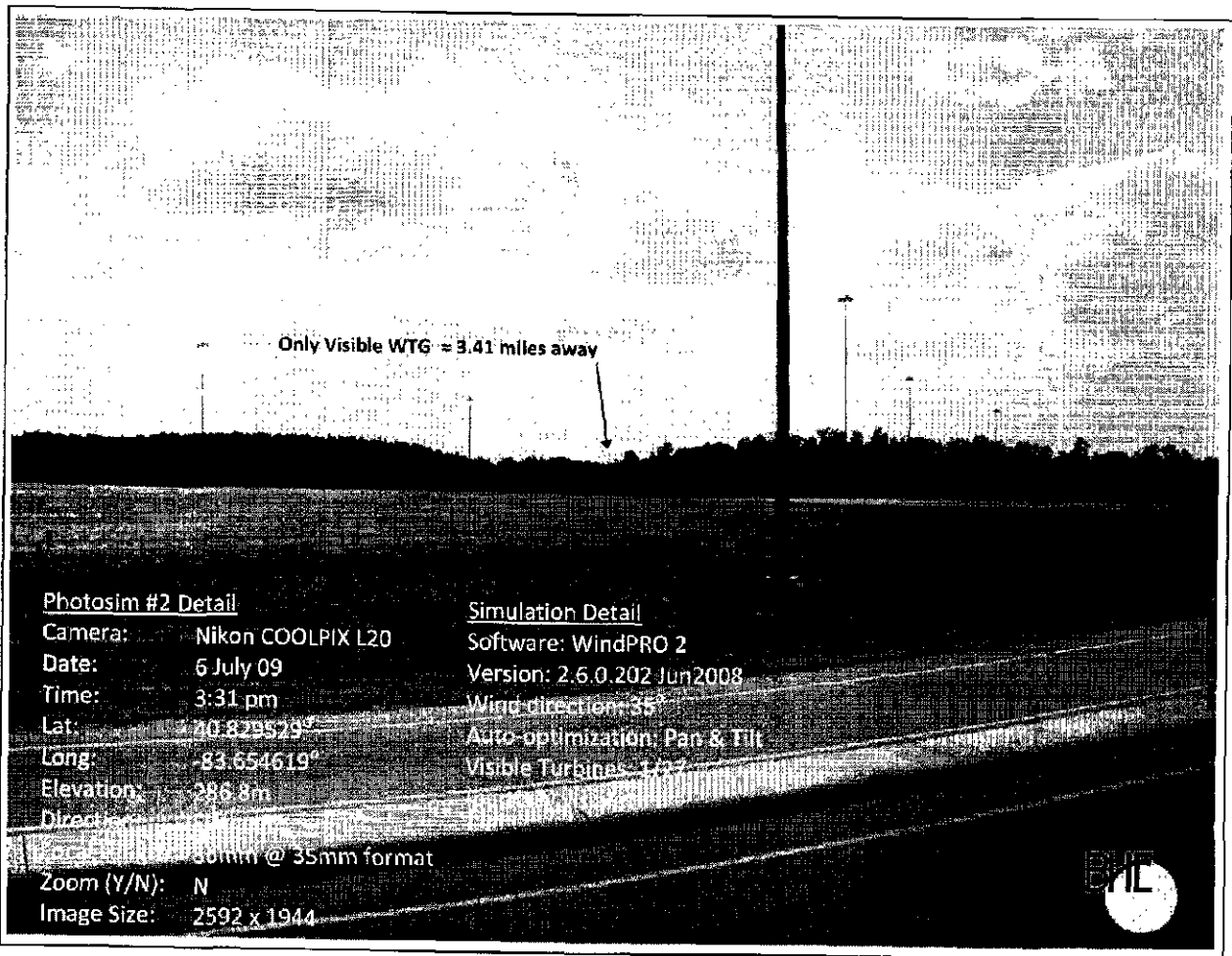
BHE Environmental (Archival research and on-site inspection by Hardlines Design Co.)
2009 *History/Architecture and Archaeological Literature Review for the JW Great Lakes Wind, LLC, Proposed Hardin County North Wind Farm Washington and Liberty Townships, Hardin County, Ohio*. Submitted with Ohio Power Siting Board Application August 14, 2009.

Howe, Henry
1888 *Historical Collections of Ohio in Two Volumes: Volume 1*. C. J. Krehbiel & Co., Cincinnati, Ohio.

Ohio Department of Development
2007 *Hardin County Profile*. Information Sheet. Ohio Department of Development, Office of Policy, Research and Strategic Planning, Columbus, Ohio.

Attachment
Photosimulations





Photosim #2 Detail

Camera: Nikon COOLPIX L20

Date: 6 July 09

Time: 3:31 pm

Lat: 40.829529°

Long: -83.654619°

Elevation: 286.8m

Distance: 30mm @ 35mm format

Zoom (Y/N): N

Image Size: 2592 x 1944

Simulation Detail

Software: WindPRO 2

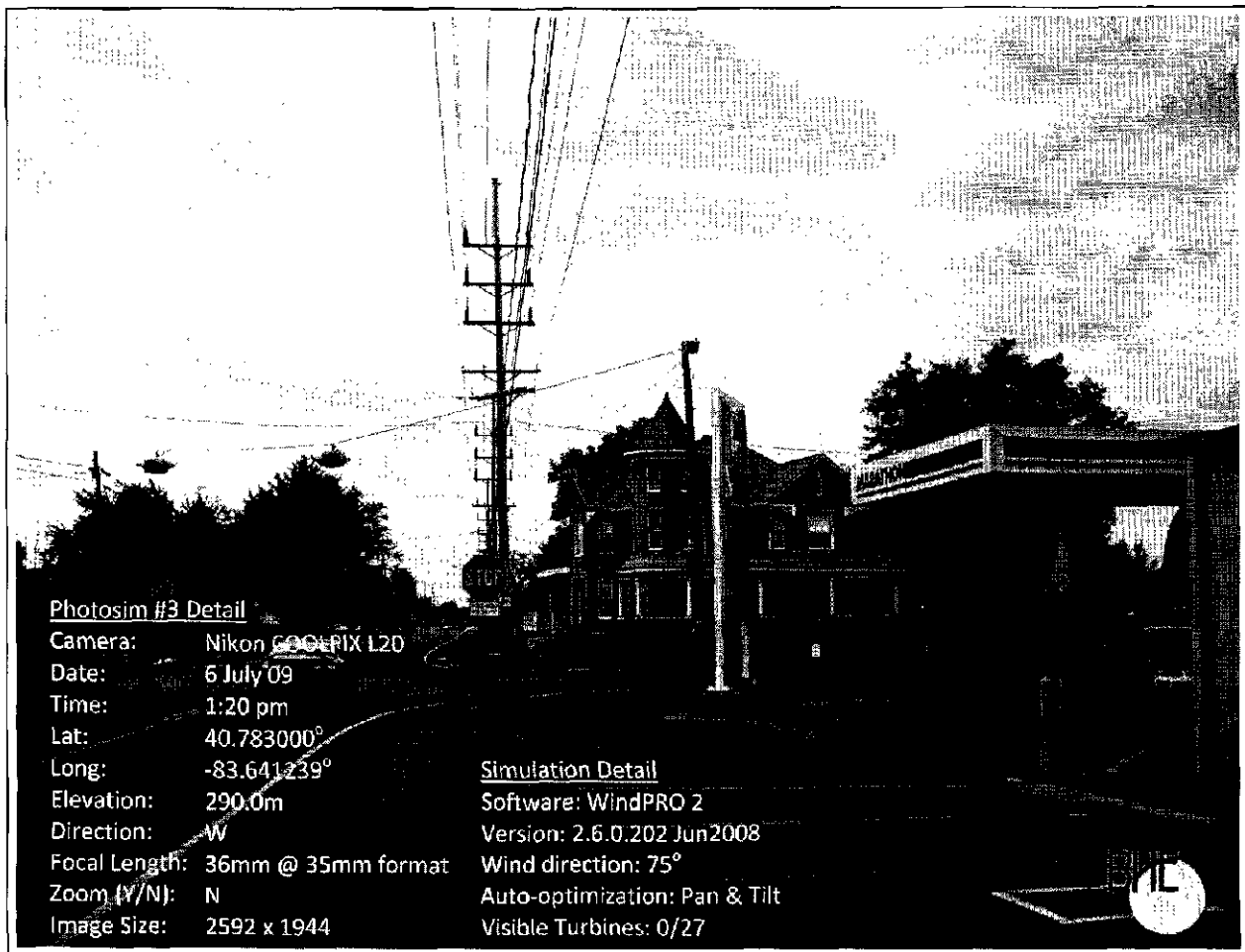
Version: 2.6.0.202 Jun2008

Wind direction: 35°

Auto-optimization: Pan & Tilt

Visible Turbines: 1/27





Photosim #3 Detail

Camera: Nikon COOLPIX L20

Date: 6 July '09

Time: 1:20 pm

Lat: 40.783000°

Long: -83.641239°

Elevation: 290.0m

Direction: W

Focal Length: 36mm @ 35mm format

Zoom (Y/N): N

Image Size: 2592 x 1944

Simulation Detail

Software: WindPRO 2

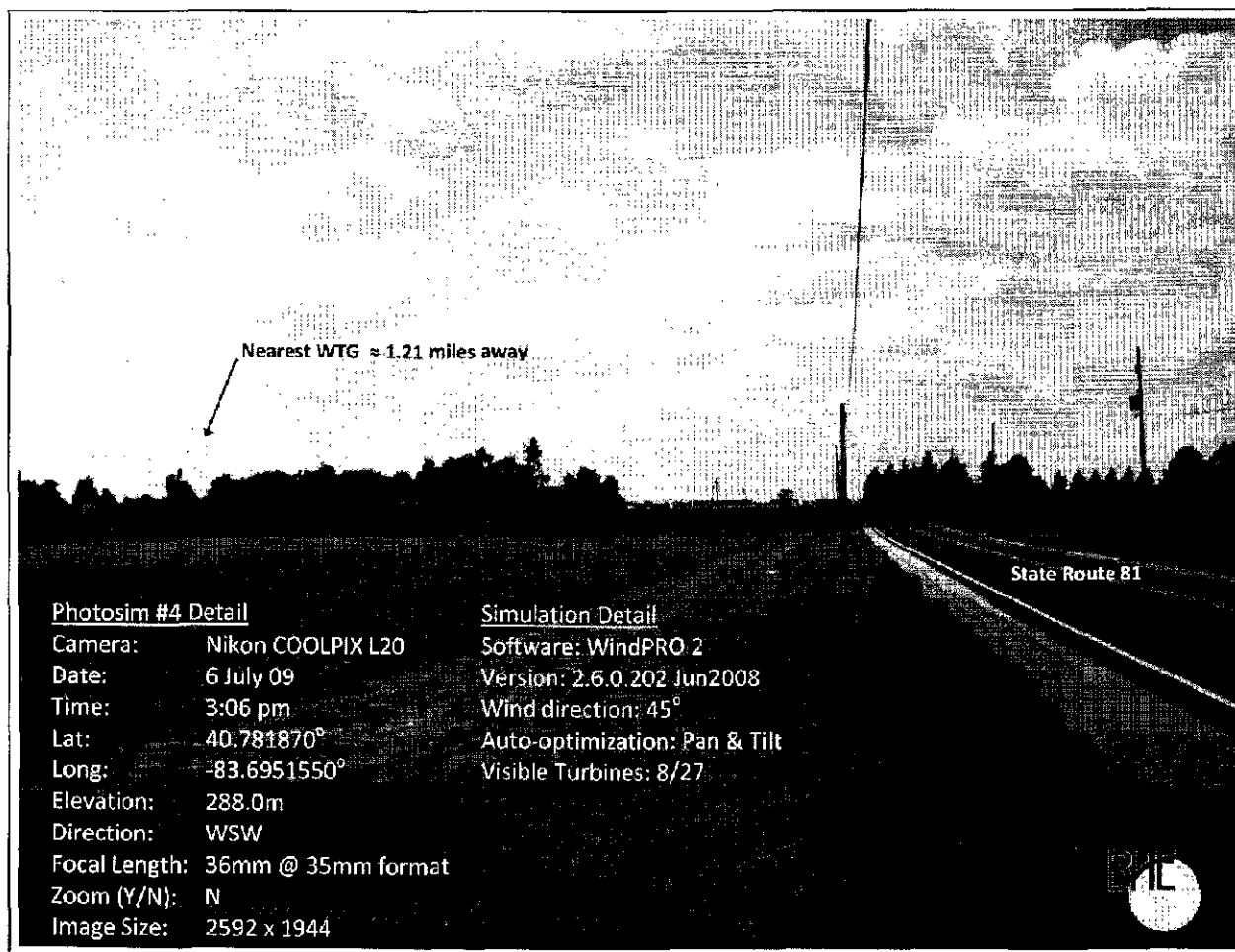
Version: 2.6.0.202 Jun2008

Wind direction: 75°

Auto-optimization: Pan & Tilt

Visible Turbines: 0/27





Photosim #4 Detail

Camera: Nikon COOLPIX L20
Date: 6 July 09
Time: 3:06 pm
Lat: 40.781870°
Long: -83.6951550°
Elevation: 288.0m
Direction: WSW
Focal Length: 36mm @ 35mm format
Zoom (Y/N): N
Image Size: 2592 x 1944

Simulation Detail

Software: WindPRO 2
Version: 2.6.0 202 Jun2008
Wind direction: 45°
Auto-optimization: Pan & Tilt
Visible Turbines: 8/27

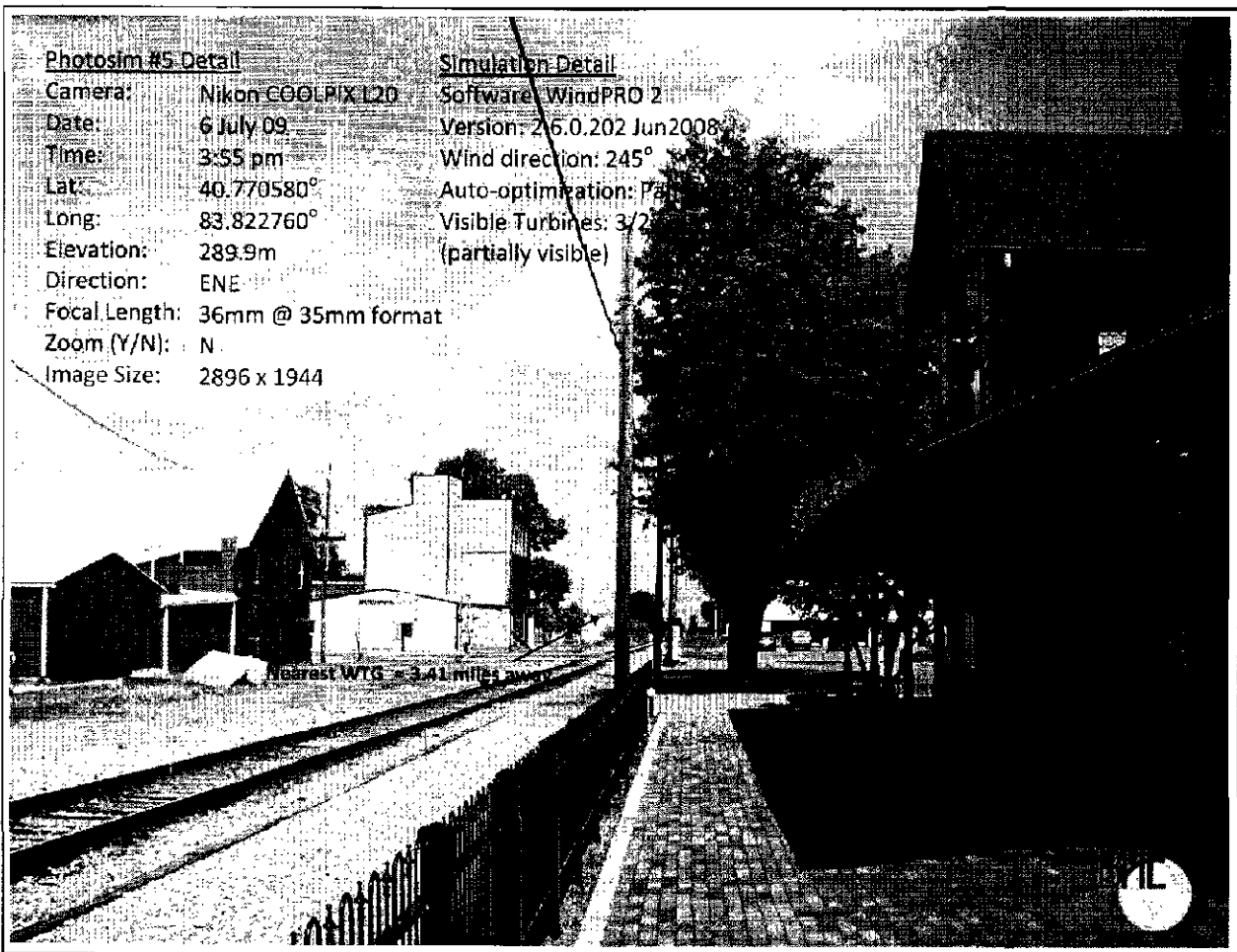


Photosim #5 Detail

Camera: Nikon COOLPIX L20
Date: 6 July 09
Time: 3:55 pm
Lat: 40.770580°
Long: 83.822760°
Elevation: 289.9m
Direction: ENE
Focal Length: 36mm @ 35mm format
Zoom (Y/N): N
Image Size: 2896 x 1944

Simulation Detail

Software: WindPRO 2
Version: 2.6.0.202 Jun2008
Wind direction: 245°
Auto-optimization: Partial
Visible Turbines: 3/2
(partially visible)



Photosim #6 Detail

Camera: Nikon COOLPIX L20

Date: 6 July 09

Time: 4:08 pm

Lat: 40.715913°

Long: 83.761821°

Elevation: 300.0m

Direction: NNE

Focal Length: 36mm @ 35mm format

Zoom (Y/N): N

Image Size: 2592 x 1944

Simulation Detail

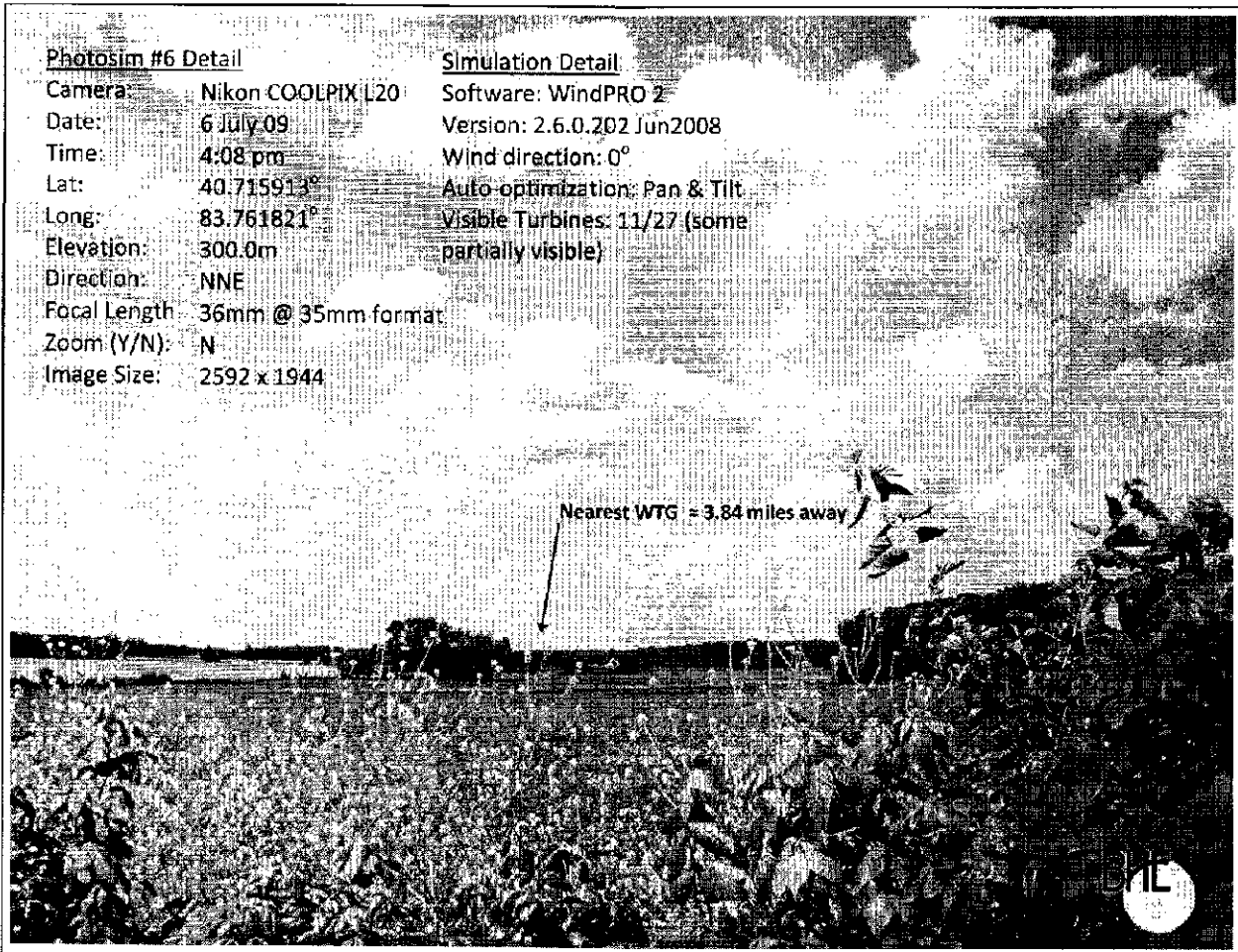
Software: WindPRO 2

Version: 2.6.0.202 Jun2008

Wind direction: 0°

Auto-optimization: Pan & Tilt

Visible Turbines: 11/27 (some
partially visible)



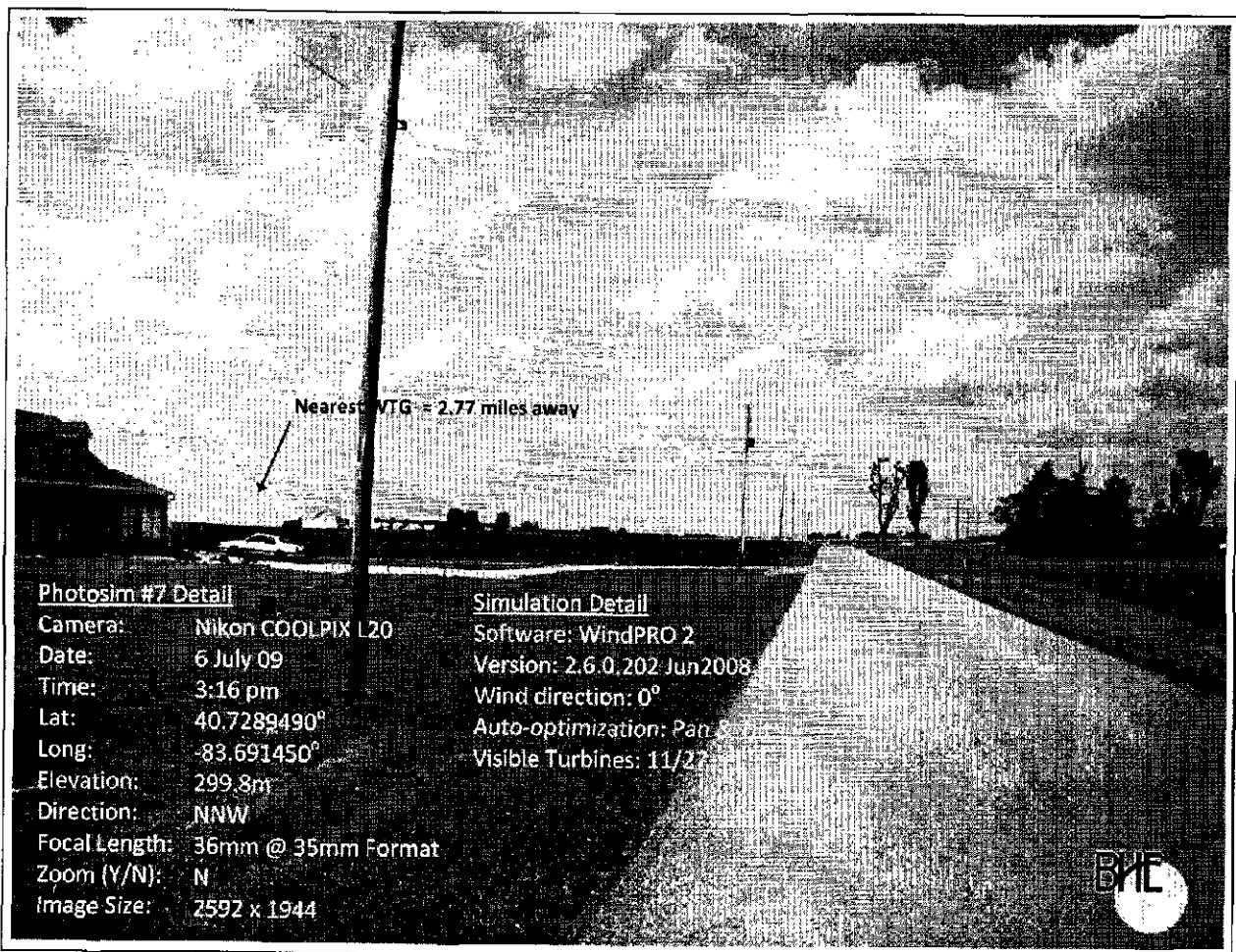
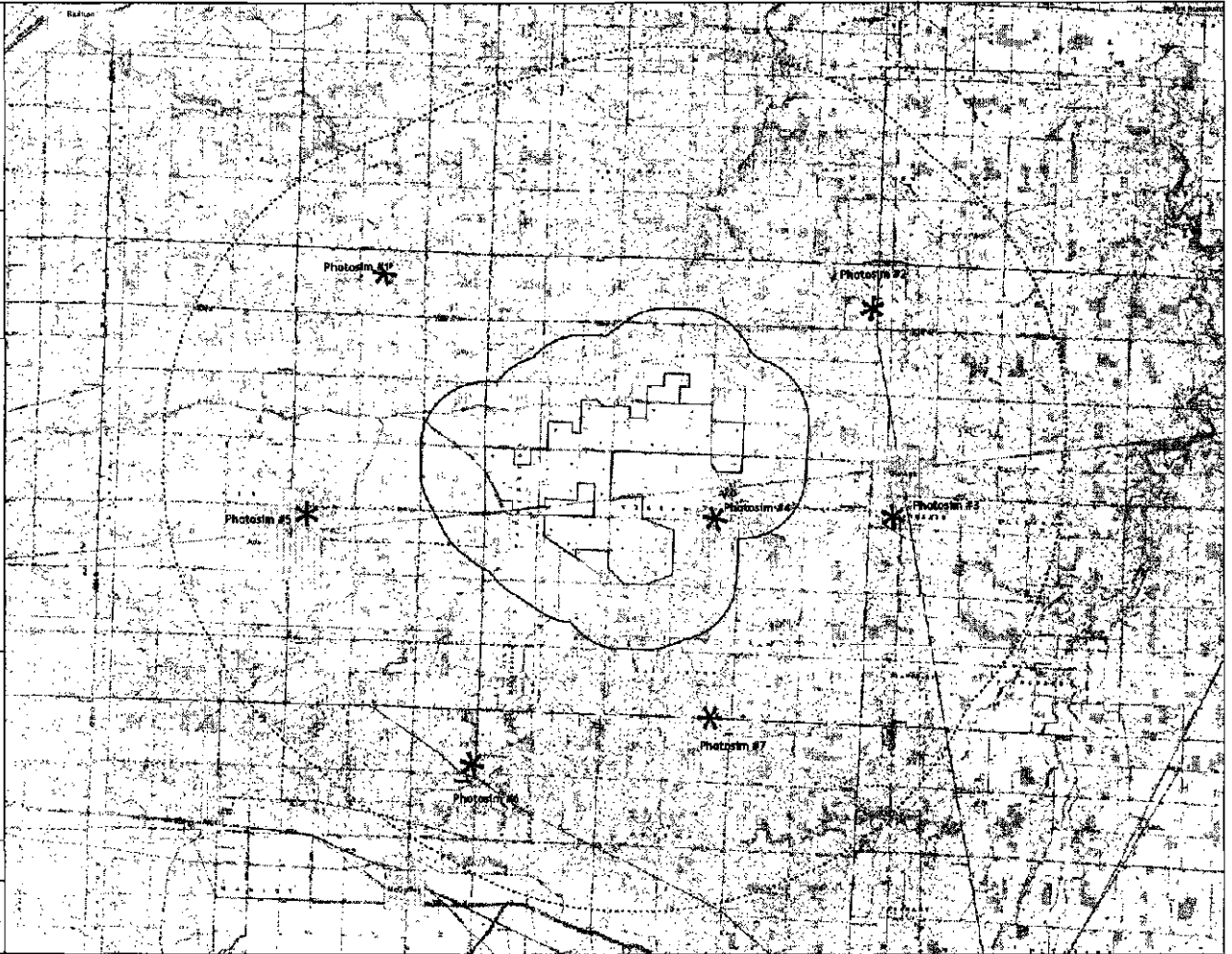




Photo Simulation Locations,
JW Great Lakes Wind
Hardin North Project, Ohio.

- Legend
- * Photosim Location
 - V90 Turbine
 - 1-mile buffer
 - 5-mile buffer
 - Property Boundary



09-277-EL-BGM

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OHIO DEPARTMENT OF NATURAL RESOURCES TERRESTRIAL WIND
ENERGY VOLUNTARY COOPERATION AGREEMENT WITH
JW GREAT LAKES WIND, LLC

The Ohio Department of Natural Resources (ODNR) seeks to coordinate wind energy projects with the wind energy developer JW Great Lakes Wind, LLC (Cooperator) in order to work collaboratively to ensure that wind-energy development project sites are developed in both an environmentally conscientious manner and with best regard to the conservation of the State's wildlife resources.

Whereas, the ODNR under its jurisdiction from Ohio Revised Code §§ 1531.08, 1533.07, 1533.08, and 1518.02 (Powers of Division of Wildlife, Protection of Non-game Birds, Permits, and Powers of Division of Natural Areas and Preserves Endangered Species) has authority to protect, propagate, manage and preserve the game or wildlife and native plants of this State and to enforce, by proper actions and proceedings, the laws of this State relating thereto.

Whereas, both the ODNR and Cooperator support renewable energy initiatives and are dedicated to arriving at uniform guidance, in the absence of comprehensive state regulations, on how best to avoid, minimize, and/or mitigate potentially adverse impacts to wildlife and native plant resources.

Whereas, the ODNR and Cooperator, in an effort to best avoid, minimize, and/or mitigate potential adverse impacts with specific intent to birds and mammals, have entered into this Cooperation Agreement in an effort to standardize wildlife monitoring protocols and wildlife impact review methods associated with wind-energy development projects in a mutually beneficial and flexible manner and with high regard to both parties goals, objectives, and purviews.

This Cooperation Agreement applies specifically to birds and bats throughout the entire lifetime of wind power projects from pre-construction through end of operations, as these animals are of concern for all wind power projects. Impacts to other State- or Federally-listed species will be addressed principally during the siting and pre-construction phase of wind projects, and possibly during later phases depending on the project location and onsite habitat. Any necessary measures or surveys to address impacts to other listed species will be provided by ODNR through the ODNR Environmental Review Process.

Therefore, the ODNR and Cooperator enter into this Cooperation Agreement based on the following terms and conditions:

1. (a) The Cooperator has or will notify the ODNR of any potential wind energy development sites of or above 10MW or 5 turbines (or an expansion of an existing site with the addition of 5 or more turbines or 10MW), at least eighteen months, preferably as early as possible, prior to construction. The notification prior to the initiation of construction at the site will allow the ODNR to review and provide as much known information on bird and mammal resources, as well as other information such as impacts on other wildlife, plants, wetlands, streams, coastal areas, and geologic substrate and slope stability, which may be present and/or potentially impacted by the development of the proposed wind-energy project. The notification should include a brief narrative of the project's planned development and proposed construction times and include as much detailed information as available such as: an original copy of the U.S.G.S. topographic map(s) depicting the proposed project area boundary limits with the quadrangle name and associated county identified on it, the proposed project site's general infrastructure delineations (both known and planned) to include access roads, electric transmission lines, wind turbine locations, planned surface impact areas needed to support construction, development and future maintenance of the project, and any known wetland areas or predetermined wildlife habitat regimes which are deemed to be of critical importance or high value.
- (b) The Cooperator shall request a scientific collectors permit at least fourteen months, preferably as early as possible, prior to construction. ODNR agrees to issue a scientific collectors permit in accord with Ohio Revised Code §1533.08 (and further defined under Ohio Administrative Code Section 1501:31-25-01 and 02), defining the terms and conditions for use throughout the project area by the Cooperator's designated biologist(s) for all bats, birds,

and state-listed threatened or endangered species which are collected while conducting the ODNR's approved monitoring plan and mortality protocol. The scientific collectors permit may be automatically renewed upon the anniversary date of the permit, providing further that the permit terms and conditions have been strictly adhered to and this Cooperation Agreement remains in effect.

- (c) For those projects which the Cooperator has already initiated prior to the effective date of this agreement and are planned for construction prior to the eighteen-month time frame noted herein, the Cooperator shall submit the required information as requested in Paragraph 1 (a) and request a permit as required by Paragraph 1 (b), within ninety days (90) from the date of this Agreement, preferably as early as possible.
 - (d) For those projects which are currently under construction prior to the date of this Agreement, the Cooperator shall only be required to comply with the monitoring efforts referenced within Paragraph 6 that pertain to assessing post-construction bird & bat mortality. Further, within 90 days of the Agreement date, the Cooperator shall provide to the ODNR a listing of all other projects or phases of projects that are planned for construction to begin within 18 months from the date of this Agreement. The listing will include all available site-specific project information as more clearly specified within this paragraph for each project identified on the list. For each project identified on the list where construction commences within 18 months from the date of this Agreement, the Cooperator shall be required to comply with the monitoring efforts referenced within Paragraph 1 (a) and 6 that pertain to assessing post-construction bird & bat mortality.
- 2. It is understood between the Cooperator and ODNR that both parties may support the use of other potential funding mechanisms or processes which directly or indirectly reduce the overall costs associated with the Cooperator's monitoring requirements as identified herein providing further the intent of those monitoring requirements remain the same.
 - 3. The ODNR and Cooperator will share all relevant information concerning wildlife and resources under the jurisdiction of the ODNR in and around the project area and the potential adverse impact to those resources. Shared information will include all known publicly available data from past/current/future monitoring efforts and pre- and post-construction study results relative to the subject project area. The ODNR further agrees to

consider all existing relevant wildlife resource information provided by the Cooperator and the ODNR will reduce to the fullest extent possible any further requests made to the Cooperator to provide additional relevant data and/or monitoring results which can be ascertained from known existing data regarding potential known wildlife impacts.

4. The ODNR will provide the Cooperator with the results of all its internal reviews and provide written comment and/or meet with the Cooperator within 45 days of receiving the information specified in Paragraph 1, as well as the results of the Ohio Natural Heritage Database, and all pre- and post-construction monitoring methods and recommendations on how best to avoid and reduce direct and indirect impacts to wildlife. Additional coordination will occur from the ODNR for actions needed in regards to species listed in the Ohio Comprehensive Wildlife Conservation Strategy (CWCS) to include all state threatened and endangered wildlife species known to occur or determined to exist within or adjacent to the project area.
5. The ODNR in consultation with the Cooperator will determine the risk level for monitoring and survey efforts. The Cooperator agrees to conduct monitoring according to the attached protocol, unless otherwise directed by the ODNR. The ODNR may request the Cooperator conduct an additional year's post-construction monitoring if a state or federally listed threatened or endangered species is killed or other mortality is deemed to be at an unacceptable level for any species. The Cooperator may request a reduction in the mortality monitoring effort for the second year based on the first year's mortality results. Such a request by either party for additional or reduced monitoring shall be made in writing by the party requesting a change and an informal meeting will be arranged between the parties to discuss and mutually agree upon any changes in monitoring efforts.
6. All suggested pre-construction and some post-construction monitoring protocol are designed to reduce the exposure of state-listed species in order to avoid, minimize or mitigate potential adverse risk to species of special concern, through the collaborative efforts of both the Cooperator and ODNR. Attached to this Agreement, and included by reference herein, are protocols for monitoring bird and bat populations in and around wind-energy development project sites during both pre- and post-construction time periods and protocols for assessing bird and bat mortality at wind-energy facilities after they begin operating (Exhibit A, version dated May 4, 2009 with revised mitigation measures language). The ODNR will use all

available information, including site-specific project plans provided by the Cooperator as described in Paragraph 1, to identify the level of monitoring needed for a proposed project where the intensity or duration of monitoring described in Exhibit A is associated with site priority or other assessment of risk. In general, Cooperators will be expected to monitor site use by wildlife, primarily raptors, breeding and migratory birds and bats. Project-specific information will be used to determine the intensity or necessity of such surveys with the goal to provide reliable biological data to define wildlife use of the project area and make recommendations to decrease or eliminate potential adverse impacts to wildlife resources. The goals of post-construction bird and bat mortality monitoring are to (1) determine if project operations are causing an unacceptable level of impact so that additional minimization or mitigation measures can be employed if needed, and (2) assess the predictive value of pre-construction monitoring, minimization and avoidance measures by comparing those results with post-construction mortality.

The ODNR and Cooperator have agreed to a scope of work based on the protocols in Exhibit A for all wind energy projects currently in development (Exhibit B) and mutually agree to review details of the scope of work for any future modifications proposed by the Cooperator for these projects.

7. Cooperator agrees to utilize to the greatest extent possible, all reasonable and feasible generally accepted wind industry and ODNR best management practices relevant to the conservation of wildlife resources during construction and subsequent operation of the wind-energy facility. The ODNR shall provide URL links to or copies of all known and updated best management practices to the Cooperator on an annual basis.
8. The ODNR agrees not to pursue liability against the Cooperator due to any incidental takings of the State's bird, mammal or native plant resources for which it has purview under Ohio Revised Code §§ 1531.08, 1533.07, 1533.08 and 1518.02 (Powers of Division of Wildlife, Protection of Non-game Birds, Permits, and Injury to Endangered Native Plants) as a result of the Cooperator's wind-energy development and operations within the State of Ohio providing further such incidental takings were not malicious in their intent and the Cooperator remains in compliance with the terms and conditions of this Agreement and has with a good faith effort avoided and minimized potential adverse impacts by way of implementing best management practices and ODNR guidance as noted herein.

The ODNR and Cooperator agree to work cooperatively in the future to avoid, and minimize further impacts to the State's bird and mammal resources as new relevant project information becomes available. In the event that an incidental take occurs upon an Ohio listed threatened or endangered species of bird or mammal during the operation of any of the Cooperator's wind-energy facilities, the Cooperator agrees to take all reasonable best management practices, including: painting turbine blades, feathering, minimizing lighting, burying collection lines, curtailing during high risk periods, decommissioning turbines no longer in operation, and enhancing off-site habitat areas; as deemed appropriate by the ODNR and the Cooperator to further avoid, minimize and/or mitigate such wildlife losses in the future.

9. ODNR recommendations or decisions under the Cooperation Agreement do not supersede any comments, decisions, or recommendations of the United States Fish & Wildlife Service.
10. The Cooperator agrees to provide coordinated access to ODNR, upon 24-hour prior notice during normal business hours, to all its wind-energy facilities, during the pre-construction and operational life of the wind-energy facility, as deemed necessary by ODNR staff in order to ensure both parties' compliance to this Agreement. All ODNR access shall be subject to all the normal safety measures implemented by the Cooperator with regard to access to the facility.
11. Either party upon their own discretion and reason can terminate this Agreement in its entirety after having first provided the other party written notification of such termination forty-five (45) days in advance of such termination date. Said written notification to be sent certified mail to the respective parties' place of address as noted herein. Termination can be conditioned to exclude those projects identified, which remain in compliance with the Agreement.
12. It is understood between the parties that information resulting from the Cooperator's compliance with this Agreement shall be treated with the highest affordable level of confidentiality available unless otherwise agreed to in writing by both parties, or if it is necessary to support the ODNR's waiver of liability set forth in Paragraph 8 hereof. It is the intent of both parties to release to the general public relevant project monitoring &

mortality information deemed to be in the best interest of both the ODNR and Cooperator. Release of information will be by mutual consent only in accordance with applicable law.

13. **Assignment:** The Cooperator may assign this Agreement, or any project covered under the terms of this Agreement, to any affiliate (as defined below) without the approval or consent of the ODNR provided that (i) the Cooperator is not in default of this Agreement with respect to the project(s) being so assigned at the time of the proposed assignment and (ii) the Cooperator notifies the ODNR of any proposed assignment in accordance with this Agreement. The Cooperator may assign this Agreement, or any project covered under the terms of this Agreement, to any non-affiliate (as defined below) provided that (a) the Cooperator is not in default of this Agreement with respect to the project(s) being so assigned at the time of the proposed assignment, (b) the proposed assignee has agreed in writing to be bound by all of the terms and conditions of this Agreement, (c) the ODNR has met with the proposed assignee and the Cooperator, after being notified of the proposed assignment, to discuss the terms and conditions of the project(s) covered by the assignment, and (d) the ODNR consents to the proposed assignment in writing, which consent shall not be unreasonably withheld, conditioned or delayed. For purposes of this section, an "affiliate" of the Cooperator refers to any person, corporation or entity that (i) has a direct or indirect ownership interest in the Cooperator or vice versa or (ii) is subject to common operating control and is operated as part of the same system or enterprise as the Cooperator. Any person, corporation or entity that is not an "affiliate" as defined above shall be a non-affiliate for purposes of this section. At the request of the Cooperator, the ODNR and the assignee shall execute, after said assignment is approved if required, a new Agreement with terms identical to the terms of the Agreement at the time of the assignment.
14. **Notices.** All notices, demands or requests required or permitted under this Agreement shall be in writing and shall be personally delivered or sent by certified United States mail (postage prepaid, return receipt requested), overnight express mail, courier service, facsimile transmission or electronic mail with confirming receipt (in the case of facsimile transmission and electronic mail with the original transmitted by any of the other aforementioned delivery methods) addressed as follows:

If to ODNR to:

Ohio Department of Natural Resources
Office of Legal Services
Building D-3
2045 Morse Road
Columbus, OH 43229

and

If to Cooperator to:

Ralf M. Krueger, CEO
JW Great Lakes Wind
Tower Press Building
1900 Superior Avenue, Suite 333
Cleveland, Ohio 44114-2148

or to such other person at such other address as a Party shall designate by like Notice to the other Party. Unless otherwise provided herein, all Notices hereunder shall be effective at the close of business on the Day actually received, if received during business hours on a Business Day, and otherwise shall be effective at the close of business on the first Business Day after the Day on which received.

15. No Third-Party Beneficiaries. This Agreement is not intended to, and does not confer upon any Person other than the Parties hereto and their respective successors and permitted assigns, any rights or remedies hereunder.
16. Entire Agreement. This Agreement, including all Protocols hereto, constitutes the entire agreement between the Parties hereto with respect to the matters contained herein and therein, and all prior agreements with respect to the matters covered herein are superseded, and each Party confirms that it is not relying upon any representations or warranties of the other Party, except as specifically set forth herein or incorporated by reference hereto.

17. Amendment. This Agreement and the attached protocols may only be amended or modified in writing by the mutual consent of the Parties hereto.

IN WITNESS WHEREOF, ODNR and Cooperator have caused this Agreement to be duly executed and have caused their seals to be hereto affixed and attached by their proper officers, all hereunto duly authorized, on the date first above written.

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE

ATTEST:

Sean D. Logan
Sean D. Logan
Director, Department of Natural Resources

5.4.09

Date

David M. Graham
David M. Graham
Chief, Division of Wildlife

5-4-09

Date

Steve Maurer
Steve Maurer
Chief, Division of Natural Areas & Preserves

5/4/09

Date

COOPERATOR

ATTEST:

Ralf M. Krueger
Ralf M. Krueger
Chief Executive Officer
JW Great Lakes Wind, LLC

05
09. 2009

Date

On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for
Commercial Wind Energy Facilities in Ohio

An Addendum to the Ohio Department of Natural Resource's Voluntary
Cooperative Agreement

The following protocols are meant to establish a standardized framework in which pre- and post-construction surveying should be conducted at proposed commercial wind turbine facilities within the state of Ohio. The Ohio Department of Natural Resources (ODNR) will assess the level of surveying effort required within the project area boundary limits (henceforth referred to as the "site"), based upon the information provided from section 1.(a) of the Cooperative Agreement, the habitat characteristics within the site (determined through a site visit by ODNR Division of Wildlife biologists and GIS analysis), and its proximity to focal points of bird and bat activity. Additional surveys for species other than birds and bats may be requested based upon a review of the ODNR Division of Natural Areas and Preserves' natural heritage database. These studies are meant to document the level and timing of species activity, diversity and abundance. Results of the studies outlined within this document will allow the ODNR Division of Wildlife to assess the potential impact that a proposed turbine facility may have either directly through mortalities or indirectly through avoidance behaviors, on Ohio's wildlife resources. Post-construction mortality estimates will be used to validate or refute pre-construction predictions, and to determine if the use of mitigation measures is warranted in order to minimize impacts to wildlife. By having consistent study methodology among projects, over time a regional assessment may be formed for adjusting the methods or duration of the studies recommended.

The type of surveying recommended will be at the discretion of the ODNR Division of Wildlife, and will be tailored to the specific site, but may fit generally into one of the categories listed below. These survey types are to be cumulative, meaning if the "moderate" level of surveying is required, the survey techniques described in the "minimum" level must also be conducted. While this document is intended to serve as a guide for wind developers as they plan projects and determine the level and type of wildlife monitoring that is likely to be recommended, the ODNR Division of Wildlife reserves the right to be flexible in the application of these surveys based on site-specific or project-specific conditions.

- **Minimum**

These areas are large tracts of agricultural lands that do not come within 500 meters of a woodland ≥ 10 hectares, wetlands ≥ 3 hectares, or large water body (i.e., rivers, lakes or reservoirs).

- **Moderate**

Primarily agricultural or grasslands, with patches of forests, wetlands, and/or other habitat.

- **Extensive**

These include those areas within proximity to migratory corridors, staging areas, Audubon Important Bird Areas (IBAs), or the Lake Erie shoreline (3-mile buffer) (Fig. 1).

In an effort to standardize information collected among projects, data should be recorded on forms provided for each of the various types of recommended surveys for all pre- and post-construction monitoring activities. Completed forms should be returned to the ODNR Division of Wildlife at the conclusion of surveying. Weather data should be recorded during all types of surveying (e.g. temperature, relative humidity, cloud cover, wind speed and direction).

1. Minimum Surveying Effort

1.1. *Breeding birds*

While breeding birds in the eastern United States have not been shown to be at high risk of mortality from turbines within their territories, it is important to identify what species may be impacted through habitat disturbance or avoidance. Therefore, point-counts should be conducted at all proposed turbine locations, with 2 points established for each turbine. The first set of points should be ~ 100-meters from the turbine or any adjacent proposed turbine locations. The second set of points will be between 125 to 300-meters (distance assigned by ODNR on a site by site basis) from any proposed turbines. The 100-meter point will be used to assess those species that may be directly affected by construction of the turbine; the second point will be used to assess indirect impacts such as avoidance. Effort should be made to place all points in nearby undisturbed habitat that will remain post-construction. Habitat for the point-counts should be similar to that of the turbine location. Because of increased detectability, points within grassland habitats may be placed at every other turbine. If turbine locations have not yet been determined, 2 point-count locations should be established for the maximum number of turbines proposed. These points should be randomly stratified across the site relative to the proportion of individual habitat types. Generally, active agricultural fields are not considered suitable nesting habitat for most species of birds; thus, surveys do not need to be conducted at any point that falls within these areas. Point-count locations (GIS coverage and/or GPS coordinates) should be provided to the ODNR Division of Wildlife. Three 10-minute point-count surveys should be conducted at each point: 1 in May, and 2 in June.

Certain bird species do not frequently sing until later in the breeding season; given this reduced detectability, 1 additional point-count is required in July for sites with suitable habitat for the Henslow's sparrow, dickcissel, and/or sedge wren. These additional point-counts should be conducted on sites that contain or are directly adjacent to >50 hectares of contiguous grassland (for all 3 species) or >1 hectare of wet meadow or freshwater marsh (for sedge wren only).

All surveys should begin at approximately dawn and not extend past 10:00 a.m. EST. Surveys should be conducted by experienced personnel who are able to distinguish Ohio breeding bird species by sight and sound. All birds detected during surveys should be identified to species and their behavior, indications of breeding activity (refer to breeding bird atlas codes¹), estimated distance, and direction (bearing) should be recorded. Birds flying overhead that do not land or originate within 200-meters of the center of the point should be listed as "fly over." Observations should be recorded using appropriate alpha species codes². Incidental observations of state and federal threatened or endangered species (Table 1) should be noted regardless of whether detected with the given survey time or while at a point-count location. Due to reduced detectability, surveys are not to be conducted on mornings of heavy wind (>5 meters/second), prolonged periods of rain (>20 minutes), or fog. To assess avoidance of the project area after construction, surveys should be conducted 1 year prior to and 1 year post-construction.

For wind energy development projects proposed by Voluntary Agreement cooperators on sites deemed to pose minimum risk to wildlife resources only, breeding bird surveying can occur prior to construction and after submission of the associated permit application to the Ohio Power Siting Board (OPSB). Under these conditions, the ODNR Division of Wildlife will certify to the OPSB that these data are not required prior to evaluating the potential ecological impacts at the site of the proposed project. Submission of survey results to the ODNR Division of Wildlife must occur prior to construction, and post-construction monitoring, as noted above, is still required.

1.2. *Raptor nest searching*

One early season (1 February – 31 March) survey should be conducted on and within 1 mile of the proposed site. A 2-mile buffer should be used if the site is within 1 mile of large water bodies (lakes, rivers, or reservoirs) or wetlands >5 hectares as these areas have a higher potential for use by threatened or endangered species of raptors. The species and locations of nest sites should be marked on USGS 1:24,000 topographic quadrangles.

1.2.1. *Raptor nest monitoring*

Monitoring should be conducted to assess the daily movement patterns of any species of protected raptor whose nest is located within 2 miles of the proposed site. During the incubation and rearing stage the location of adult birds should be tracked for at least 4 hours twice per week until consistent activity patterns are established. Alternate monitoring strategies that assess the degree to which nesting raptors use the proposed turbine facility will be considered (contact ODNR Division of Wildlife). Information collected

¹ <http://www.ohiobirds.org/obba2/uploads/Handbook%20Body.pdf>

² <http://www.pwrc.usgs.gov/bbl/manual/sname.htm>

will be used to document how frequently the birds enter the proposed turbine facility and whether particular turbines may pose a more substantial risk.

1.3. *Bat acoustic monitoring*

With the expansion of wind turbines into the eastern United States, incidences of bat mortalities have become increasingly more common. Initially, these issues were limited to forested sites within the Appalachian Mountains. Now, unfortunately, they have been documented on agricultural sites as well. As a result, bat activity levels should be assessed at all proposed wind turbine facilities. For sites deemed to pose minimum risk to wildlife resources only, bat acoustic monitoring can be waived for Voluntary Agreement cooperators if the permit application for the wind turbine facility is conditioned such that turbines will not operate at wind speeds ≤ 4 meters/second (as measured within the rotor swept area) from dusk to dawn, July 1 to October 31 annually. Under these conditions, post-construction acoustic data will not be required unless unacceptable mortality rates are detected.

At least 1 full season (15 March – 15 November) of acoustic monitoring should be conducted. This can be accomplished by attaching AnaBat (either SD1 or those equipped with CF ZCAIMS) units to all meteorological towers, with 1 unit positioned at 5 meters of the ground, and 1 unit within or as close as possible to the rotor swept area. In an effort to standardize results among study sites, the AnaBat's sensitivity should be adjusted to detect a calibration tone³ at 20 meters. AnaBat units must monitor from 0.5 hour before sunset until 0.5 hour after sunrise. A "pass" will be defined as any file with ≥ 2 echolocation pulses. When possible, detections should be identified to species or species group (e.g., big brown/silver-haired) within AnaLook. Copies of original and identified detections should be provided to the ODNr Division of Wildlife. In an effort to assess both potential attractant issues, and to correlate the number of detections with bat mortalities, acoustic monitoring should continue through the conclusion of post-construction monitoring.

2. *Moderate surveying effort*

2.1. *Passerine migration*

Numerous incidences exist of nocturnally migrating songbirds colliding with tall structures such as lighthouses, cell phone towers, and tall buildings. It is unclear what the cumulative impact of potentially 100s of turbines on the landscape will be to migrating birds. In an effort to gauge the amount of use a particular site receives during bird migration, point-counts should be conducted in the spring and fall. One point-count location should be established for every 100 hectares of

³ Unlike most ultrasonic pest repellers, this product produces a constant ultrasonic sound and should be used to calibrate AnaBat units. <http://home.earthlink.net/~nevadabat/BatChirp/index.html>

combined forest, shrub, and wooded wetland; however if the site would require <5 survey points, the ODNR Division of Wildlife will consider eliminating this survey requirement after a field review of habitat quality. Points should be established in patches of the aforementioned habitats, and should be stratified across the extent of the site. Surveys should be conducted once weekly from 1 April to 31 May, and from 15 August to 15 November. All surveys should begin at approximately dawn and not extend past 10:00 a.m. EST. Observers should record every bird seen or heard, during a 10-minute period at each point. Birds flying overhead that do not land or originate within 200 meters of the center of the point should be listed as "fly over." The direction (bearing) and estimated distance of the bird from the observer should also be recorded.

2.2. *Diurnal bird/raptor migration*

Though modern turbines seem to pose less of a threat to birds during the day, surveys should still be undertaken to minimize possible wildlife/wind turbine interactions. Day-long (9:00 a.m. to 4:00 p.m.) surveys should be conducted 3 times a week, during seasonally favorable weather for migration (southerly winds in spring, northerly winds in fall). Due to species-specific differences in migration timing, surveying should be conducted from 15 March to 1 May, and 1 September to 31 October. The number of sample points will vary with the size and configuration of the proposed facility.

2.3. *Owl playback surveys*

These surveys should be conducted once monthly for the appropriate species: January (great horned), February (barred), and March (screech). One sample point should be created for every 100 hectares of contiguous forest. Points should be established within forest patches and be spaced >400 meters apart. Surveys should begin 0.5 hour after sunset. Owl calls should be played through a megaphone or portable radio. Three replications of 1 minute of calls, followed by 4 minutes of listening (15 minutes total per station) should be played at each point-count location. Playback calls should have a minimum of background noise, and equipment must be able to broadcast so that the sound pressure is 80-90 dB at 1 meter from the speaker.

2.4. *Bat mist-netting*

While acoustic monitoring may be able to provide a generalized activity level for the site, it can not discriminate distinct individuals nor indisputably determine species composition. Thus, mist-netting should be performed to determine species diversity and locate potential concentrations of activity. Also, the range of the federal and state endangered Indiana myotis (*Myotis sodalis*) is considered statewide within Ohio. This species is known to occur in a variety of habitats including stream and river corridors, forest canopy, and edges. Mist-net surveys

should be conducted in accordance with U.S. Fish & Wildlife Service guidelines⁴, and by an individual approved to handle Indiana myotis (contact U.S. Fish & Wildlife Service for list) and have obtained an ODNR issued scientific collectors permit. Prior to beginning mist-netting activities, project consultants must meet with ODNR Division of Wildlife and U.S. Fish & Wildlife Service staff on-site to review habitats within the project area. Two netting stations should be established per square kilometer of forested area. In order to better assess the bat species community, each station should consist of a minimum of 4 net sets, with at least 1 set being a high net (3 standard mist nets stacked on top of one another to create one set that is ~ 7.5 meters tall). Each site should be surveyed on 2, non-consecutive nights between 15 June – 31 July. Mist-netting should occur during the 5 hours following sunset. Documentation photos should be taken for all species encountered on site. To identify within night recaptures, a small (i.e., ~ 5 mm) mark of non-toxic water-soluble paint should be applied to one forearm of all captured bats. Due to concerns over White Nose Syndrome (WNS), equipment should be decontaminated following U.S. Fish & Wildlife Service protocols⁵.

If Indiana myotis, Rafinesque's big-eared bat, or eastern small-footed myotis⁶ are encountered during mist-netting surveys the ODNR Division of Wildlife must be notified within 24 hours and additional information must be collected. Each individual captured should have voucher photographs taken of the head, body, and species-specific identifiable features, such as the calcar, foot, or mask. Radio telemetry should be conducted on up to 4 Indiana myotis (3-4 females, no more than 1 male) and all Rafinesque's big-eared bats or eastern small-footed myotis. Home range (nightly locations taken every 5 minutes, for the life of the transmitter), roost trees, and maternity colonies should all be identified. If multiple maternity colonies of listed species are suspected to be located on or adjacent to the proposed site, additional transmitters may be requested. Photos, GPS location, tree species, dbh, site characteristics, and exit counts should be collected at each roost. If high densities (>15 of 1 species) of lactating females of the more common colonial species (e.g., big brown bat, little brown, or northern myotis) are captured within a night's trapping, radio telemetry should be used to identify the location of the maternity colony. A maximum of 10 transmitters should be allocated for this task, and their use should be stratified across the proposed facility. Maternity colonies represent an area of increased activity and thus greater risk if turbines were located in proximity to nightly travel routes. Additionally, Indiana myotis are known to occasionally share roosts with the more common little brown myotis. Banding (following U.S. Fish & Wildlife Service protocol⁷) should be done on Indiana myotis and Rafinesque's big-eared bat, but not eastern small-footed myotis due to entrapment concerns associated

⁴ <http://www.fws.gov/northeast/nyfo/es/2007Mistnetting.pdf>

⁵ <http://www.fws.gov/midwest/Endangered/mammals/BatDisinfectionProtocol.html>

⁶ Rafinesque's big-eared bat and the eastern small-footed myotis have each only been recorded once within the state. Though the likelihood of encountering these species is low, if one was captured it is important to maximize the opportunity to gather habitat information on these species.

with its over-wintering habitat. Bands will be provided by ODNR Division of Wildlife.

Finally, any possible hibernacula sites on or within 5 miles of the proposed site should be trapped during spring emergence and fall swarming to determine potential use. Monitoring should follow the current U.S. Fish & Wildlife Service protocol⁷. Surveys are to be conducted every 2 weeks from 15 March – 15 April, and 15 September – 15 November. More extensive monitoring may be requested if listed species of bat are detected during summer mist-net surveys. Nightly captures should be marked similar to those captured during mist-netting. Internal surveys are not recommended due to safety concerns, difficulty in determining species absence, and the potential transmission of WNS.

Where applicable (determined by ODNR)

2.5. Nocturnal marsh bird surveys

Ohio has lost >90% of its original wetland habitat. Accordingly, several species of marsh birds are protected within the state. For projects that contain or that are directly adjacent to ≥ 3 hectares of contiguous wetland, marsh bird surveys should be conducted. Playback surveys should be used to assess the presence of least bittern, sora, Virginia rail, king rail, and American bittern. Surveys are to be conducted weekly from 20 May to 15 June. One survey location should be established for every 50 hectares of contiguous wetland, or 1 location per wetland ≥ 3 hectares in size if there are multiple isolated patches of habitat. Points should be spaced >400 meters apart in appropriate habitat. Each survey should be conducted during a 2-hour period centered on either sunrise or sunset. Thirty seconds of territorial calls should be broadcast through either a portable radio or megaphone, followed by 30 seconds of listening, for each species. Playback calls should have a minimum of background noise, and equipment must be able to broadcast so that the sound pressure is 80-90 dB at 1 meter from the speaker. Due to interspecies competition, the sequence of the species calls should be played as they are listed above.

2.6. Barn owl surveys

Barn owls are a state listed threatened species in Ohio; thus, if suitable habitat exists additional effort should be taken to identify if individuals are nesting within the region. These surveys should be undertaken if the proposed site is within areas depicted in Fig. 2 and includes or is adjacent to ≥ 80 hectares of combined wet meadow, pasture, and grassland. Surveyors should contact property owners of lands that have either barns or barn owl nest boxes and inquire about whether barn owls are currently using these structures. Surveyors should also visit each suitable barn or nest box in the area once from 15 June to 15 July to look for whitewashing, pellet material, fresh pellets, feathers, or other indications of the

⁷ <http://www.fws.gov/Midwest/endangered/mammals/inba/DrftSrvyPrtcl.html>

presence of nesting barn owls. If barn owls are suspected of using a structure, playback calls should be used in an attempt to elicit begging responses from young that may be concealed in the rafters. Playback surveys should consist of broadcasting 1 minute of adult calls, followed by 2 minutes of listening for young. This procedure should be repeated 3 times per survey and should be conducted between 0.5 hour after sunset and midnight.

2.7. *Sandhill crane migration*

Sandhill cranes are listed as an endangered species in Ohio. If sandhill cranes are known to migrate within the vicinity of the proposed project (Fig. 2), additional surveys should be conducted. These surveys will be an extension of the weekly diurnal bird/raptor migration protocol to include the timing of sandhill crane migration, from 1 November to 15 December.

2.8. *Waterfowl surveys*

Ohio not only has a large migratory population of waterfowl, but also provides important over-wintering habitat for numerous species. If the site includes ≥ 3 hectares of wetlands, rivers, lakes, or agricultural fields where concentrations of waterfowl are known to feed, static or driving surveys of the waterfowl community should be conducted twice monthly, from 1 September – 1 April. The number of points will vary with the size and configuration of the water body. Consult with the ODNR Division of Wildlife for possible locations, survey times, or tracts.

2.9. *Shorebird migration*

The Lake Erie basin provides important stopover habitat for migratory shorebirds. Twice monthly point-counts (15 April to 31 May, and 15 July to 15 October) should be conducted in appropriate habitat such as beaches, flooded fields and mudflats. A minimum of 10 minutes should be spent at each point; additional time may be spent to accurately assess the number and species composition of the flock. The number of points will vary with the habitat surveyed as well as the size and configuration of the site. Consultation with ODNR Division of Wildlife is strongly recommended.

3. Extensive

3.1. *Radar monitoring*

Marine radar should be used to monitor nightly passage rates, 5 nights a week from 15 April to 31 May, and 15 August to 31 October. Surveys should begin at sunset and continue until sunrise. Information on estimated numbers/density, direction, hourly changes in activity and altitudes should be included. Preferably 2 radar units should be operated simultaneously; to assess target density and

altitudes concurrently; if that is not logistically possible, the radar unit should be alternated between the vertical and horizontal position every 20 minutes. Hourly weather data should also be recorded in order to correlate passage rates with climatic factors. Due to reduced detectability, monitoring should not be conducted on nights of heavy rain or fog.

Interpretation of pre-construction survey results

Upon completion of surveys, a summary report of all findings should be presented to the ODNR Division of Wildlife. Once permitting applications have been filed with the OPSB, these reports will be made available to the public. Construction should not commence prior to review of these data and findings by ODNR Division of Wildlife (and U.S. Fish & Wildlife Service for federal listed species). A pre-construction meeting to review monitoring results and discuss potential concerns with respect to turbine locations and wildlife resources will be scheduled with ODNR staff, the developer, and project consultants before construction of the facility begins and before official agency comments are provided for any permits pending. Based on survey results, the ODNR Division of Wildlife may recommend 1 or several of the following:

- a) The project should be constructed without altering the initial design.
- b) Changes are needed regarding the number or micro-siting of turbines, auxiliary structures, and/or access roads.
- c) Additional surveying is recommended based upon initial survey results.
- d) The project should not be constructed due to significant wildlife and/or related ecological concerns.

Facility design

Several measures are thought to decrease the likelihood of wildlife strikes at wind turbine facilities. Accordingly, these measures should be incorporated into the design of all turbine facilities within Ohio.

Lighting

Passerines use celestial cues to aid in navigation during migration. Lights are known to disorient nocturnally migrating passerines; this may directly increase the mortality risk from collisions, or indirectly through exhaustion. Therefore, the number of lights on a site should be minimized. Turbines and meteorological towers should have the fewest number of lights permitted by the Federal Aviation Administration (FAA). Preferably these will be white lights with the minimum intensity, and number of flashes per minute (longest strobe) allowable by the FAA. Lights around substations or auxiliary structures should be down-shielded, equipped with motion sensors, or turned off when not in use.

Minimization of perches

New commercial wind turbine facilities have discontinued the use of lattice-work towers which were thought to contribute to the large numbers of raptor fatalities at sites such as Altamont, California. However, effort should still be made to reduce the number of perches available at a site. When possible all electrical cables connecting turbines to each other or to the substation should be buried.

Guyed structures

Guy wires seem to pose a particularly high threat to migratory birds as demonstrated by the large number of fatalities found at certain communication towers. Thus, to the degree possible, unguyed meteorological towers should be used to reduce possible mortalities from striking wires.

Tree removal

In order to reduce the potential for the incident take of bats that form large maternity colonies, including the federally endangered Indiana bat, tree clearing should be minimized and necessary clearing should be constrained to the dates suggested by U.S. Fish & Wildlife Service (1 October to 31 May).

Avoidance of nests for protected species of raptor

Raptor nests represent an area of increased activity and thus, turbines within close proximity may pose an increase risk. Therefore, the ODNR Division of Wildlife suggests a minimum setback of ½ mile from any nest of a protected species of raptor.

Post-construction monitoring (all sites)*Wildlife monitoring*

Several monitoring studies should be continued through the post-construction monitoring period. These studies will be used to assess potential behavioral changes in wildlife due to the presence of wind turbines. While avoidance behavior has been noted in species of grouse, it is unclear whether other species of grassland or forest-dwelling birds will avoid areas with wind turbines. Thus, breeding bird surveys should be continued to examine any species-specific threshold distances. Alternately, the high number of bat mortalities at turbine facilities in the eastern U.S. suggests the possibility that bats are actually being attracted to the site post-construction. In order to assess attraction and to potentially correlate bat mortality with detection frequency, acoustic monitoring should also be continued throughout the post-construction monitoring phase.

Mortality searches

One initial year (1 April to 15 November) of daily mortality searches will be recommended to the OPSB for each site with an optional second season depending on the first year results. The results of the mortality searches should be submitted to ODNR Division of Wildlife and U.S. Fish and Wildlife Service for review. Depending on the results of the first year, ODNR Division of Wildlife will determine if post-construction monitoring of mortality in the second year can be waived, reduced (i.e., focused on time periods when higher numbers of fatalities were detected), or continued for a full year.

The number of turbines searched will depend on the number of turbines at the facility.

- ≤10: all searched.
- 11-40: 1/2 searched, minimum of 10.
- >40: 1/4 searched, minimum of 20.
- All meteorological towers.

Turbines to be searched will be randomly selected but may include specific turbines in areas of concern if so noted by the ODNR Division of Wildlife or U.S. Fish & Wildlife Service based on pre-construction monitoring results. Recommendations for monitoring during any second year may differ, as noted above, both in terms of time period, specific turbines and number of turbines searched to address potential wildlife impacts.

Transect area and design

At each searched turbine, north-south oriented transects should be established every 5 meters. The length of these transects, and the perpendicular distance that transects should extend from the turbine base should be equal to twice the blade length of the turbine being searched. Transects should not venture into hazardous areas, such as steep slopes or high water. Vegetation mapping should be done for each of the searched turbines 3 times a year (spring, summer, and fall), given that vegetation influences carcass detectability. Mapping will consist of recording the GPS location, vegetation height and percent cover (1-meter transect) every 10 meters for each transect. Additional points should be taken at abrupt transition zones such as the edge of a road. An estimate of searchable area also should be provided for each searched turbine. If turbines are within agricultural regions, developers should encourage landowners to plant areas within 60 meters of the turbine in either soybean or wheat crops to increase the probability of detecting carcasses.

Searcher efficiency and Scavenging rates

In order to compensate for carcasses that are scavenged or those missed by observers, searcher efficiency and scavenging rates should be determined for each site using the

procedure described below. These indices should be calculated for each year of post-construction monitoring.

Searcher efficiency

Search efficiency trials consist of placing test carcasses at locations chosen at random to assess an individual's ability to detect turbine mortalities. These surveys should be conducted by someone who is not actively involved in the searches, and carcasses should be placed unbeknownst to the searchers. Individual trials should be conducted randomly at least 200 times each year (a trial consists of the placement of an individual carcass). Carcasses may be used for multiple trials throughout the season. Each carcass should be placed at a turbine, with distance (within the searched area) and direction selected at random. Each carcass should be discreetly marked to identify it as a trial individual. Carcasses must be similar to those expected to be encountered during the search and should vary in both species composition and stage of decomposition. After a searcher has finished his or her survey, the individual conducting the efficiency trial should attempt to recover any missed carcasses to ascertain whether they were scavenged prior to the beginning of the search.

Scavenging rate

In an effort to assess how quickly carcasses are removed from the site by scavengers, a minimum of 50 carcasses per year should be placed at random distances and directions. Several carcasses should be placed each month, since rates are likely to change throughout the year. These carcasses should be checked daily for the first week, then every 2 days until the carcass is removed or completely decomposed. Preferably, carcasses used for scavenging rate estimation will be those collected from the site, and not surrogate species such as pigeons, starlings, or house sparrows since these have been found to be scavenged less frequently. Characteristics that should be recorded for each placed carcass include: the GPS location, vegetation height, percent cover, distance/direction from turbine, and species.

Turbine site searches

Each day searches should begin approximately at first light; this reduces the number of carcasses removed by diurnal scavengers and increases the likelihood of recovering live individuals. The appropriate number of surveyors should be hired to completely search the allotted turbines by 1:00 p.m. The initial start and stop time should be recorded for each survey. Searchers should walk slowly, scanning ~ 2.5 meters on either side of the transect. When a bird or bat is encountered, the distance when the observer first detected it should be recorded. The searcher should then assess whether the individual is alive or dead. If the individual is alive, efforts should be made to release or take the animal to a

licensed rehabilitator⁸. If successful rehabilitation is not likely, then the individual should be humanely euthanized through cervical dislocation⁹. For each individual (regardless of dead or alive), the site should be flagged, and returned to after the turbine search has been completed. Once relocated, a photograph should be taken of the carcass before it is moved. The carcass should be collected in individual re-sealable plastic bags, and the carcass identification number written in pencil on a piece of write-in-the-rain paper enclosed with the carcass. All information on the "Fatality Reporting Form" should be recorded. Mortalities encountered outside the bounds of an official search should be collected, and the above information recorded, but "Incidental" should be written into the notes area. These will not be used in the calculation of site mortality rates, but may (depending on species) be used in searcher efficiency or carcass removal trials. Bats within the *Myotis* family are difficult to differentiate, and should not be used for scavenging rate or searcher efficiency trials. These carcasses should be frozen and given to the ODNR Division of Wildlife at a prearranged date. If a state or federal threatened or endangered species is located, the ODNR Division of Wildlife and U.S. Fish & Wildlife Service must be contacted within 48 hours. At that time arrangements will be made for turning over the carcass to the appropriate agency. If a larger than expected mortality event occurs, ODNR Division of Wildlife and the U.S. Fish & Wildlife Service must be notified within 24 hours. For our purposes a significant mortality event will be defined as >5 birds/bats at an individual turbine, and/or >20 birds and/or bats across the entire facility.

Note: ODNR suggests individuals involved in collecting mortalities under turbines take the same precautions as those individuals handling live bats during mist-netting operations (i.e., leather gloves and maintain up-to-date rabies vaccinations).

Mitigation measures

The ODNR, Division of Wildlife (DOW) recognizes that it is unreasonable to expect wind turbine facilities in Ohio to have no impact on wildlife; however, wildlife impacts from wind energy and other "green" development projects should be minimized. Ultimately, the DOW will use Ohio-specific data from wind energy facilities to define typical or expected versus unacceptable levels of mortality to wildlife from the operation of land-based wind turbines. Those data, however, do not exist at this time. Thus, the DOW will review all available post-construction mortality data from regional wind energy facilities in landscapes with habitats similar to what is found in Ohio's commercially viable wind resource areas. Data from sites and studies deemed relevant to Ohio, as determined by the DOW, will be used to define mortality rates for birds and bats that will be considered acceptable, of concern, and unacceptable.

⁸ Contact the Ohio Division of Wildlife District office nearest to the site for area wildlife rehabilitators (Fig. 3)

⁹ If the species in question is a state or federally protected species the appropriate agency must be contacted before the individual is euthanized.

If operation of wind turbines at a permitted facility in Ohio results in mortality rates at or below the regional average for comparable landscapes, the DOW will not recommend additional post-construction monitoring or use of mitigation measures. When mortality rates are within 1 standard deviation (SD) above the regional average, mitigation measures should be employed to curtail impacts to Ohio's wildlife resources and bring the mortality rate for the facility to the regional average or below. While the DOW will require the facility to take action and monitor the results, specific mitigation measures will not be mandated. Rather, the DOW will work collaboratively with the facility operators to develop an economically tenable mitigation strategy with a reasonable likelihood of reducing mortality rates to the regional average or below. Mitigation measures for consideration include, but are not limited to, those listed within the National Wind Coordinating Collaborative's Mitigation toolbox¹⁰. The collection of additional data to better define the spatial or temporal extent of observed mortality rates or test specific mitigation measures may be considered as part of an overall mitigation strategy. If mortality rates exceed the regional average by more than 1 SD, mitigation measures must be employed to curtail impacts to Ohio's wildlife resources and bring the mortality rate for the facility to the regional average or below. The DOW will require that unacceptable mortality to bats, at a minimum, must include seasonal curtailment as defined under Section 1.3 (*Bat acoustic monitoring*), unless the DOW and facility operators agree to an alternative strategy based on site-specific conditions showing that the temporal and/or spatial distribution of mortality can be reduced effectively with the application of other mitigation measures or new technologies in a more economically viable manner for the facility.

Future definition of normal or acceptable mortality rates for birds and bats due to operation of commercial-scale wind energy facilities in Ohio, as well as mortality rates of concern and those that are unacceptable, will be based on Ohio-specific data. If revised trigger points are more favorable for operators of wind energy facilities in Ohio, we will also apply them to all previously permitted sites. If revised trigger points become more stringent, the trigger points in use at the time a facility was permitted will continue to be applied to that site during its operating lifetime.

Neither the federal Migratory Bird Treaty Act nor the Ohio Revised Code differentiates between the taking of species of migratory non-game birds based upon abundance; thus, relative abundance of impacted bird species will not be a factor in the application of trigger points noted above. However, any mortality to federal or state-listed wildlife species attributed to operation of wind energy facilities in Ohio will require development and implementation of mitigation measures in cooperation with the DOW (and U.S. Fish & Wildlife Service for federal trust species).

¹⁰ http://www.nationalwind.org/publications/wildlife/Mitigation_Toolbox.pdf

Finally, while the currently accepted metric for defining mortality at wind energy facilities is number of birds (or bats) killed per turbine (or megawatt, MW) per year, the use of this metric does not imply that the need for mitigation and its application will be targeted at individual turbines within a permitted facility. Rather, just as an entire facility is proposed for permitting, and pre-construction wildlife monitoring recommendations are based on the landscape containing the proposed facility, a mortality rate for birds and similar rate for bats will be calculated using all relevant data for the entire facility. Unless the average mortality rate for the entire facility is of concern or unacceptable, mitigation measures will not be recommended or required. Thus, it is possible that a subset of individual turbines could have uncharacteristically high mortality rates while the overall rate for the permitted facility is within the acceptable or "normal" range for similar sites in Ohio or the region. We would expect the facility operator to exercise good faith in dealing with mortality rates in such situations. On the other hand, if a facility's mortality rate for birds, bats or both is of concern or unacceptable, we will use the best available data to define the temporal and spatial extent of the problem and work with the facility operators to target mitigation measures to the individual turbines and/or time periods that contribute disproportionately to the overall rate. Where possible, the goal is to find a workable solution for minimizing mortality to wildlife while having as small an impact on the site's economic viability as possible.

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Table 1. Endangered and threatened birds and bats of Ohio*

Endangered

Indiana myotis ^E	<i>Myotis sodalis</i>
American bittern	<i>Botaurus lentiginosus</i>
Northern harrier	<i>Circus cyaneus</i>
King rail	<i>Rallus elegans</i>
Sandhill crane	<i>Grus Canadensis</i>
Piping plover ^E	<i>Charadrius melodus</i>
Common tern	<i>Sterna hirundo</i>
Black tern	<i>Chlidonias niger</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Golden-winged warbler	<i>Vermivora chrysoptera</i>
Kirtland's warbler ^E	<i>Denroica kirtlandii</i>
Lark sparrow	<i>Chondestes grammacus</i>
Trumpeter swan	<i>Cygnus buccinator</i>
Snowy egret	<i>Egretta thula</i>
Cattle egret	<i>Bubulcus ibis</i>

Threatened

Upland sandpiper	<i>Bartramia longicauda</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Yellow-crowned night-heron	<i>Nyctanassa violacea</i>
Barn owl	<i>Tyto alba</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Hermit thrush	<i>Catharus guttatus</i>
Least bittern	<i>Ixobrychus exilis</i>
Least flycatcher	<i>Empidonax minimus</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Peregrine falcon	<i>Falco peregrinus</i>
Osprey	<i>Pandion haliaetus</i>

^E Federally listed endangered

*Updated 13 May 2008.

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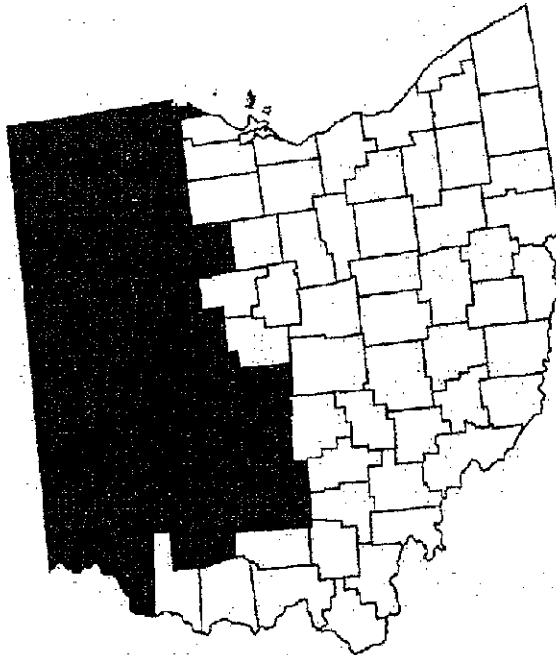
Figure 1. Survey effort.



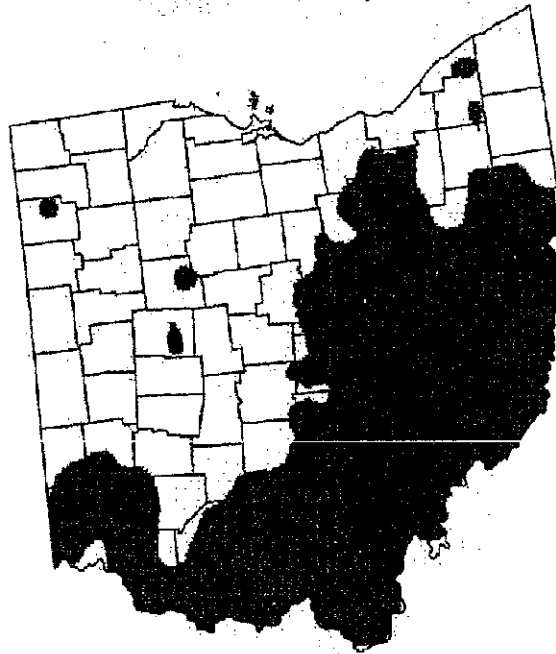
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Figure 2. Counties or areas where additional surveying for either sandhill cranes or barn owls may be recommended.

Sandhill crane

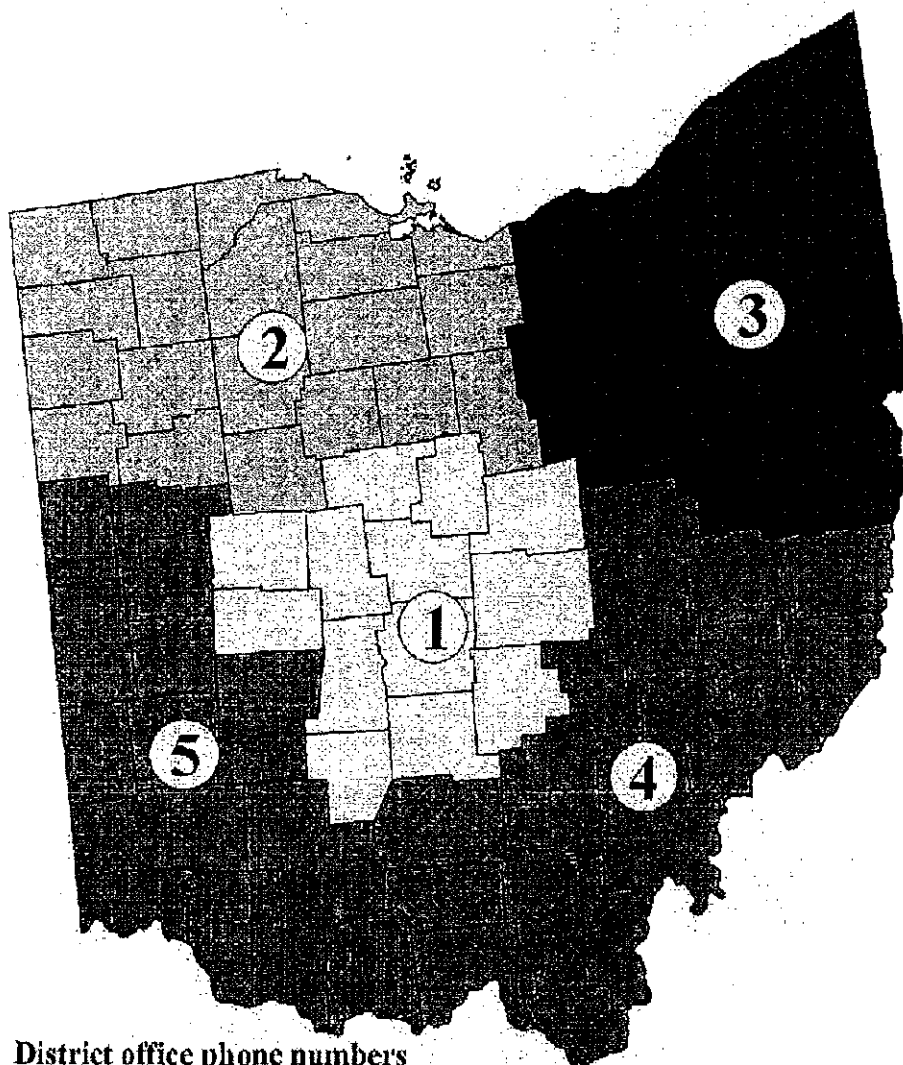


Barn owl



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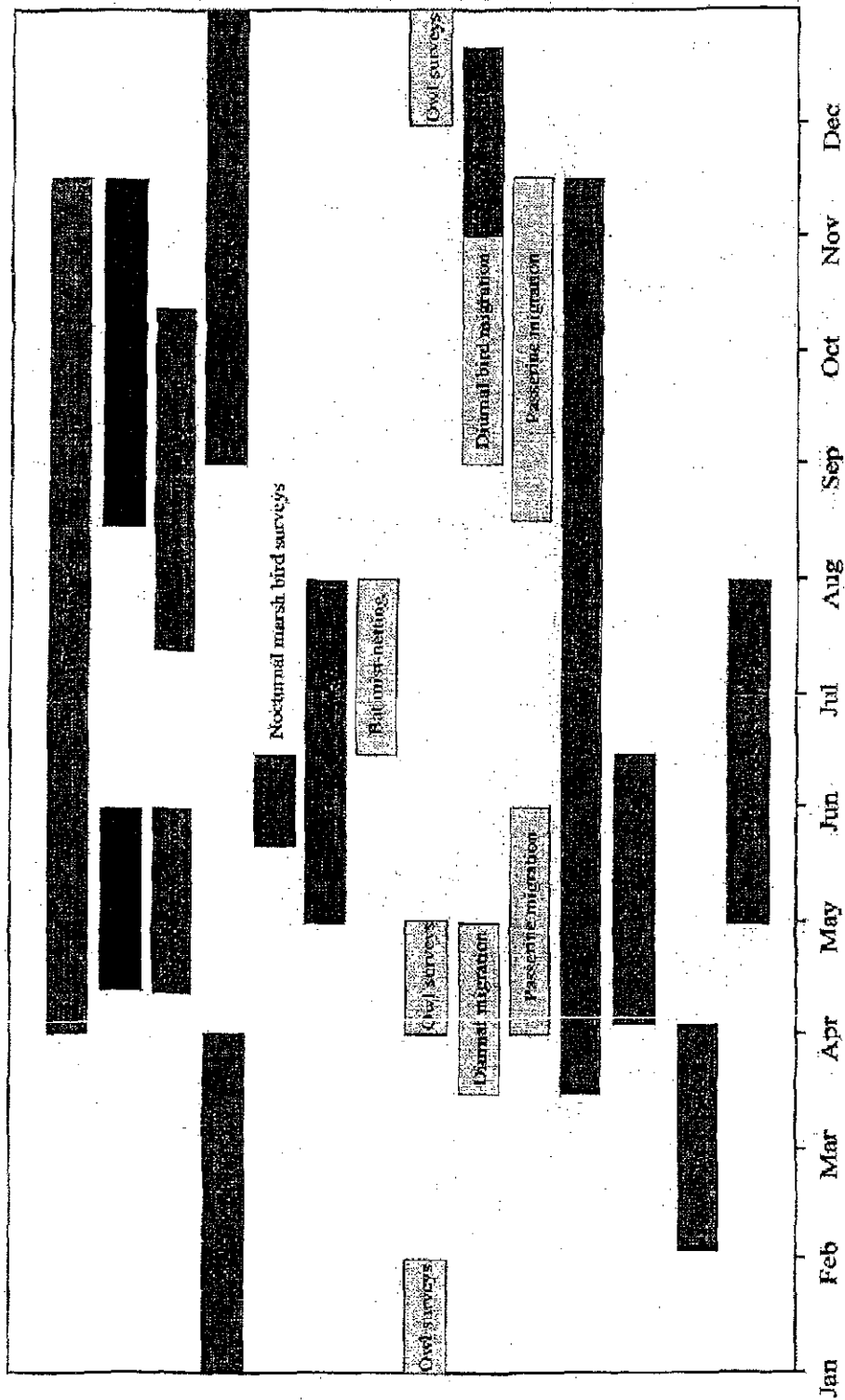
Figure 3. Ohio Department of Natural Resources district offices.

**District office phone numbers****District**

- 1 (614) 644-3925
- 2 (419) 424-5000
- 3 (330) 644-2293
- 4 (740) 589-9930
- 5 (937) 372-9261

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Appendix A. Timing of surveying effort. Colors correspond to the general effort categories; minimum (green), moderate (yellow), where applicable (orange), and extensive (red).



Wildlife Monitoring Survey Forms

BIRD SURVEY LOCATION FORM

Project Name: _____

Total Number of Points: _____

Type of Survey: _____

One form should be provided for each type of survey conducted (*breeding/migration, owl, marsh bird, waterfowl, raptor, or shorebird*). Coordinates should be recorded in UTM NAD83, Zone 17 North. Do not use Lat/Lon.

[illegible]

[illegible]

Point number: _____ Temp (°C): _____ Wind speed (m/s): _____ Cloud cover ____%

[illegible]

Observer: _____ Start time: _____ (military time) Stop time: _____

Point number: _____ Temp (°C): _____ Wind speed (m/s): _____ Cloud cover ____%

[illegible]

NIGHTLY BAT SURVEY SUMMARY FORM

Project Name: _____ Date: _____

Surveyors: _____

Survey Type: Hibernacula Summer

Site description: _____

Time and Weather

	Time	Temp (°C)	Wind speed (m/s)	Cloud cover (%)
Start				
End				

Notes: _____

Trap type and location

Set #	Trap type (harp trap or mist net)	Size (note if stacked mist nets)	Location (UTM NAD83 Zone 17N)	
			Easting	Northing
1				
2				
3				
4				
5				
6				
7				

Total net area: _____

Notes: _____

FORM WD04 OHIO DEPARTMENT OF NATURAL RESOURCES
6/27/08 DIVISION OF WILDLIFE

Project Name: _____

Date: _____

Capture summary

Species	Adult		Juvenile		Subtotal
	Male	Female	Male	Female	
Big brown					
Evening					
Silver-haired					
Eastern red					
Hoary					
Tri-colored bat					
Little brown					
Northern					
Small-footed					
Indiana					
Rafinesque's big-eared					
Other:					
Total:					

Notes:

FATALITY REPORTING FORM

Date: _____ Turbine #: _____ Searcher: _____

Total number of fatalities found during search: _____ Start time: _____ End time: _____

Carcass ID	Turbine #	Carcass #	Transect #	Transect Information	From Turbine
Time			Perp. Dist. ² (m)	Obs. Dist. ³ (m)	Distance (m)
Species	Age ⁴	Sex	Condition	Alive / Dead	Estimated time on ground ⁶
GPS file			Euthanized	Yes / No	
Photo ID			Scavenged	Yes / No	% Cover
			Notes		

Carcass ID	Turbine #	Carcass #	Transect #	Transect Information	From Turbine
Time			Perp. Dist. ² (m)	Obs. Dist. ³ (m)	Distance (m)
Species	Age	Sex	Condition	Alive / Dead	Estimated time on ground
GPS file			Euthanized	Yes / No	
Photo ID			Scavenged	Yes / No	% Cover
			Notes		

¹ Carcass ID = MMDDYYYY - Turbine # - Fatality number for that search

² Perpendicular distance from transect

³ Distance from which the searcher detected the carcass

⁴ Adult / Juvenile / Unknown

⁵ Male / Female / Unknown

⁶ Last night / 2 - 3 days / 4 - 7 days / 7 - 14 days / > 2 weeks / Unknown

SEARCHER EFFICIENCY FORM

Carcass ID	Date	Species	Easting ¹	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)	Direction				

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)	Direction				

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)	Direction				

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)	Direction				

¹ Coordinates should be recorded in UTM NAD83, Zone 17 North. Do not use Lat/Lon.

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #		Distance (m)	Direction		Photo ID		

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #		Distance (m)	Direction		Photo ID		

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #		Distance (m)	Direction		Photo ID		

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #		Distance (m)	Direction		Photo ID		

EXHIBIT B: SCOPE OF WORK, MAY 4, 2009

Survey type	Project			
	Hardin North	Revised Hardin South	Fostoria	I-80
Breeding bird	Not Suitable Habitat (NS)			
Raptor nest searches	Nest searches should occur on, and within a 1-mile buffer of the project area.			
Raptor nest monitoring	There was only one known bald eagle nest located within 2 miles of any of these projects. It is located on the I-80 project and is within ½ mile of 6 of the proposed turbines. The wildlife protocols suggest a ½ mile buffer where turbines should not be constructed due to potential direct or indirect effects on the nesting pair or fledglings. A second nest was found on east side of Fostoria site in spring 2009.			
Bat acoustic monitoring	Acoustic monitoring should be conducted at all sites. If JWGL signs the Cooperative Agreement for those sites that are deemed to pose minimum risk to wildlife resources only (i.e., the sites that are almost all "green" [Hardin North, revised Hardin South] or nearly so [I-80]), the acoustic surveys could be conducted prior to construction and after submission of the associated permit application to the Ohio Power Siting Board. Under these conditions, the ODNR Division of Wildlife will certify to the OPSB that these data are not required prior to evaluating the potential ecological impacts at the site of the proposed project. Also, the ODNR Division of Wildlife offers to process and identify all acoustic data collected at any of these sites. Likewise, these sites (HN, revised HS & I-80) could forego acoustic monitoring and opt for curtailment as outlined in the Onshore protocols document if JWGL has signed the Cooperative Agreement.			
Passerine migration (# of survey points)	NS	NS	NS	NS
Diurnal bird/raptor migration (# of survey point)	NS	NS	1	NS
Sandhill crane migration (same points as raptor migration)	NS	NS	NS	NS
Owl playback surveys	NS	NS	NS	NS
Barn owl surveys	NS	NS	NS	NS
Bat mist-netting (# of survey points)	NS	NS	5	3
Nocturnal marsh bird surveys	NS	NS	NS	NS
Waterfowl surveys	NS	NS	NS	NS
Shorebird migration	NS	NS	NS	NS
Radar monitoring	NS	NS	NS	NS

NOTES: Blue = current sampling requirements based on project details and discussions as of April 30, 2009; future revisions to project details could result in modifications to sampling requirements.