

**FINAL
ENVIRONMENTAL ASSESSMENT**

FOR

**HEARTLAND COMMUNITY
COLLEGE WIND ENERGY PROJECT**

NORMAL, MCLEAN COUNTY, ILLINOIS

**U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Golden Field Office**



DECEMBER 2010

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COVER SHEET

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE)

TITLE: *Final Environmental Assessment for Heartland Community College Wind Energy Project, Normal, McLean County, Illinois* (DOE/EA 1807).

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ABSTRACT: DOE has provided a State Energy Program (SEP) grant to the State of Illinois and proposes to authorize the State to expend \$500,000 of this Federal grant to assist with the financing of the design, permitting, and construction of the Heartland Community College (HCC) Wind Energy Project, a proposed 1.5-megawatt wind turbine on the northern end of the HCC campus, just south of Interstate 55, in Normal, Illinois. DOE has already authorized the Illinois Department of Commerce and Economic Opportunity to use a percentage of Federal funding for preliminary activities, which includes preparation of this EA, conducting analysis, and agency consultation. These activities do not significantly impact the environment nor represent an irreversible or irretrievable commitment by DOE in advance of the conclusion of the EA. The proposed wind turbine would provide electricity directly to HCC, enabling it to reduce the electrical demands of the institution and lower the carbon footprint associated with daily operations. HCC has not finalized the selection of a manufacturer or wind turbine. Therefore, the analysis in this EA used specifications for one of the largest 1.5-megawatt models under consideration, the GE 1.5 MW XLE.

This EA analyzes the potential environmental impacts of the proposed construction, operation, and decommissioning of the HCC Wind Energy Project (proposed project) and the alternative of not implementing this project (the No-Action Alternative).

PUBLIC INVOLVEMENT: The public was provided with an opportunity to comment on the draft EA via email or written correspondence. Details regarding the comment process are included in Section 1.4 of this document. Public comments and responses are included in Appendix E.

AVAILABILITY: This EA is available on the DOE Golden Field Office Reading Room website, http://www.eere.energy.gov/golden/Reading_Room.aspx , and the DOE NEPA Website, http://nepa.energy.gov/DOE_NEPA_documents.htm.

ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
ARRA	<i>American Recovery and Reinvestment Act of 2009</i>
BBS	Breeding Bird Survey
BMP	best management practice
CFR	<i>Code of Federal Regulations</i>
dBA	Decibel on an A-weighted scale, used to approximate the human ear's response to sound
DCEO	(Illinois) Department of Commerce and Economic Opportunity
DOE	U.S. Department of Energy
DNL	Day Night Average Sound Level
EA	Environmental Assessment
EcoCAT	Ecological Compliance Assessment Tool
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
GE	General Electric
GHG	Greenhouse Gas
HAARGIS	Historic Architectural and Archaeology Resources Geographic Information System
HCC	Heartland Community College
I-55	Interstate 55
IBA	Important Bird Area
IDNR	Illinois Department of Natural Resources
IHPA	Illinois Historic Preservation Agency
INHD	Illinois Natural Heritage Database
IPCB	Illinois Pollution Control Board
MBTA	<i>Migratory Bird Treaty Act</i>
NEPA	<i>National Environmental Policy Act</i>
NHPA	<i>National Historic Preservation Act</i>
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
OSHA	Occupational Safety and Health Administration
SEP	State Energy Program
SHPO	State Historic Preservation Office or Officer
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service

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1. INTRODUCTION

1.1 National Environmental Policy Act and Related Procedures

The *National Environmental Policy Act* (42 U.S.C. 4321 *et seq.*; NEPA), the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500 to 1508), and the U.S. Department of Energy's (DOE's) NEPA implementing regulations (10 CFR Part 1021) require that DOE consider the potential environmental impacts of a proposed action before making a decision. This requirement applies to decisions about whether to provide different types of financial assistance to states and private entities.

In compliance with these regulations and DOE's procedures, this Environmental Assessment (EA):

- Examines the potential environmental impacts of the Proposed Action and the No-Action Alternative;
- Identifies unavoidable adverse environmental impacts of the Proposed Action;
- Describes the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterizes any irreversible and irretrievable commitments of resources that would be involved should DOE decide to implement its Proposed Action.

DOE must meet these requirements before it can make a final decision to proceed with any proposed Federal action that could cause adverse impacts to human health or the environment. This EA provides DOE and other decision makers with the information needed to make an informed decision about the construction and operation of the proposed wind turbine. The EA evaluates the potential individual and cumulative impacts of the proposed project. For purposes of comparison, this EA also evaluates the impacts that could occur if DOE did not provide funding (the No-Action Alternative), under which DOE assumes that Heartland Community College (HCC) would not proceed with the project. No other action alternatives are analyzed.

1.2 Background

HCC proposes to construct, operate, and eventually decommission a single 1.5-megawatt wind turbine on the northern end of the HCC campus, just south of Interstate 55 (I-55), in Normal, Illinois (Appendix A- Figures 1 through 5). The proposed wind turbine would enable HCC to reduce electricity demands from the existing electrical source and lower its carbon footprint, as well as provide an opportunity for curriculum development and training for students interested in wind turbine operations and management. The current estimated project cost is approximately \$3.2 million. The Illinois Department of Commerce and Economic Opportunity (DCEO) selected this project to receive a \$500,000 grant from the Illinois State Energy Office. This grant would come from money that the State of Illinois received from DOE under the *American Recovery and Reinvestment Act of 2009* (Pub. L. 111-5, 123 Stat. 115; ARRA) and DOE's State Energy

Program (SEP). The purpose of the SEP is to promote the conservation of energy and reduce dependence on imported oil by helping states develop comprehensive energy programs and by providing them with technical and financial assistance.

States can use SEP funds for a wide variety of activities related to energy efficiency and renewable energy (see 42 U.S.C. 6321 *et seq.* and 10 CFR Part 420). In ARRA, Congress appropriated \$3.1 billion to DOE's SEP, and Illinois received \$101 million pursuant to a statutory formula for distributing these funds. Illinois informed DOE that it proposes to provide \$500,000 of its SEP funds to the HCC Wind Energy Project. The potential use of Federal SEP funds to assist in the financing of this project constitutes a Federal action subject to review under NEPA.

1.3 Purpose and Need

1.3.1 DOE'S PURPOSE AND NEED

DOE's purpose and need is to ensure that SEP funds are used for activities that meet congressional statutory aims to improve energy efficiency, reduce dependence on imported oil, decrease energy consumption, create and retain jobs and promote renewable energy. Providing funding as part of the Illinois SEP grant to HCC would partially satisfy the need of this program to assist U.S. cities, counties, states, territories, and American Indian tribes to develop, promote, implement, and manage energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors; and
- Create and retain jobs.

ARRA enacted legislation to create jobs, restore economic growth, and strengthen America's middle class through measures that modernize the nation's infrastructure, enhance America's energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief, and protect those in greatest need. Provision of funds under SEP would partially satisfy the needs identified under ARRA. However, it is not DOE's role to dictate to the DCEO how to allocate its funds among these objectives or to prescribe the projects it should pursue.

1.3.2 ILLINOIS' PURPOSE AND NEED

Illinois' purpose and need is to grow the economy of the state by connecting companies and communities to financial and technical resources to deploy renewable energy technologies, and to support the goals of SEP and ARRA to reduce energy costs, reduce reliance on imported energy, reduce the impacts of energy production and energy use on the environment, and to preserve and create jobs.

1.3.3 ILLINOIS' SEP PROJECT SELECTION PROCESS

The Illinois SEP is using its ARRA funding for programs to increase the energy efficiency of businesses and industry while promoting deployment of clean energy projects that will help improve the cost-effectiveness and economic stability of businesses and industry in the state. The Illinois Office of Energy includes four sub-programs:

- Energy Efficiency Development
- Renewable Energy Development
- Green Manufacturing
- Biofuels Development

The Illinois Office of Energy issued a Request for Proposals for the SEP-funded Renewable Energy Development Program. The Illinois Program used the following criteria for selection: project readiness; matching capabilities, financing, and cost-effectiveness; economic impact for Illinois; project characteristics and potential for innovation; and a project's ability to (1) provide emission-free energy and (2) create jobs during the construction of the project. HCC was one of the many renewable energy grant applicants to which the Office of Energy awarded SEP funds in 2009. Illinois has appropriated \$500,000 to HCC. For this project, DOE is the Federal action agency, the Illinois Office of Energy is the recipient of Federal funding, and HCC is the sub-recipient of this funding. The project would be implemented on HCC property.

1.4 Public and Agency Involvement

1.4.1 SCOPING

When it began preparing this EA, DOE sent notices of public scoping to stakeholders and interested parties, including local, State, Tribal, and Federal agencies, organizations, and the general public to solicit comments. The notices were sent via postcard on July 16, 2010, directing the stakeholders to DOE's Golden Field Office's Public Reading Room (http://www.eere.energy.gov/golden/reading_room.aspx), where DOE published the scoping letter for review. The scoping letter described the DOE's Proposed Action and requested public comment regarding the Action and assistance in identifying potential issues that could be evaluated in the upcoming EA. The public comment period closed on July 30, 2010. DOE did not receive any comments during the scoping period. Appendix D-4 of this EA contains a copy of the scoping letter and stakeholder distribution list (discussed in Section 1.4.2).

The following agencies and organizations were contacted by HCC and/or DOE (see Section 9 of this EA):

- U.S. Fish and Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)
- U.S. Department of Commerce – National Telecommunications and Information Administration (NTIA)
- U.S. Department of Agriculture
- Illinois Historic Preservation Agency (IHPA)

- Illinois Department of Natural Resources (IDNR), Division of Ecosystem and Environment
- DCEO
- Illinois Department of Transportation, Bureau of Operations Region 3/District 5
- Illinois Department of Military Affairs
- HCC Board of Trustees
- Town of Normal Office of the City Manager
- McLean County Building and Zoning Department

In addition, HCC consulted with the HCC Board of Trustees, the Town of Normal, and McLean County. The potential for a wind turbine on the HCC campus was presented at the HCC's Board of Trustees meetings of December 12, 2006, and February 20, 2007 (Appendix D-1). Section 9 of this EA contains additional information on agencies and persons consulted.

The project requires a construction permit from the Town of Normal. HCC anticipates the process to obtain the construction permit will begin in January 2011, with the permit granted in the spring of 2011.

The County of McLean does not require permits or planning approvals.

Pursuant to Section 7 of the *Endangered Species Act* and Section 106 of the *National Historic Preservation Act* (NHPA), DOE sent letters to USFWS and IHPA describing the proposed project and requesting information regarding Federally listed species and known historic or cultural resources in the area, respectively, that might be affected through implementation of the proposed project. Copies of the response letters are included in Appendix C.

1.4.2 DRAFT ENVIRONMENTAL ASSESSMENT

The draft EA was available for public comment for 15 days beginning with the publication of a Notice of Availability (NOA) in the *Pantagraph* on October 1, 2010, and on the HCC website (<http://www.heartland.edu>). The NOA was sent to potential stakeholders and interested parties (i.e., Federal, State, Tribal and local agencies, as well as members of the public). The NOA clearly identified the public's opportunity to comment on the proposed project's potential effects. In addition, DOE conducted a Section 106 consultation pursuant to the NHPA and provided an opportunity for the public to comment on that document in the same manner in which they could comment on the draft EA.

The draft EA was posted on the DOE NEPA Website (<http://nepa.energy.gov>), allowing the opportunity to comment online via email or written correspondence to the postal address provided therein. At the conclusion of the 15-day comment period (October 16, 2010), DOE analyzed all submitted comments and questions and considered each issue for inclusion in the final EA.

DOE received three comments on the draft EA. One comment complimented the thoroughness of the analysis and requested the appendices to complete the review. The second comment was from the Illinois EPA and expressed no objection to the project, but called out the potential requirement for HCC to obtain a construction site activity stormwater NPDES permit from the

Division of Water Pollution Control if one or more acre of land is disturbed during construction. The final comment letter was from the John Wesley Powell Audubon Society, identifying additional data sources DOE should consider in its biological resource analysis. The Audubon Society also requested cut-in speed modifications and that HCC monitor bird and bat mortality for one year after construction was completed. DOE revised Section 3.2.2.6 of this EA to address additional data sources, and to reflect HCC's agreement to voluntarily conduct post-construction monitoring for bat and bird mortality rates for the initial post-construction fall migration season. The section was also revised to include HCC's commitment to consider modification of the turbine's cut-in speed upon selection and evaluation of the specific turbine model. All comments received were incorporated into the EA appendices (see Public Comments and Responses in Appendix E).

2. PROPOSED ACTION AND ALTERNATIVES

2.1 DOE's Proposed Action

DOE is proposing to authorize the expenditure of Federal funding to design, permit, and construct the HCC Wind Energy Project (proposed project), a 1.5-megawatt wind turbine on the northern end of the HCC campus, just south of I-55, in Normal, Illinois.

DOE has authorized DCEO to use a percentage of its Federal funding for preliminary activities, including the preparation of this EA and associated analyses. Such activities are associated with the proposed project and do not significantly impact the environment nor represent an irreversible or ir retrievable commitment by the DOE in advance of the conclusion of the EA for the proposed project.

2.2 Illinois' Proposed Project

The DCEO selected HCC for a \$500,000 grant based on the following criteria: project readiness; matching capabilities, financing, and cost effectiveness; economic impact for Illinois; project characteristics and potential for innovation. This section process also evaluated the project's ability to (1) provide emission-free energy; and (2) create jobs during the construction of the project. The project would be implemented on HCC's property in Normal, Illinois.

The project would involve the construction, operation, and eventual decommission of a single 1.5-megawatt wind turbine along with an approximate 183 meters (600 feet) permanent gravel access road and 366 meter (1,200 feet) underground electrical transmission line on the northern end of the HCC campus, located just south of I-55 in Normal, Illinois (Appendix A- Figures 1 through 5). The underground electrical transmission line would extend from the proposed turbine south to the college's Physical Plant Building electrical switchgear (Figure 5). The proposed wind turbine would enable the college to reduce electricity demands from the existing electrical source and lower its carbon footprint, as well as provide curriculum development and training for student interested in wind turbine operations and management.

2.2.1 PROJECT LOCATION

The proposed HCC wind turbine would be located at the northern end of campus approximately 244 meters (800 feet) south of I-55. HCC is located in the northwest corner of the Town of Normal, McLean County, Illinois (Figure 2-1 below and Appendix A- Figures 1 through 5). The HCC campus is approximately 160 acres and is bounded on the north by I-55, with agricultural land located further north of the interstate; to the south by W. Raab Road, with primarily agricultural land located further south; to the east by an I-55 off ramp and agricultural land; and to the west by additional agricultural land. The campus consists of nine buildings including the Student Commons, Community Commons, Instructional Commons and Instructional Commons North Buildings, the Workforce Development Center, Child Development Lab, Community Education Center, Receiving and Storage Building, and the Physical Plant Building (see Appendix A- Figure 5). A Fitness and Recreation Center is currently under construction and is to be located to the north of the Community Education Center. A Student Center addition is also under construction and is located at the north side of the Student Commons Building. The

buildings closest to the proposed turbine include the Receiving and Storage Building [approximately 140 meters (460 feet)] and the Child Development Lab [approximately 305 meters (1,000 feet)] as these buildings are located at the northern edge of the campus.

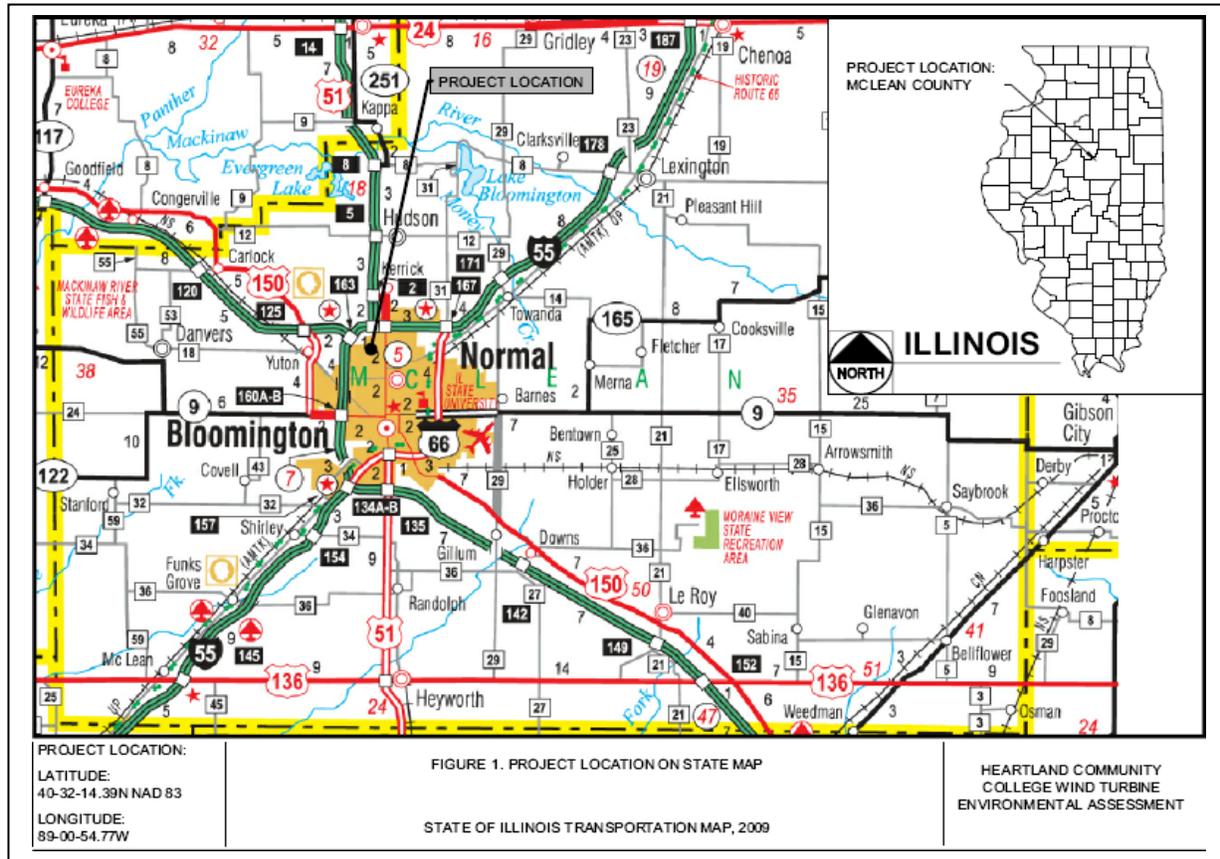


Figure 2-1. Project Location on State Map

A residential mobile home park is located approximately 1,250 meters (4,100 feet) east of the project site. Further to the southwest of the proposed turbine location are residential areas consisting of approximately three single-family residences north of W. Raab Road, and an apartment complex south of W. Raab Road. The homes and apartment complex are located approximately 564 meters (1,850 feet) and 610 meters (2,000 feet) south-southwest of the proposed turbine location, respectively. HCC acquired this property on October 29, 2010 (see section 3.2.2.1 of this EA for additional information related to land use).

The lot on which the project is proposed, and the HCC campus, is zoned S-2 Public Lands and Institutions District according to the Town of Normal Zoning Map (Town of Normal 2010) (see Appendix A- Figure 8). The project would be located on a site that has been previously disturbed (graded), currently consists of grass field, and is owned by HCC. The approximate center point of the proposed HCC wind turbine is 40 degrees north Latitude and 89 degrees west Longitude, approximately 140 meters (460 feet) north of the Receiving and Storage Building on the HCC campus.

2.2.2 CONSTRUCTION AND INSTALLATION

Site construction would include installation of a single wind turbine, underground distribution line, necessary access roads and road improvements, crane pad, foundation system, and fencing around the turbine base. The construction would be carried out in accordance with an approved storm water pollution prevention plan, associated National Pollutant Discharge Elimination System (NPDES) permit, and in compliance with all other applicable requirements and regulations. Construction would be located on land previously disturbed/graded and maintained by HCC. Turbine delivery is assessed in Section 3.2.2.8 of this EA.

The project would include an approximate 366 meter (1,200 feet) new underground electrical transmission line to connect the turbine to the college's Physical Plant Building electrical switchgear.

To adequately distribute the power from the turbine to the campus the following may be installed:

- Underground conduits
- Conduit trestle
- Rigid conduit
- 250 kcmil wire
- #2/0 ground wire
- 4,160-volt switchgear on concrete housekeeping pad
- Bus duct to interconnect into HCC's existing switchgear
- Production meter

The transformer and switch gear cubicle would be situated outside the wind turbine tower at the foundation level. The low voltage side of the transformer would be connected to a distribution panel at the tower's base inside the tower, by cable connection leading through the foundation of the turbine. The unit substation (transformer and switch gear cubicle) would be provided by the manufacturer.

During construction of the proposed turbine, the crane pad would be located approximately 18 to 24 meters (60 to 80 feet) away from turbine's foundation base. An approximately 183 meter (600 feet) permanent gravel access road would be constructed from the northern edge of the campus Parking Lot K to the proposed wind turbine location (Appendix A- Figure 5). Permanent fencing and warning signs indicating high voltage areas are planned to surround the turbine foundation.

Based on a variety of geotechnical conditions, bearing capacity of the soils, depth and quality of bedrock, and other factors, a variety of foundation design approaches can be used for this project. In most instances, a "spread foot foundation" (steel-reinforced concrete footer) has proven to be safe, appropriate, and effective for wind turbine installations similar to this proposed project.

Short-term surface disturbance during construction is anticipated, during the preparation of the tower facilities, associated access road, and underground electrical distribution trench may disturb more than one acre of land. Construction would be performed in accordance with an approved erosion and sedimentation control plan and in compliance with all other applicable

requirements. An NPDES permit would be acquired from the Illinois Environmental Protection Agency for protection of waterways. Construction activities for wind turbine foundations, tower erection, turbine nacelle placement, and blade installation are highly contingent on temperature and weather conditions. Turbine nacelle and blade installations would be installed during periods of calm wind. Foundations would not be installed during cold winter months. These factors are highly relevant to the installation schedule and would determine the final construction timeline.

The wind turbine construction, including site preparation, erection, final commissioning, generator installation, and overall systems tie-in and start-up is estimated to take at least 12 months. The proposed project schedule is subject to variables and contingencies related to timely document and permit preparation and approvals. Variations in these timeframes would result in adjustments to this initial schedule. During this 12-month period the site would be expected to see activity for approximately 5 months. Two months at the beginning of the 12-month period for excavation and foundation work, and three months at the end of the 12-month period for electrical work, tower erection, turbine and blade installation, and startup. The following breakdown is anticipated for the construction phase:

- Excavation – 2 weeks
- Foundation and reinforcing work – 8 weeks
- Electrical distribution (including directional boring for underground conduit, conduit trestle, in-plant conduit installation, and switchgear installation at existing switchgear room) – 12 weeks
- Tower erection – 1 week
- Turbine nacelle and blade installation – 2 weeks
- Electrical tie-in and interconnection – 2 weeks
- Turbine and system commissioning – 2 weeks
- Site cleanup and recreation facility restoration – 1 week

Construction also would entail occupying surrounding areas of the project within the privately owned HCC campus to serve as lay down areas for machinery, equipment, and supplies. During construction, the property would be closed and secured via temporary fencing and locked gates to prevent public access to the work zone. The field would be restored to its previous condition upon completion of construction activities.

Aviation Lighting

Lighting for aviation safety would be installed to comply with FAA requirements (FAA 2007). Red strobe lights would be used at the minimum number, minimum intensity, and minimum number of flashes per minute allowable by the FAA (Appendix D).

Operations and Maintenance

HCC would operate and maintain the wind turbine according to standard industry procedures and applicable requirements. All workers and students would be properly trained for turbine maintenance and safety. Routine maintenance of the turbine would be necessary to maximize performance and identify potential problems or maintenance issues. The turbine would be monitored to ensure that operations are proceeding efficiently. Any problems would be reported to operations and maintenance personnel, who would perform both routine maintenance and

most major repairs. Most servicing would be performed up-tower by a maintenance crew who would not need to use a crane to remove the turbine from the tower. In addition, all roads, pads and trenched areas would be regularly inspected and maintained to minimize erosion.

2.2.3 DECOMMISSIONING

The turbine and other infrastructure are expected to have a useful life of at least 20 years. The trend in the wind energy industry has been to “repower” older wind energy projects by upgrading equipment with more efficient turbines, thereby extending a project’s useful life beyond 20 years. Upon reaching the expected operational life of the wind turbine, HCC anticipates retooling the generator and additional parts in an effort to continue its operation until the entire turbine needs to be replaced. At that time, HCC would determine if the turbine would be replaced based on current day technologies.

Activities associated with the decommissioning of the project are expected to be similar in nature to the initial construction when the project is terminated and if an upgrade is not considered, the turbine and other infrastructure would be decommissioned, and all facilities would be removed to a depth of approximately 0.9 meter (3 feet) below grade. The surface soil would be restored as close as possible to its original condition. Underground facilities would either be removed or safely secured and left in place. Salvageable items (including fluids) would be sold, reused, or recycled as appropriate; unsalvageable material would be disposed of at authorized sites. Reclamation procedures would be based on site-specific requirements commonly employed at the time the area is to be reclaimed and could include re-grading, adding topsoil, and replanting of all disturbed areas with native species. All decommissioning activities would be performed in accordance with the selected manufacturer’s guidelines, the decommissioning plan as well as all applicable Federal, State, and local regulations. Similar activities would be evaluated during the construction phase and reevaluated during the decommissioning

2.3 Alternatives

2.3.1 DOE ALTERNATIVES

Illinois’ ARRA SEP funds are from a formula grant; the amount is established pursuant to a formula from DOE’s SEP grant procedures at 10 CFR 420.11. Allocation of funds among the states is based on population and other factors. Recipients of these formula grants have broad discretion in how they use these funds as set forth by law and by SEP.

In compliance with applicable statutes and regulations, this EA examines the potential environmental impacts of the DOE’s Proposed Action (providing funding for the Proposed Project) and the No-Action Alternative. This EA also describes options that the Heartland Community College considered during development of its application to the State of Illinois, which is the recipient of SEP funding. This EA provides DOE with the information needed to make an informed decision about whether allowing the State of Illinois to pass through some of its Federal funds for the proposed project may result in significant environmental impacts. Based on this EA, DOE either will issue a Finding of No Significant Impact (FONSI), which may include mitigation measures, or determine that additional study is needed in the form of a more detailed environmental impact statement.

2.3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, DOE would not allow Illinois to use its SEP funds for this project. DOE assumes for purposes of this EA that the project would not proceed without SEP funding. Using this assumption allows a comparison between the potential impacts of the project as proposed and the impacts of not proceeding with the project. Without the proposed project, HCC operations would continue as otherwise planned, but without the proposed turbine. The ability of the State of Illinois to use its SEP funds for energy efficiency and renewable energy activities would be impaired, as would its ability to create jobs and invest in the nation's infrastructure in furtherance of the goals of ARRA.

2.3.3 ALTERNATIVES CONSIDERED BY THE PROJECT PROPONENT

In order to meet the goals of a reduced carbon footprint and energy cost savings, HCC considered the use of other renewable energy sources for power generation; however, the cost of the other technologies considered were determined to exceed the benefits. HCC conducted an analysis for the consideration of multiple turbines and developed criteria to be considered during siting in the October 2009 report *Wind Resource Analysis and Wind Turbine Recommendations* (Appendix D-2). While the GE 1.5 MW XLE was used for this analysis to represent the upper limit of associated impacts, the turbines listed below were evaluated in the October 2009 report:

- AAER A-1500-70177 Wind Turbine
- GE 1.5 MW SLE Wind Turbine
- Nordex N60 Wind Turbine
- Suzlon S66 Wind Turbine
- VESTAS V82 Wind Turbine

The turbines were evaluated under the following criteria:

- Mechanical System – rotor, blades, color and reflectivity, pitch control, nacelle, yaw control, drive train, suspension and bearings, tower, maintenance and serviceability, corrosion protection, mechanical system, rotor;
- Electrical System – principles of operation, standard/special configurations, integrated grid protection schemes, major components, generator type, converter (inverter), external electrical grounding, house load;
- Safety – International Standards for Wind Turbine Generating Systems class parameters, temperature range (operating and structural), general fail-safe, breaking, safety chain, equipment, lightning, fire; and
- Wind Turbine Control – control system and Supervisory Control and Data Acquisition cut-in and cut-out strategy, blade icing detection, strategies.

HCC's options for turbine siting were limited to the northern end of its campus due to a number of factors, including but not limited to setback requirements from I-55, wind velocities and wind direction, topography of land, feasibility of payment to land owners for use of their property,

planned development of the eastern wing of HCC campus, amount of ground disturbance needed for trenching the distribution line to the physical plant on HCC campus (Appendix A- Figure 5), and proximity to existing buildings and to the Town of Normal. The final project location was selected to ensure that existing parking lots, buildings, and publicly accessible roadways would not be located within the proposed turbine’s fall zone. (Refer to Section 3.2.2.7 of this EA for further discussion on the fall zone.) During the NEPA process DOE determined that Parking Lot K and the Receiving and Storage Building (Appendix A- Figure 5) would have been located within the analyzed fall zone of the original turbine location. To eliminate any potential risk associated with having public access areas within the turbine’s fall zone, HCC elected to relocate the turbine approximately 91 meters (300 feet) west-southwest of the original location. This updated location was used to conduct the analyses throughout this EA.

2.4 Permits, Approvals, and Notifications

Prior to construction, all required Federal, State and local permits and approvals would be obtained. The required permits, approvals and notifications are listed in Table 2-1. Documentation of all agency approvals received are provided in Appendix C of this EA.

Table 2-1. Federal, State, and Local Permits, Approvals, and Notifications

Agency	Permit Approval / Type
Federal	
FAA	FAA Aeronautical Determination (received November 16, 2009, Appendix C-3; in process for new location)
NTIA	Radio Frequency Transmission Notification
USFWS	Compliance with the <i>Endangered Species Act</i> , the <i>Migratory Bird Treaty Act</i> , and the <i>Bald and Golden Eagle Protection Act</i>
State	
IHPA	Compliance with <i>National Historic Preservation Act of 1966</i> (as amended)
Illinois Environmental Protection Agency	National Pollutant Discharge Elimination System; filing the Notice of Intent for Construction Activities
IDNR	17 III. Adm. Code Part 1075 and 1090. State Threatened or Endangered Species consultation and natural resource review
Illinois Department of Transportation	Oversize/Overweight Vehicle (to be obtained by the trucking/delivery company)
Local	
Town of Normal	Construction Permit

2.5 Project Proponent-Committed Practices

HCC has committed to the following measures and procedures to minimize or avoid environmental impacts if the proposed project is carried forward.

2.5.1 BIRD, BAT, AND RAPTOR AVOIDANCE AND MINIMIZATION MEASURES

During turbine siting, HCC has and would continue to give consideration to the guidelines contained within the *Interim Guidelines to Avoid and Minimize Wildlife Impacts* (USFWS 2003).

The following measures are part of the proposed project and would be implemented to minimize impact to avian and bat species:

- Electrical distribution line would be installed underground.
- Ground lighting would be limited to the immediate vicinity of the turbine tower base and lighting fixtures would be used that reduce the potential to attract songbirds and other bird species migrating at night.
- The turbine would be a monopole design. Lattice towers, which have become roosting sites for birds at other wind projects, would not be used to support the wind turbine.
- Ground guy wires would not be used for support of the wind turbines. Guy wires can be a challenge for birds and bats to locate, which makes them difficult to maneuver around them and can lead to injury or death.

HCC has also reviewed and incorporated several of the BMPs from the USFWS Wind Turbine Guidelines Advisory Committee's Site Development and Construction BMPs (USFWS 2010a). Discussion of the applicable recommendations and actions are located within the "Direct and Indirect Impacts" section within Section 3.2.2.6 of this EA. HCC reviewed the May 2010 Bat Conservation International report, "Effectiveness of Changing Wind Turbine Cut-in Speed to Reduce Bat Fatalities at Wind Facilities" prepared for the Bats and Wind Energy Cooperative and the Pennsylvania Game Commission (BCI 2010a). Based on the findings of this report, HCC will consider increasing the turbine's cut-in speed during periods of known heavy bat migration (primarily during weather conditions favorable for migration during the period late August to October) after further evaluation of the specific turbine model chosen for the site.

HCC would conduct voluntary post-construction avian and bat mortality surveys. Voluntary monitoring would likely consist of an initial post-construction fall migration season (approximately 8-12 weeks, based predominantly on Indiana bat migration habits). HCC plans to implement the voluntary monitoring with in-kind support/oversight from HCC faculty/staff, or with faculty/staff support from nearby Illinois State University. This monitoring will provide data to the USFWS, DOE, and IDNR on potential avian and bat mortality associated with single wind turbines. DOE is working with USFWS Region 3 to establish an appropriate protocol for post-construction monitoring. The final protocol is expected to include details related to timing, frequency, and reporting. HCC would implement monitoring consistent with the final protocol.

2.5.2 CULTURAL AND HISTORIC RESOURCES

If archaeological resources were encountered during construction, ground-disturbing activities would immediately cease, and the IHPA would be contacted for resolution and further instruction regarding additional studies and/or potential avoidance, minimization, or mitigation measures in accordance with the NHPA.

2.5.3 HUMAN HEALTH AND SAFETY

The construction contractor and facility operator would prepare a health and safety plan per Occupational Safety and Health Administration (OSHA) requirements before commencing work. Facilities would be secured by fencing. The construction of the proposed Wind Energy Project would comply with all applicable Federal, State and local requirements. Facilities would be secured by fencing and signs warning of high-voltage areas would be installed.

2.5.4 NOISE

All construction activities would occur during normal working hours to avoid noise and other disturbances to surrounding areas, and would conform to all local noise ordinances and other applicable Federal, State, and local requirements.

2.5.5 SOIL AND GEOLOGY

HCC would require its construction contractor to use best management practices (BMPs) during construction, operation, and decommissioning to protect topsoil and to minimize soil erosion. BMPs would include at a minimum: containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material and re-vegetating disturbed areas with native species. Construction would be carried out in accordance with an approved NPDES permit, Stormwater Pollution Prevention Plan, and in compliance with all other applicable requirements and regulations.

2.5.6 WASTE MANAGEMENT

Any waste generated during construction, operation, and eventual decommissioning of the proposed project, including used lubricants, would be handled, collected, transferred and reused/recycled in accordance with applicable Federal, State, and local regulations.

2.5.7 OPERATION AND MAINTENANCE

Because an exact model has not been selected, specific operation and maintenance procedures have not been determined; however, HCC would maintain the turbine to manufacturer specifications while incorporating BMPs. All workers and students would be properly trained for turbine maintenance and safety. Routine maintenance of the turbine would be necessary to maximize performance and identify potential problems or maintenance issues. The turbine would be monitored to ensure operations are proceeding efficiently. Any problems would be reported to HCC operations and maintenance personnel, who would perform all routine maintenance. Major repairs are anticipated to be completed by the manufacture or the manufactures representative. Most servicing would be performed up-tower by a maintenance crew who would not need to use a crane to remove the turbine from the tower.

2.5.8 UTILITIES AND ENERGY

While impacts to the electromagnetic communication links (i.e., radio, microwave, radar) are not anticipated, should a Federal agency or private entity identify concerns with the proposed project, HCC would work directly with the party to resolve those concerns.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This chapter of the EA examines in detail the potential environmental impacts of the proposed project and of the No-Action Alternative for the following affected environmental resource areas: Land Use, Visual Quality, Noise, Cultural and Historic Resources, Geology and Soil, Biological Resources, Human Health and Safety, Socioeconomics, Environmental Justice, Transportation, Air Quality, and Utilities and Energy.

Although, DOE EAs commonly address other resource and subject areas, this assessment did not examine some resource areas at a higher level of detail. The focus for the more-detailed analysis was on those activities or actions that DOE determined have the potential or perceived potential for significant adverse environmental impacts.

HCC has not yet selected the wind turbine model to be constructed; therefore, the analysis in this EA used specifications for one of the largest and loudest models under consideration, the GE 1.5 MW XLE (Appendix D-5). The height of the turbine's hub would be approximately 80 meters (262 feet) and the total height would be approximately 121 meters (397 feet) to the blade tip at its highest point. The proposed project would also include:

- An approximate 366 meter (1,200 feet) new underground electrical transmission line to connect the turbine to the college's Physical Plant Building electrical switchgear, and associated system components.
- An approximate 183 meter (600 feet) permanent gravel access road would be constructed from the northern edge of the campus Parking Lot K to the proposed wind turbine location.
- Permanent fencing to surround the turbine foundation.

3.1 No-Action Alternative

Under the No-Action Alternative, baseline conditions would continue pursuant to HCC's current plan of purchasing energy from Corn Belt Energy. If the HCC Wind Energy Project was not implemented, approximately 61 percent of HCC's average daily electrical power that could be provided by the project would continue to be purchased from Corn Belt Energy. Corn Belt Energy's power supplier, Wabash Valley Power Association, generates electricity and also purchases electricity from other utilities. According to the Corn Belt Energy website (<http://www.cornbeltenergy.com/about-us/news-center/company-profile.html>), the Wabash Valley Power Association obtains approximately 78 percent of its electricity from nonrenewable fossil fuel sources such as coal, petroleum, and natural gas (Corn Belt Energy 2010). Therefore, fossil fuels are currently the primary electricity source for the HCC. Thus, carbon dioxide emissions from generating electricity to serve HCC would be higher under the No-Action Alternative, and HCC would not meet its objective to reduce its carbon footprint.

The jobs created by construction and operation of the wind turbine would not be realized and the local area would forego the economic benefit associated with these new jobs. Additionally, the

opportunity for curriculum development and the proposed change to HCC's Applied Maintenance certificate program would not be realized.

3.2 Illinois' Proposed Project

3.2.1 CONSIDERATIONS NOT CARRIED FORWARD FOR ANALYSIS

Consistent with NEPA implementing regulations and guidance, DOE focuses the analysis in an EA on topics with the greatest potential for significant environmental impact. For the reasons discussed below, the proposed project is not expected to have any measurable effects on certain resources, and the description and analyses of these resources are not carried forward for further analysis.

3.2.1.1 Intentional and Destructive Acts

DOE considers intentional destructive acts (acts of sabotage or terrorism) in its EAs and environmental impact statements (DOE 2006). Construction and operation of the proposed Wind Energy Project would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. The proposed project would not offer any particularly attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, health, or safety.

3.2.1.2 Waste Management

Solid wastes anticipated to be generated during construction include equipment packaging materials and construction related material debris. Solid wastes generated during operation of the proposed turbine would be minimal. Solid wastes anticipated to be generated during decommissioning include dismantled equipment and construction related material debris. Hazardous and regulated nonhazardous wastes are not anticipated to be generated during construction, operation or decommissioning. All wastes generated over the life of the proposed project would be handled, collected, transferred, and disposed of in accordance with all applicable Federal, State, and local regulations. Used oil (e.g., spent gear box oil, hydraulic fluid, and gear grease) is not considered a waste because it can be reused and/or recycled. Used oil would be generated during operations of the proposed project, and would be handled, collected, transferred and reused/recycled in accordance with applicable Federal, State, and local regulations.

3.2.1.3 Water Resources

3.2.1.3.1 Floodplains and Wetlands

Pursuant to 10 CFR Part 1022, DOE reviewed the IDNR Ecological Compliance Assessment Tool (EcoCAT) and the USFWS National Wetlands Inventory (USFWS 2009). The IDNR EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. The USFWS National Wetland Inventory provides information on the extent and status of the Nation's wetlands. The data consists of geospatial information and topical maps that show wetlands and deepwater habitats and can be used to determine if any wetlands in the vicinity of the proposed project. According to the IDNR EcoCAT, the Illinois Natural Heritage Database

(INHD) contains no record of wetlands in the vicinity of the proposed project location. Documentation associated with the consultation with IDNR is provided in Appendix C-1. The National Wetlands Inventory map of the proposed project location is provided in Appendix A-Figure 6.

The Federal Emergency Management Agency floodplain maps (FEMA 2005) were reviewed and no floodplains were identified on the proposed project site (Appendix A- Figure 7).

3.2.1.3.2 Ground and Surface Water

The Town of Normal provides water to HCC through the use of municipal wells, which are located greater than 305 meters (1,000 feet) from the proposed project location. According to the Illinois State Private Well Database, four private wells may be located within 609 meters (2,000 feet) to the southwest of the proposed turbine location. These private wells are likely associated with the residential homes currently located to the southwest of the site as shown in Appendix A-Figure 4.

In compliance with the *Clean Water Act*, the project site was investigated for surface water bodies. No ponds or streams occur in the immediate proposed project vicinity. Therefore, no surface waters would be impacted by the project. The nearest surface water body is a retention pond located approximately 609 meters (2,000 feet) southeast of the site. The nearest stream is Sugar Creek which is located greater than 4 km (2.5 miles) south of the turbine location.

Construction of the single turbine is not anticipated to have an adverse impact to surface, ground and drinking water resources in the project area. No runoff or discharges from the proposed project construction area would directly enter Sugar Creek. An NPDES permit would be acquired prior to any construction related earthwork. The construction would be carried out in accordance with an approved soil erosion and sedimentation control plan and the associated NPDES permit, and in compliance with all other applicable requirement, regulations, and sediment and erosion pollution control BMPs.

3.2.1.3.3 Wild and Scenic Rivers

DOE reviewed the IDNR website (<http://www.dnr.state.il.us/>) and the National Park Service's national rivers inventory website (<http://www.nps.gov/ncrc/programs/rtca/nri/states/il.html>) (DOI, 2010). The proposed project site is not located within a waterway, corridor, or drainage area of a stream or river protected under State Law (State of Illinois Public Act 84-1257) or a waterway included in the National Wild and Scenic River System. The closest designated Wild and Scenic River is the Middle Fork of the Vermilion River, approximately 109 km (68 miles) southeast from the proposed project location.

3.2.2 CONSIDERATIONS CARRIED FORWARD FOR FURTHER ANALYSIS

3.2.2.1 Land Use

The proposed HCC wind turbine would be located at the northern end of the campus, approximately 244 meters (800 feet) south of I-55. HCC is located in the northwest corner of the Town of Normal, McLean County, Illinois (Appendix A- Figures 1 through 5). The land use

pattern in the vicinity of the proposed Wind Energy Project is institutional and agricultural. The Town of Normal has the project area zoned S-2 Public Lands and Institutions District (Appendix A- Figure 8). The property is bounded on the north by I-55 with agricultural land located further north of the interstate. To the south, the property is bounded by the HCC campus, with W. Raab Road and agricultural land located further south. Three single-family residences are located to the southwest of HCC's campus. This agricultural land (immediately to the west of the campus property) is under jurisdiction of McLean County and it is not within the limits of the Town of Normal. A residential mobile home park is located to the east of the property and approximately 1,250 meters (4,100 feet) east of the project site. While the mobile home park property is currently under residential use, it is zoned as a B-1 General Business District. The nearest residential areas include the three homes referenced above, located between approximately 564 and 716 meters (1,850 and 2,300 feet) southwest of the proposed turbine location, and an apartment complex located approximately 640 meters (2,100 feet) south-southwest of the proposed turbine location (Appendix A- Figure 4). The campus consists of nine buildings including the Student Commons, Community Commons, Instructional Commons and Instructional Commons North Buildings, the Workforce Development Center, Child Development Lab, Community Education Center, Receiving and Storage Building and the Physical Plant Building (Appendix A- Figure 5). A Fitness and Recreation Center is currently under construction and is to be located to the north of the Community Education Center. A Student Center addition is also under construction and is located at the north side of the Student Commons Building. The buildings closest to the proposed turbine include the Receiving and Storage Building and the Child Development Lab, as these buildings are located at the northern edge of the campus.

On September 21, 2010, under a willing seller agreement, the HCC Board of Trustees voted to purchase all land (approximately 96 acres) west of the campus's current western property line up to the I-55/I-74 interchange. The property was acquired on October 29, 2010. The purchase represented a strategic acquisition for future growth. Specific expansion plans do not exist at this time. There are three residential units on the property; two owner occupied and one rental. It is anticipated that the residents of the owner-occupied units would be allowed to remain in their homes for up to seven years; however, HCC would own these structures. It is also anticipated that the land currently used for agricultural purpose would continue to be leased for that purpose for the near future.

The center of the Town of Normal is located approximately 3.2 km (2 miles) southeast of the proposed wind turbine site, and the City of Bloomington is located approximately 6.08 km (3.8 miles) southeast (Figure 2-1). The Central Illinois Regional Airport at Bloomington-Normal is located approximately 8.8 km (5.5 miles) to the southeast of the proposed project. The predominant land use within a 1.6 km (1 mile) radius of the proposed project site is agricultural. Higher density residential development is present at distances greater than 1.6 km (1 mile) to the east, southeast, and south, while agricultural and open space dominate the landscape to the northeast, north, northwest, west, and southwest for more than 8 km (5 miles).

Direct and Indirect Impacts

Implementation of the proposed project would permanently commit 0.2 acre (8,712 square feet) and temporarily commit approximately 2 acres of previously disturbed land. The general land use of the area is and would continue to be institutional and agricultural. The area immediately

surrounding the proposed tower location would continue to be used for residential, mixed-use, and agricultural purposes. The proposed project would not result in any direct or indirect impacts or any irretrievable commitment of land.

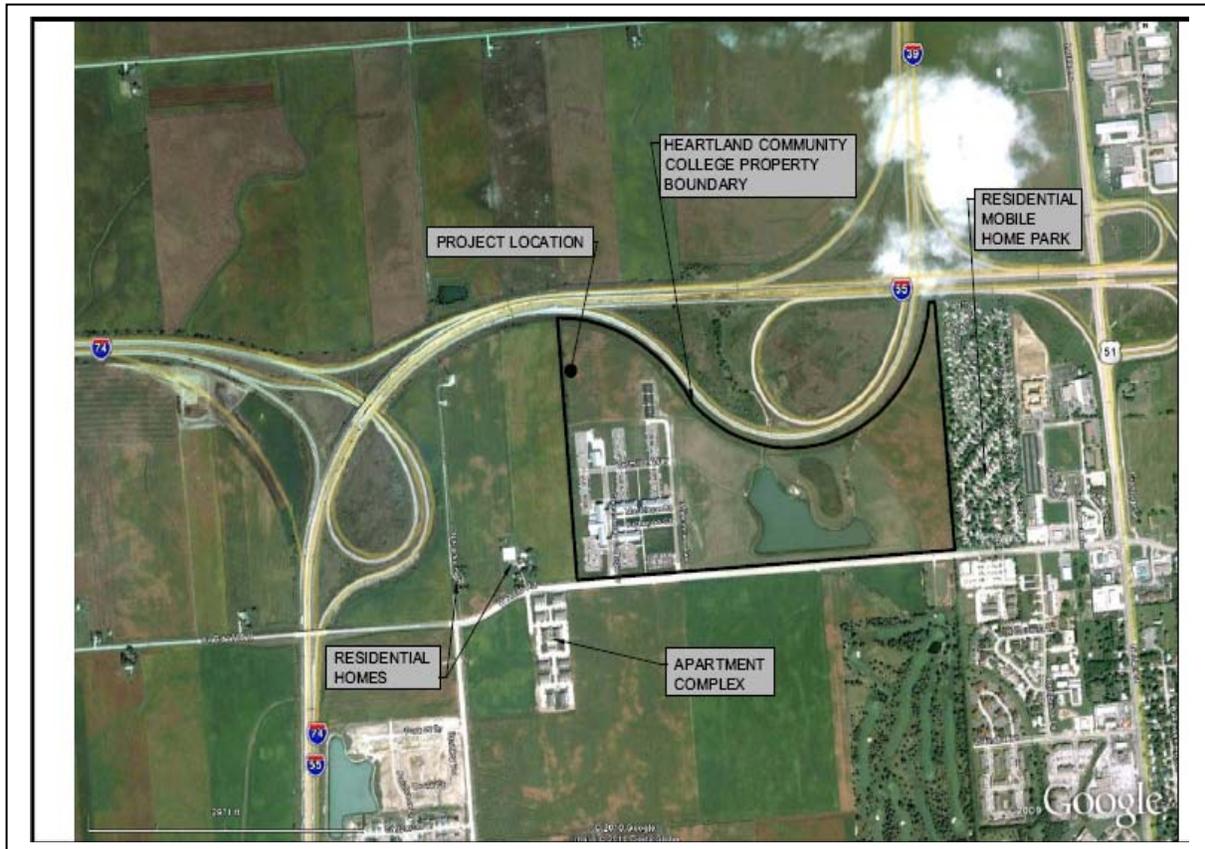


Figure 3-1. Project Location on Aerial Photo

3.2.2.2 Visual Quality

The existing viewshed of the project area is primarily agricultural and mixed-use. Vertical features in the area include a 50 meter (164-foot) meteorological tower located approximately 381 meters (1,250 feet) to the west of the proposed turbine location. All other features in the immediate project area do not have a strong vertical component. The nearest day-to-day viewers of the proposed turbine would be employees, students, and visitors at HCC. Other potential viewers of the proposed turbine, located within a 1.6 km (1 mile) radius of the project area include:

- Vehicles on I-55, I-39, and I-74/Route 51;
- Surrounding farm residences; nearest residence located approximately 0.56 km (0.35 mile) southwest of the project site;
- Residences located along Parkside Road, approximately 1.2 km (0.75 mile) southwest of the project site;

- Normal Community West High School, approximately 1.6 km (1 mile) southwest of the project site;
- Apartment complex located along W. Raab Road, approximately 0.64 km (0.4 mile) south of the project site;
- Users of the Illinois State Golf Course, located approximately 1.2 km (0.75 mile) southeast of the project site; and
- Residential mobile home park, located approximately 1.25 km (0.77 mile) east of the project site.

3.2.2.2.1 Visual Simulations

To address potential concerns about the aesthetic impacts of the proposed project, HCC commissioned a visual simulation of the proposed turbine from various viewpoints. These viewpoints were chosen with the intent to capture predominantly unobstructed views of the proposed project from multiple directions and key receptor vantage points. Photos were taken from these viewpoints and an image of a wind turbine was rendered into the photos at the proper scale and location. See Appendix B for these simulations showing the location of the photographs selected for simulation, and the simulations themselves¹.

Figure 3-2 shows the locations of the photo simulations. The following summarizes the images and the extent to which the turbine would be visible or obstructed:

- Location 1: Looking east from I-55/I-74 at I-55/Highway 51 – Turbine visible, foundation and tower partially shielded by grass-covered berm;
- Location 2: Looking south from E. North Road – Turbine visible;
- Location 3: Looking southwest from I-55/I-39 – Turbine visible, foundation and tower partially shielded by trees/vegetation;
- Location 4: Looking northwest from W. Raab Road – Turbine visible, foundation and tower partially shielded by HCC buildings;

1. Photo simulations are based on an original turbine location approximately 300 feet northeast of the current location under evaluation. The location was changed to remove existing parking lots from the fall zone. DOE has determined that based on the minor change in proposed turbine location, the previously prepared photo simulations adequately represent the visual impacts of the turbine, and preparation of new images was not warranted.

- Location 5: Looking northeast from W. Raab Road – Turbine visible, foundation and tower partially shielded by corn crops;

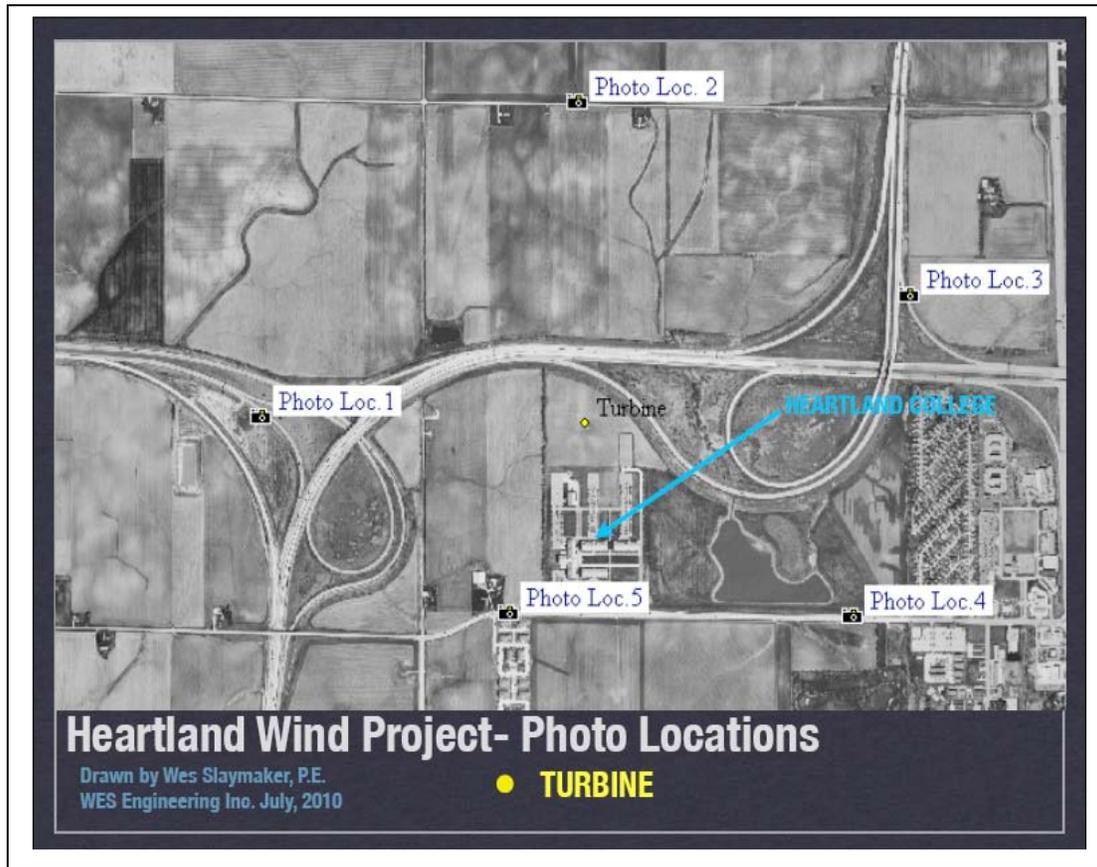


Figure 3-2. Heartland Community College Photo Simulation Locations

3.2.2.2.2 Shadow Flicker

Another potential visual impact associated with wind turbines is shadow flicker. Shadow flicker is defined as alternating changes in light intensity caused by a moving object (such as a rotating rotor blade) casting shadows on another object. Shadow flicker from wind turbines can occur when moving turbine blades pass in front of the sun, creating alternating changes in light intensity or shadows. These flickering shadows can cause an annoyance when cast on nearby “receptors,” such as residences, schools, and hospitals. The spatial relationship between a wind turbine and a receptor, the location of trees, topography, buildings, and other obstacles, and weather characteristics such as wind speed/direction, and cloud cover, are key factors related to shadow flicker impacts. Shadow flicker becomes much less noticeable at distances beyond 305 meters (1,000 feet). At distances beyond 1,000 meters (3,280 feet), the changing light intensity is low enough that a person does not perceive the turbine rotor as “chopping” through the sun, but rather as an object with the sun behind it.

For shadow flicker to occur, the sky must be clear, and the turbine must be operating, otherwise no moving shadows are cast. For shadow flicker to occur at the location of a shadow receptor, the turbine rotor must be located in the line of sight from the receptor to the sun. Furthermore,

for the shadow flicker to be visible, the change in light intensity must be above the level of perception of the human eye. Shadow flicker intensity decreases with greater distance from the receptor to the turbine, up to a point where the change in light intensity is below what the human eye can distinguish. As distance between the receptor and the turbine increases, the proportion of the sun that is blocked decreases and the shadows become less intense and less discernible. Shadow flicker intensity is also significantly reduced if the plane of the rotor is at an angle other than perpendicular to the line of sight from the receptor to the sun, again because a smaller proportion of the sun is blocked by the passing blades. Ambient lighting conditions also affect the visibility of shadow flicker. Changing light intensity is more noticeable in a darkened room than outdoors where ambient light levels are higher.

There is some concern in the public that shadow flicker from wind turbines can cause epileptic seizures. Shadow flicker from wind turbines occurs much more slowly than the light “strobing” associated with seizures. The strobe rates necessary to cause seizures in people with photosensitive epilepsy are 3 to 5 flashes per second and large wind turbine blades are not engineered to rotate at such a high rate (AWEA 2009). For example, the turbine model GE 1.5 MW XLE is engineered for a rotational speed between 10.1 and 18.7 blade rotations per minute.

A shadow flicker study was conducted in September 2010 and is provided as Attachment D-3 in Appendix D.

Direct and Indirect Impacts

The proposed project would affect the viewshed in the project area. The turbine would be a dominant vertical component in the landscape due to its height; however, the visual impact of the wind turbine is reduced because of other already existing vertical elements in the area (e.g., transmission line towers). Installation of the turbine on a landscape that already has vertical features has less of an impact than placing it on a flat landscape with no other vertical development. The visibility of the proposed wind turbine would vary by location due to area development and land use patterns. While it is not possible to quantify the visual impact of a Wind Energy Project, visual impacts can be a concern with such projects. Concerns about the visual impacts of Wind Energy Projects generally revolve around aesthetic impacts and shadow flicker impacts associated with the rotating turbines.

According to the Shadow Flicker Report referenced above, the results indicate the shadow impact would affect the Child Development Laboratory building located at the northeastern edge of the HCC campus [approximately 322 meters (1,056 feet) from the proposed turbine location]. According to the report, the shadow impact would occur in May, June and July with the greatest time of 70 minutes per day from 5:30 pm to 6:40 pm. The Child Development Lab operates weekdays from 7:30 am to 5:00 pm and offers care for children of HCC students, faculty and staff, ages 6 weeks to 6 years. Based on the results of the Shadow Flicker Report and the hours of operation of the daycare facility, shadow flicker would not be experienced by children or care providers either in or around the Child Development Lab. Shadow flicker may be experienced during the evening when the only occupants would be students at night classes. If any of the west facing rooms were to be utilized during the limited time period when shadow flicker effects are produced, the building is equipped with blinds to mitigate the impacts. Overall, occupants of the HCC Child Development Lab building would experience shadow flicker less than 1 percent of the time during the year. The Fitness and Recreation Center would experience a maximum

estimated 8 hours of shadow flicker per year. No other campus buildings, and no residences or off campus buildings would experience shadow flicker (Figure 3-3).

The shadow flicker study also determined that there would be some areas of I-55, and the off-ramp from I-55 E to I-39 N, a total length of approximately 1,066 meters (3,500 feet), would experience shadow flicker. The majority of the impacted roadway would experience less than 120 hours of shadow flicker in one year. As there are approximately 4,380 hours of daylight per year at 42 degrees latitude, 100 hours of shadow flicker equates to having no impacts for 97 percent of the daylight hours in a year. Also, approximately 762 meters (2,500 feet) of the off-ramp from I-55 E to I-39 N would experience between 60 and 200 hours of shadow flicker per year, which equates to at least 95 to 98 percent of the daylight hours in a year with no impacts. The brief experience would be comparable to driving late or early in the day while sunlight flickers through nearby trees, vegetation, or other tall structures, conditions experienced often by most drivers.

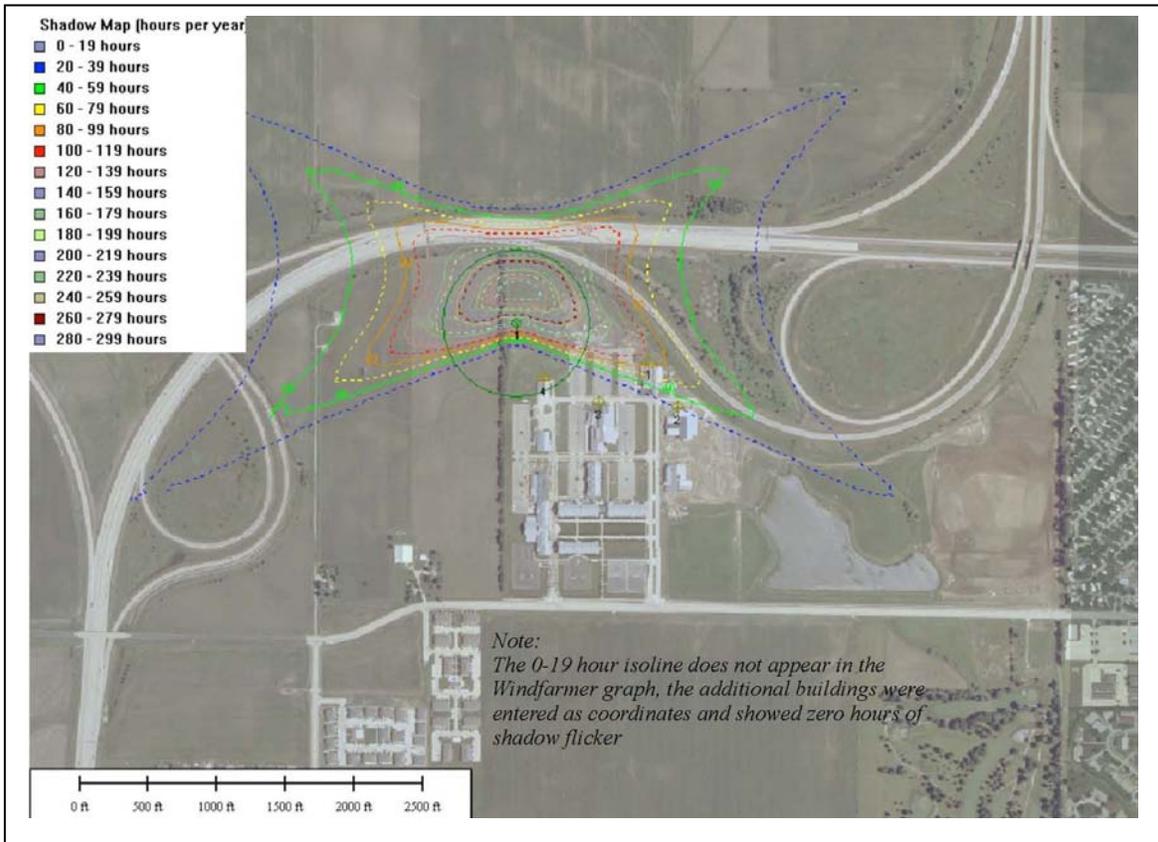


Figure 3-3. Heartland Community College Shadow Flicker Map

Shadow flicker becomes indiscernible at distances beyond 1 km (3,280 feet), Impacts associated with receptors near or beyond this distance generally receive less than 25 hours of shadow flicker per year and the actual shadow becomes defuse by the ambient light so it is not a distinct shadow assuming that the weather is clear, sunny, and windy every day. However, because it is extremely unlikely that the weather would be clear, sunny, and windy every day, shadow flicker would have no impacts for more than 99.5 percent of the daylight hours in a year.

If shadow flicker impacts become an annoyance to nearby receptors, HCC would discuss mitigation techniques with the affected receptor(s) including but not limited to purchasing blinds for windows or planting indigenous trees to attenuate for impacts.

3.2.2.3 Noise

Sound is a result of fluctuating air pressure. The standard unit for measuring sound pressure levels is the decibel. A decibel is a unit that describes the amplitude (or difference between extremes) of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals. Typically, environmental and occupational sound pressure levels are measured in decibels on an A-weighted scale (dBA). The A-weighted scale deemphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear [using the A-weighting filter adjusts certain frequency ranges (those that humans detect poorly)] (Colby et al. 2009).

Noise is any unwanted, undesirable sound. It has the potential to interfere with communication, damage hearing, and, in most cases, it is perceived as an annoyance. Noise can occur in different volumes and pitches depending on the type of source and the distance away. It is important to consider the amount of noise that would be created during both the installation and operation phases of a project so as to not inconvenience people working or living in the surrounding areas (HUD 2009).

The U.S. Environmental Protection Agency (EPA) identifies noise levels necessary to protect public health and welfare against hearing loss, annoyance, and activity interference in its document, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). These noise levels are in terms of “24-hour exposure” levels or an average of acoustic energy over period of 24 hours, and over long periods of time such as years. A cumulative 24-hour measure of noise accounts for the moment-to-moment fluctuations in A-weighted decibel levels due to all sound sources during 24 hours, combined. For example, occasional higher noise levels would be consistent with a 24-hour energy average of 70 decibels, so as long as a sufficient amount of relative quiet is experienced for the remaining period of time.

A 24-hour exposure level of 70 decibels is indicated by EPA as the level of environmental noise at which any measurable hearing loss over a lifetime may be prevented, and levels of 55 decibels outdoors and 45 decibels indoors are defined as preventing activity interference and annoyance to human receptors. These levels of noise are those at which spoken conversation and other daily activities such as sleeping, working and recreation, can readily occur.

In 1981, the Federal government concluded that noise issues were best handled at the State or local government level. As a result, the EPA phased out Federal oversight of noise issues to transfer the primary responsibility of regulating noise to State and local governments. The EPA has an existing design goal of a Day Night Average Sound Level (DNL) less than or equal to 65 dBA and a future design goal DNL of 55 dBA for exterior sound levels (EPA 1977). It is important to note that the EPA noise guidelines are design goals and not enforceable regulations. However, these guidelines and design goals are useful tools for assessing the affected environment.

The Illinois Pollution Control Board (IPCB) noise regulations are set forth in Illinois Administrative Code Title 35, Subtitle H, Chapter I, Part 901 Sound Emissions Standards and Limitations for Property-Line Noise-Sources. The Illinois Administrative Code sets limits of allowable sound criteria for a variety of different land classifications (i.e., business, industrial, agricultural, residential). IPCB regulations apply to noise generators and receptors in relation to their respective property lines. For this proposed project noise generated and received within HCC’s property line. IPCB standards are not applicable to any receptor on campus. Unlike the EPA noise guidelines the IPCB noise regulations are enforceable.

The GE 1.5 MW XLE, with a hub height of 80 meters (262 feet), and rotor diameter of 80.5 m (264 feet,) was used for this analysis. According to the GE 1.5 MW XLE specifications, the octave band sound power levels at the nacelle are shown in Table 3-1 (from Appendix D-3). This corresponds to a maximum sound level at the nacelle (turbine generator) of 104 decibels.

Table 3-1. GE 1.5 MW XLE Wind Turbine Sound Power Levels

Frequency (Hz)	31	63	125	250	500	1,000	2,000	4,000	8,000
Sound Power Level (dB)	–	83.4	92.2	97.8	99.4	97.7	93.4	86.6	84.8

(–) = value not provided.

dB = decibel.

Hz = hertz.

Table 3-2 shows some sound pressure levels associated with common activities measured in dBA. For comparison, the sound from a wind turbine at distances between 305 and 610 meters (1,000 and 2,000 feet) is generally within 40 to 50 dBA (Colby et al. 2009, referenced herein).

The existing environment for the proposed wind turbine location is a turf field on the northern end of the HCC campus. The north boundary of the campus is bounded by I-55 an eight lane interstate highway and beyond that by agricultural property. Additional HCC property and the I-55 off-ramp to northbound I-39 are located to the east of the project location, with the nearest development being a residential trailer park approximately 1,250 meters (4,100 feet) east of the project location. W. Raab Road forms the southern boundary of the campus, 610 meters (2,000 feet) south of the project location; agricultural property is currently the predominant use south of W. Raab Road, with multi-unit residences starting to be developed further south and west of the campus. The area south of W. Raab Rd., while currently agriculture, is zoned for a mix of residential densities (multi-family, single-family, mixed residential), commercial development and “University District.” Agricultural land (McLean County zoning designation) borders the western property boundary of HCC (north of W. Raab Road), with a strip of undeveloped commercial land (McLean County zoning designation) west of North Parkside Rd., abutting the eastern boundary of I-55/I-74, and additional agricultural land located further west (McLean County zoning designation). Three single-family homes are located on this agricultural property, the closest being approximately 564 meters (1,850 feet) from the proposed project location.

On September 21, 2010, the HCC Board of Trustees voted to purchase all land (approximately 96 acres) west of the campus’s current western property line up to the I-55/I-74 interchange. The property was acquired on October 29, 2010. The purchase represented a strategic acquisition for

future growth. Specific expansion plans do not exist at this time. There are three residential units on the property; two owner occupied and one rental. It is anticipated that the residents of the owner occupied units would be allowed to remain in their homes for up to seven years; however, HCC would own these structures. These residential units are labeled Dwellings 9 and 10 in Figure 3-4 below or in the Shadow Flicker and Noise Report (Appendix D-3).

Table 3-2. Common Outdoor and Indoor Sound Sources and Typical Associated Sound Levels (dBA)

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Carrier deck jet operation	140	
	130	Pain threshold
Jet takeoff (200 feet)	120	
Auto horn (3 feet)	110	Maximum vocal effort
Jet takeoff (1000 feet)	100	
Shout (0.5 feet)		
N.Y. subway station	90	Very annoying
Heavy truck (50 feet)		Hearing damage (8-hour, continuous exposure)
Pneumatic drill (50 feet)	80	Annoying
Freight train (50 feet)	70 to 80	
Freeway traffic (50 feet)		
	70	Intrusive (Telephone use difficult)
Air conditioning unit (20 feet)	60	
Light auto traffic (50 feet)	50	Quiet
Living room	40	
Bedroom		
Library	30	Very quiet
Soft whisper (5 feet)		
Broadcasting/Recording studio	20	
	10	Just audible

Adapted from Table E, "Assessing and Mitigating Noise Impacts", NY DEC, February 2001.

Table 3-2 is cited in Colby et al. 2009.

The nearest on-campus buildings to the proposed turbine location include the Receiving and Storage Building located approximately 140 meters (460 feet) south of the proposed turbine, the Child Development Lab, located approximately 305 meters (1,000 feet) southeast of the turbine, and the Workforce Development Center, located approximately 259 meters (850 feet) south-southeast of the turbine location. Multiple HCC parking lots would be located within a 122 to 305 meter (400- to 1,000-foot) radius to the south-southeast of the turbine location. Heartland is a community college with no on-campus housing.

Direct and Indirect Impacts

Temporary noise would be generated by construction equipment during daytime hours for the duration of the approximately 5 month active construction phase. However, due to the noise generated from the existing on-campus activities and traffic and interstate/roadway traffic as described above, the wind turbine construction noise is not expected to significantly increase daytime ambient noise levels. Furthermore, the nighttime ambient noise environment would not be impacted by the construction phase of the proposed project.

Modern wind turbines have been designed to significantly reduce the noise of mechanical components, so the most audible noise is the sound of the wind interacting with the rotor blades. Modern wind turbines are generally quiet in operation and the sound is very low compared to that of the traffic and campus activities.

Sound Pressure Levels from point sources diminish at a rate of approximately 6 decibels per doubling of distance from the source. At a distance sufficiently far from the turbine, turbine noise levels would be below ambient noise levels and inaudible. Table 3-3 shows the estimated octave band sound pressure level due to the turbine at the nearest off campus receptor (a single-family residential home) approximately 564 meters (1,850 feet) southwest of the proposed turbine location. These values were developed as described above, using a maximum sound power level of 104 decibels. This value represents the sound power level at the nacelle when wind speeds exceed 17.9 miles per hour (8 meters per second).

Table 3-3. Estimated Turbine Sound Pressure Level at Nearest Residential Receptor (single-family home located approximately 564 meters (1,850 feet) southwest of proposed turbine location – Receptor 9 in Figure 3-4).

Frequency (Hz)	31	63	125	250	500	1,000	2,000	4,000	8,000
Nearest residential receptor	55.9	45.9	44.7	43.3	38.9	34.2	29.9	22.1	22.3
IPCB Nighttime Standard (10 p.m. – 7 a.m.) ^a	69	67	62	54	47	41	36	32	32

a. IPCB nighttime standards are more stringent than daytime standards; therefore, if there were no exceedances during the night, there would not be exceedances during the day.

Hz = hertz.

IPCB = Illinois Pollution Control Board.

Table 3-3 also shows the IPCB nighttime (most stringent) noise standard for sound emitted from Class C lands [Per IPCB regulations, alternative energy sources (i.e., wind projects) are Class C] to Class A lands, which includes residences.

Estimated turbine noise levels under the above scenario at the nearest residential receptor are below IPCB nighttime noise standards (most stringent). Turbine noise levels also would be lower than EPA DNL guidelines of 55 to 65 dBA. Figure 3-4 below shows the modeled sound output from the proposed turbine. Sound levels were determined using the WindFarmer model and maximum sound power level of 104 decibels (WES 2010)

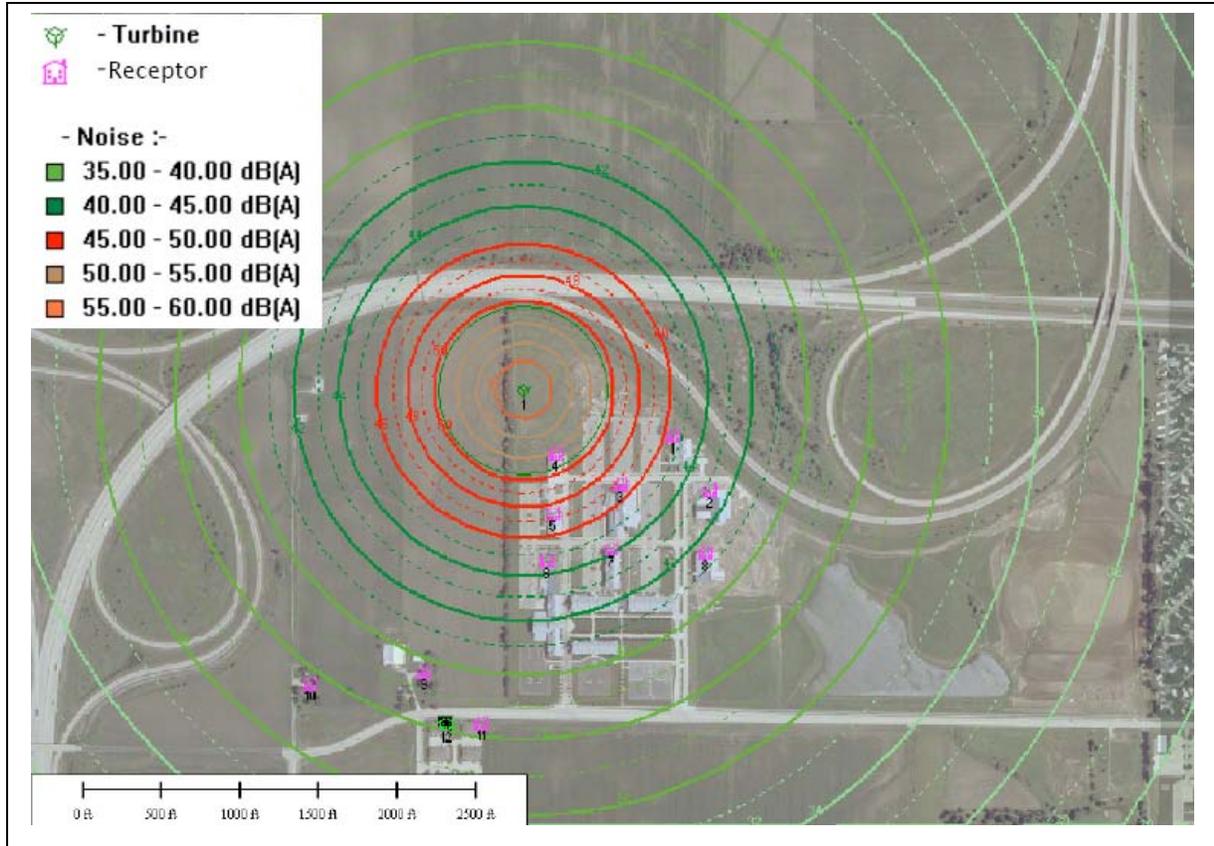


Figure 3-4. Heartland Project Sound Pressure Levels Contour Map

Estimated turbine noise levels under the above scenario at the nearest on campus buildings [Receiving and Storage Building (Receptor 4), Child Development Lab (Receptor 1), and the Workforce Development Center (Receptor 3)] would range between 45.48 and 51.80 dBA, which is lower than EPA DNL guidelines of 55 to 65 dBA.

DOE did not identify any information that suggested children should be considered a particularly sensitive receptor with respect to noise impacts. Therefore, children attending the Child Development Lab are not expected to experience significant impacts as a result of the noise generated by the proposed project.

No significant noise impacts are expected. These results represent maximum potential outdoor results, and use of these buildings is predominantly indoors, thereby reducing the experienced sound level even further. Furthermore, the mechanical, electrical, and HVAC systems, as well as routine movement of students, faculty, and staff and classroom activities (or mechanical equipment operation in the case of the Receiving and Storage Building) all contribute to ambient noise within the buildings (estimated at 40 to 60 dBA, based on Table 3-3) that would be expected to meet or exceed that produced by the turbine in these areas.

3.2.2.4 Cultural and Historic Resources

The NHPA is the primary Federal law protecting cultural, historic, Native American, and Native Hawaiian resources. Section 106 of the NHPA (36 CFR Part 800) requires Federal agencies to assess and determine the potential effects of their proposed undertakings on prehistoric and historic resources (e.g., sites, buildings, structures, and objects) and to develop measures to avoid or mitigate any adverse effects. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO).

On August 28, 2009, DOE executed a Memorandum authorizing its ARRA grant applicants under the Energy Efficiency and Conservation Block Grants (EECBG), Weatherization, and SEP programs to initiate Section 106 consultations pursuant to 36 CFR 800.2(c)(4)(DOE, 2009). On May 6, 2010, the Illinois Programmatic Agreement was executed with the DOE, which further solidified a recipient's ability to initiate consultation with the SHPO. On March 26, 2010, HCC submitted a cultural/historical resources consultation letter to the IHPA for the proposed project in accordance with the submittal guidelines (<http://www.illinoishistory.gov/PS/rcdocument.htm>).

The IHPA evaluated the proposed project in accordance with the standards for determining adverse effects in 36 CFR Part 800, using an aboveground area of potential effect (APE) consisting of a 1.6 km (1 mile) radius around the proposed project location as the distance with the potential to cause alterations in the character or use of historic properties, if present. While conditions can vary from location to location, in general the likelihood of a clear, unobstructed vista of a wind turbine beyond 1.6 km (1 mile) is small and diminishes rapidly as one travels further away from the site. In particular, the extent to which a single turbine dominates the landscape diminishes with distance. Varied topography such as elevation changes, and other site-specific characteristics such as power line corridors, structures associated with human development, tall towers, tree canopy, and natural areas of dense vegetation, all serve as common visual obstructions that block expansive views of a given project site from various directions. In conducting its evaluation, IHPA considered the potential impacts to archaeological resources within the footprint and immediate vicinity of the proposed construction area. They also analyzed the potential impacts to the character of the physical features that contribute to historic significance and integrity of significant historic features of properties listed in or potentially eligible for listing in the National Register of Historic Places (NRHP).

Concurring with the appropriateness of a 1.6 km (1 mile) radius APE, DOE also conducted a search to identify historic properties that the proposed wind turbine might adversely affect. A review of the NRHP revealed no properties listed within 1.6 km (1 mile) of the project location. The closest listed property was the Gymnasium Building at Illinois State University located approximately 3.2 km (2 miles) south/southeast of the project location. The IHPA's Historic Architectural and Archaeology Resources Geographic Information System (HAARGIS) was reviewed to identify structures potentially eligible for listing in the NRHP. HAARGIS identified no sites potentially eligible for listing in the NRHP (status designated as "Undetermined") within a 1.6 km (1 mile) radius. The closest potentially eligible property was the former McLean County Tuberculosis Sanatorium at the west end of Summit St. at Main St., approximately 2.4 km (1.5 miles) southeast of the project location. Further review concluded that there were no National Natural Landmarks within the APE [closest being Funks Grove, approximately 33.8 km (21 miles) to the southwest], and no sites on the IHPA's list of Illinois State Historic Sites within

the APE [closest being the David Davis Mansion in Bloomington, approximately 6.4 km (4 miles) to the southeast].

According to “Indian Entities Recognized and Eligible to Receive Services” from the U.S. Bureau of Indian Affairs in 72 FR 13648 dated March 22, 2007, there are no Federally recognized tribes in the state of Illinois. There are also no State-recognized tribes within Illinois. However the IHPA provided DOE with a list of tribes with an historic presence in various regions of Illinois (Appendix D-6). DOE utilized this list to determine the relevant tribes within the APE of the proposed project. DOE provided public scoping notifications to the listed contacts for the relevant tribes for their initial review and comment on the proposed project. DOE received no comments in response to the scoping notification. DOE also provided the Tribal contacts with the notice of availability for the draft EA and associated 15-day comment period; no comments were received related to that correspondence. Tribal contacts are listed in the stakeholder list (Appendix D-4). No comments regarding DOE’s Proposed Action were received from the tribes contacted.

Direct and Indirect Impacts

As described above, no properties listed on or potentially eligible for listing on the NRHP were identified within the APE. It is DOE’s conclusion, therefore, that, based on information reviewed and through consultation with the IHPA, no historic properties would be affected by the proposed project [per 32 CFR 800.4(d)(1)]. Through IHPA’s review of its internal archaeological database it was concluded that impacts to archaeological resources during construction of the proposed project were not likely. On April 6, 2010, the IHPA provided a written response to HCC indicating its cultural resource review was complete and concluding that, “no historic properties are affected. We therefore have no objection to the undertaking proceeding as planned” (Appendix C-2).

If archaeological resources are encountered during construction, activities would cease, and the IHPA would be contacted for further instruction regarding additional studies and/or potential mitigation measures required in accordance with the NHPA.

3.2.2.5 Geology and Soil

3.2.2.5.1 Geology

The project site lies within the Bloomington Morainic System. A moraine is a surface feature originating from depositional activities of glaciers, which passed through McLean County in several “waves.” The rolling land features of the area are attributable to moraines with postglacial erosion activity contributing to surface relief. Material carried and subsequently deposited by glaciers included clay, silt, sand, gravel, and boulders. The unconsolidated materials lying below the site are more than 61 meters (200 feet) thick (Piskin and Bergstrom 1975).

Meltwater from receding glaciers also carried sediments of clay, sand, and gravel. These sediments were deposited along ancient drainage ways and in many areas created thick deposits of sand and gravel, which currently serve as aquifers for groundwater withdrawals.

The upper portion of the unconsolidated material is clayey material. Water movement through clay materials is very slow. Below the unconsolidated deposits lies consolidated sedimentary bedrock of Pennsylvanian age. Bedrock in this area is comprised of sandstone, creviced limestone, fractured shale and coal. These formations do not constitute what would be considered a “good” aquifer because of low permeability and low water yielding characteristics. The upper bedrock in this area would only be explored for water resources for a small supply if all attempts to secure a water supply from the unconsolidated materials failed.

Seismic activity in McLean County is not considered a significant risk. The greatest frequency (81 percent) of seismic activity in Illinois occurs in southern Illinois. The last recorded seismic activity originating in McLean County was recorded in 1885. The strength of this earthquake registered as Level III on the Modified Mercalli Intensity Scale. At this strength there are typically no effects on structures, but felt noticeably indoors and standing cars may rock (Heigold and Larson 1990).

3.2.2.5.2 Soil

The surficial soils in the area of the assessment are defined on the Soil Survey Map of McLean County, Soil Conservation Service, United States Department of Agriculture, as shown below in Table 3-4 and in Appendix A- Figure 9 (USDA 1998).

Table 3-4. Project Area Surficial Soils

ID#	Description
154	Flanagan silt loam
145B2	Sable silty clay loam

ID# 154 is classified as Flanagan silt loam. Flanagan silt loam is described as a somewhat poorly drained soil with moderate permeability in the upper part and moderately slow permeability in the underlying material. This type of soil displays a high shrink-swell potential and slow runoff. Flanagan silt loam is well suited for croplands, pasture and hay, and poorly suited for dwellings and septic tank absorption fields.

ID# 145B2 is classified as Saybrook silt loam. Saybrook silt loam is described as moderately well drained soil with moderate permeability in the upper part and moderately slow permeability in the underlying material. This type of soil displays a moderate shrink-swell potential and medium runoff. Saybrook silt loam is well suited for croplands, pasture and hay, is moderately suited for dwellings and poorly suited for septic tank absorption fields.

A request for consultation regarding the project was made to the Natural Resources Conservation Service, Normal, Illinois, Service Center via letter dated July 28, 2010 (Appendix C-6). A response from the Service Center has not been provided at this time.

Direct and Indirect Impacts

Data reviewed from the Illinois State Geological Survey would suggest there is a low risk of seismic activity jeopardizing the structural integrity of the proposed wind turbine.

The proposed project would not impact prime farmland since the project is to be located on previously disturbed land and is currently grass fields. In addition, the land has previously been disturbed for the development of the college campus.

Site preparation and project construction would result in soil disturbance; however, soils at the proposed turbine location have previously been disturbed and graded. HCC would use BMPs and employ NPDES requirements during construction to protect topsoil and to minimize soil erosion. BMPs would include at a minimum the following: containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material and re-vegetating disturbed areas.

3.2.2.6 Biological Resources

Birds and bats can be injured or killed if they fly into operating wind turbines. In addition, birds, bats and vegetation could be disturbed by construction and decommissioning activities associated with the proposed project. The USFWS and IDNR are responsible for protecting various plant and animal species and associated habitat in the proposed project area. A primary emphasis of these agencies is to ensure appropriate actions are taken to reduce or mitigate potential harm to protected species and habitat.

A literature and database review was used to identify bird and bat species known to occur within or in close proximity to the project area. References include but are not limited to North American Breeding Bird Survey (BBS) data (USGS 2010), INHD (2010), Illinois Natural History Survey (2005, 2009) and the USFWS (2010b). The regulatory status (i.e., threatened, endangered, special concern) of rare birds potentially occurring in the project area was reviewed and summarized. Bat species distributions and habitat information were obtained from Bat Conservation International.

3.2.2.6.1 Migratory Birds

The *Migratory Bird Treaty Act* (16 U.S.C. 703-7012; MBTA) implements four international conventions that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests, except when specifically authorized by the U.S. Department of Interior. While MBTA has no provision for allowing unauthorized take, the USFWS recognizes that some migratory birds may be taken during activities such as wind turbine operation even if all reasonable measures to avoid them have been implemented.

According to the United States Geological Survey North American BBS, no BBS routes were found to be located within 8 km (5 miles) of the project area. According to the Birding McLean County website, no bird viewing sites were listed within the immediate vicinity of the project location (Birding McLean County 2007). Additionally, the IDNR lists only one location in McLean County (Moraine View State Park, located approximately 27 km (17 miles) southeast of the project location) as being among the best birding areas in Illinois (IDNR 2010). However, the HCC retention pond, the prairie plot to the north of the pond, and the associated greenspace near the project site are considered by local experts to be bird viewing sites, where a variety of species can be observed. Recent breeding bird and waterfowl counts were provided by local experts documenting the presence of such species on HCC's campus and around the retention

pond. The data results are included in Appendix D-7. There are no known major raptor migration corridors according to the USFWS's map of Fall and Spring Migratory Bird Information (Appendix A- Figures 13 and 14), no Audubon Important Bird Areas (IBAs) (Cecil et al. 2009) and no known other areas of high bird concentration or use in close proximity to the project area. The closest IBA to the proposed project is the Clinton Lake State Recreation Area located approximately 45 km (28 miles) to the south/southeast. Additionally, highly suitable avian habitat within the project area is limited; as the project area consists of a previously disturbed field, which was and continues to be disturbed with the ongoing expansion of the college (see Appendix A- Figure 4 and 5). The surrounding area is comprised of primarily agricultural lands and previously developed areas in and around the Town of Normal and the city of Bloomington. There are no riparian corridors or naturally occurring woodland habitat occurring within 3.2 km (2 miles) of the proposed project area.

3.2.2.6.2 Bald and Golden Eagles

Bald and golden eagles are included under the MBTA, and are afforded additional legal protection under the *Bald and Golden Eagle Protection Act* (16 U.S.C. 668-668d). On August 8, 2007, the bald eagle was removed from the list of Threatened and Endangered Wildlife (72 FR 37345, July 9, 2007). Subsequent to the delisting, the USFWS issued a final rulemaking which provided a vehicle for limited take of bald and golden eagles, where the take to be authorized is associated with otherwise lawful activities. These regulations also establish permit provisions for intentional take of eagle nests under particular, limited circumstances.

There is limited potential for bald eagles to occur on the project site as according to the IDNR EcoCAT, the nearest nesting area is located 43 km (27 miles) from the site. Bald eagle habitat generally consists of large, tall trees (i.e., deciduous, evergreen trees), near rivers, streams, lakes or reservoirs (INHS 2009). There is also limited potential for golden eagles to occur on the project site. Golden eagles are associated with mountainous regions, rocky cliffs and tall trees (INHS 2009). According to the Illinois Raptor Center, the Illinois raptors habitat ranges from cliffs, bottomland forests and woodlands; however, birds may be seen in parks and suburban areas (Illinois Raptor Center 2010). The land at the project site was previously graded for the development of the college and currently consists of a field, which has grown up with native vegetation since the grading and, therefore, would not be considered a suitable habitat for bald and golden eagles and raptors.

3.2.2.6.3 Bats

No records of specific bat surveys in McLean County were found. However, the project area is located in a region of moderate bat species density (Cryan 2008). Based on review of the Bat Conservation International Species Profile (BCI 2010b), a total of 8 bat species have geographic distributions that may include the project area including (the Threatened and Endangered Species section of this EA discusses the Indiana):

- Big brown bat (*Eptesicus fuscus*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)

- Little brown myotis (*Myotis lucifugus*)
- Indiana bat (*Myotis sodalis*)*
- Evening bat (*Nycticeius humeralis*)
- Tri-colored bat (*Perimyotis subflavus*)

These species roost in forest habitats, cliff faces, meadows, farmlands or edge habitats (BCI 2010b). Many of these species forage along tree tops, disturbed areas and small clearings, or along roadways or water courses (BCI 2010b). The big brown bat is most abundant in deciduous forests but this generalist species will also forage over agricultural fields (BCI 2010b).

The IDNR reviewed the proposed project and provided feedback and information concerning special-status species, habitat suitability, and other protected resources within or near the project area. According to the IDNR EcoCAT, there were no occurrences of the Indiana bat in the vicinity of the project (Appendix C-1).

There are no stream corridors or extensive woodlots within or in close proximity to the project area. The agricultural fields in and adjacent to the project area may provide suitable foraging habitat for the big brown bat. The Illinois Gap Analysis indicates that predicted suitable habitat may exist for three species (little brown bat, big brown bat, Eastern red bat) in the vicinity of the project area (INHS 2005). Based on consultations with IDNR, tree bats including those listed above have been known to migrate in large numbers over agricultural fields and towns in the Midwest, including McLean County.

3.2.2.6.4 Threatened, Endangered, and Special Concern Species

Information regarding the potential occurrence of Federally listed species was reviewed using the USFWS Endangered Species website and a list of potentially occurring listed species for McLean County, Illinois was prepared (USFWS 2010b).

The USFWS lists two Federally listed species for McLean County; the Indiana bat (*Myotis sodalis*) and the Eastern prairie fringed orchid (*Platanthaera leucophaea*) (USFWS 2010b). The Section 7 Consultation Letter (Appendix C-5) was provided to the USFWS indicating that the site did not provide suitable habitat for the Eastern prairie fringed orchid due to its disturbed mature and agricultural use. In its letter dated September 10, 2010, the USFWS concurred with this determination and found that the proposed project would have no effect on this species.

The USFWS reviewed information provided by DOE, and then conducted research and data review regarding the proposed project site and Federally listed species. In its September 10, 2010 letter, the USFWS stated that there are no summer records for the Indiana bat in McLean County, Illinois, and the nearest known hibernaculum and designated critical habitat area is Blackball Mine in LaSalle County, Illinois (Priority 2 hibernaculum), 90 km (56 miles) north of the proposed project area.

The IDNR reviewed the proposed project and provided feedback and information concerning special-status species, habitat suitability, and other protected resources within or near the project area. As part of this review, IDNR's INHD was searched for known occurrences of State-listed threatened or endangered species within McLean County. Consultation with the IDNR has

shown that the INHD contains no records of State-listed species occurring in the project area or surrounding vicinity. The INHD lists the State-listed threatened and endangered upland sandpiper, least bittern and loggerhead shrike, which are all migrating species, as potentially occurring within McLean County (INHD 2010). The natural resource review provided by IDNR's EcoCAT concluded that the INHD contains no record of State-listed threatened or endangered species in the vicinity of the proposed project and that adverse effects to state-listed species are unlikely (Appendix C-1). Furthermore according to the IDNR EcoCAT, there were no occurrences of the Indiana bat in the vicinity of the project. The INHD does not include records of Illinois Natural Area Inventory Sites, dedicated Illinois Nature Preserves, registered Land and Water Reserves, or wetlands in the vicinity of the project area.

3.2.2.6.5 Plant Species

Vegetation in the proposed project area consists of grass fields. The lands that would be primarily affected by the Wind Energy Project, including the location of the turbine and transmission line, have been previously disturbed by college campus facilities. Conservation measures include voluntary cleaning of equipment/vehicles, use of clean fill and mulch, and avoiding planting invasive species. The project proponents would include these conservation measures as notes on the construction drawings to ensure they are implemented.

Direct and Indirect Impacts

The land at the project site was previously graded for the development of the college and currently consists of a field which has grown up since the grading. The project would consist of a single turbine. As described in Section 2.5 of this EA, guy wires would not be used to support the proposed wind turbine. Guy wires can be a challenge for birds and bats to locate, which makes them difficult to maneuver around and can lead to injury or death. Also, lattice towers, which have become roosting sites for birds at other wind projects, would not be used to support the wind turbine. Aviation lighting would comply with FAA requirements and USFWS guidelines to minimize impacts to birds.

HCC would conduct voluntary post-construction avian and bat mortality surveys. Voluntary monitoring would likely consist of an initial post-construction fall migration season (approximately 8-12 weeks, based predominantly on Indiana bat migration habits). HCC plans to implement the voluntary monitoring with in-kind support/oversight from HCC faculty/staff, or with faculty/staff support from nearby Illinois State University. This monitoring will provide data to the USFWS, DOE and IDNR on potential avian and bat mortality associated with single wind turbines. DOE is working with USFWS Region 3 to establish an appropriate protocol for post-construction monitoring. The final protocol is expected to include details related to timing, frequency, and reporting. HCC would implement monitoring consistent with the final protocol.

Migratory Birds, Bald and Golden Eagles

HCC has and would continue to give consideration to the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (USFWS 2003). HCC has committed to incorporating those applicable recommendations as appropriate and has included them as Project Proponent Committed Practices for the proposed project, in order to avoid and minimize potential impacts to migratory birds and bald and golden eagles. HCC has also reviewed and incorporated several of the BMPs from the USFWS Wind Turbine Guidelines Advisory

Committee's Site Development and Construction BMPs (USFWS 2010). The following is a brief description of facts demonstrating that HCC would follow USFWS's Interim Guidelines. The project is a single wind turbine located in already disturbed habitat. Therefore, configuration of turbines is not applicable. The proposed turbine design is a monopole, no external features are proposed to the design and all electric lines would be placed underground. The proposed project would require a permanent access road and temporary disturbance of approximately 2 acres. However the area around the turbine is a turf field and does not provide significant bird habitat or fragment any such habitat. Construction BMPs would be implemented as part of the proposed project. All but the 0.2 acre footprint of the wind turbine would be revegetated with indigenous species and continue to be an unmaintained as a turf field. Aviation lighting would be utilized, the minimum required by FAA in order to minimize potential bird and bat impacts.

Both the USFWS and IDNR were consulted prior to preparation of this EA and their review of the siting of the turbine and their evaluations of the potential effects are included herein. Based on the feedback received from the USFWS and the IDNR and DOE's own research conducted on the proposed turbine location and its potential to provide habitat to bird, bat and other wildlife species the proposed project is thought to be a low risk to wildlife. Based on DOE's review of the USFWS Spring/Fall Raptor Migration Routes (Appendix A- Figures 13 and 14); DOE does not believe that the proposed turbine location is located in or near a migratory pathway. Furthermore, the proposed project is not located within an Audubon-designated IBA. The proposed project is a single turbine; therefore, configuration of turbines (plural) was not necessary. The area around the turbine is mainly agricultural and does not provide significant bird habitat nor does the project fragment any such habitat. The proposed project site is bounded on the north by I-55, with agricultural land located further north of the interstate; to the south by the college campus, with W. Raab Road and primarily agricultural land located further south; to the east by an I-55 off ramp and agricultural land, and to the west by agricultural land. The proposed turbine design is a monopole and no external features are proposed to the design. Strike risk is not considered high at this location and all electric lines would be placed underground.

Based on the lack of suitable stopover habitat, migrating birds moving across the project area are not likely to use or stop at this site. The potential for project impacts to non-migrating birds is greater for grassland bird species than for forest bird species or waterfowl, given the land cover composition within the project area. The predominance of cultivated crops, and lack of highly suitable nesting or foraging habitats, may lower the overall risk to birds from the project. The predominance of previously disturbed grass fields, lack of highly suitable nesting or foraging habitats may lower the overall risk to birds from the project. Avian habitat within the project area is already of limited quality, given the predominance of the existing field and proximity to human development. Therefore, the footprint of the proposed project would not be likely to cause disturbance to networks of high-quality avian habitat in the region. Moreover, wind farms typically only result in the loss of from 0.7 to 1.0 acre per turbine, leaving the majority of existing habitats on the project area intact (Strickland 2004). Based on the information prepared and presented to the USFWS for this project and consultation with the IDNR, there are no records of bald eagle nesting sites for the project area or surrounding vicinity. Due to the lack of highly suitable habitat, it is unlikely that Bald/Golden Eagles would be present in the project area.

Bats

The proposed project site is not considered highly suitable bat habitat. Recent studies for three wind facilities in Wisconsin (Blue Sky Green Field, Cedar Ridge, and Forward Energy) estimated the annual bat fatality per turbine for those three wind turbines were 41 for Blue Sky Green Field, 50 for Cedar Ridge, and 71 for Forward Energy, which consist of 88, 41, and 86 turbines, respectively (Drake et al. 2010; BHE 2010; Gruver et al. 2009). Other studies have shown a lower range of bat fatalities per turbine. Data from the 33-turbine Crescent Ridge Wind Power project in Bureau County showed an average of three bats killed per turbine per year (Kerlinger et al. 2007). For three sites in the Midwestern United States (Buffalo Ridge, Minnesota; Lincoln, Wisconsin; and Top of Iowa, Iowa), fatalities ranged from 2 to 8 bats per turbine (Arnett et al. 2008). Cedar Ridge, Blue Sky Green Field, and Top of Iowa found a relatively high proportion of the common little brown bat (14, 28.6, and 23.5 percent, respectively) (BHE 2010). These high proportions of little brown bats are unlike those found at Crescent Ridge, Illinois (Kerlinger et al. 2007) and Buffalo Ridge, Minnesota (BHE 2010) and may have contributed to higher overall bat mortality (BHE 2010).

Although some bats would be killed by the operating wind turbine, DOE does not anticipate this project would impact bat populations. Since there is no suitable foraging or roosting habitat at the site or adjacent properties, coupled with the fact that the project consists of a single wind turbine, DOE expects bat fatalities to be at the lower range of annual fatalities provided above.

Threatened, Endangered, and Special Concern Species

The proposed project site does not include suitable wintering habitat (hibernacula) for the Indiana Bat, and there is no known highly suitable foraging habitat for this species in the area. Mature trees and/or undisturbed habitats do not occur on the site and the surrounding area is predominantly agricultural. The nearest known summer (maternal roosting) habitat is at Middle Fork River County Forest Preserve, approximately 92 km (57 miles) to the southeast of the proposed project location. USFWS Concurrence Letter stated, “The risk to migrating bats is difficult to characterize because little is known of the migratory patterns of this species” (Appendix C-5). Based on previous consultations with the USFWS on other proposed DOE funded single turbines in Illinois; expanses of 305 meters (1,000 feet) or greater are not generally spanned by foraging Indiana bats and it is believed use of the noncontiguous habitat is unlikely. Based on these facts, the USFWS concurred with DOE’s determination that the project “may affect but is not likely to adversely affect Indiana bats and the likelihood of take is discountable” (Appendix C-5).

The USFWS concurred with DOE’s determination in DOE’s September 10, 2010, letter that there would be no effect to the prairie-fringe orchid and that the proposed project may affect but is not likely to adversely affect the Indiana bat. Therefore, implementation of the proposed project is not likely to adversely affect or pose a significant impact to threatened, endangered, and/or special concern species. Thus DOE has completed consultation with USFWS as required under Section 7 of the *Endangered Species Act*.

Based on the information prepared and presented to IDNR for this project and consultation with IDNR, there are no records of State-listed threatened, endangered, or special concern species for the project area or surrounding vicinity. Based on consultations with USFWS and based on the

lack of highly suitable habitat occurring in the project area, it is unlikely that Federally listed threatened or endangered species would be affected by the proposed project.

Plant Species

The land areas that would be primarily affected by the Wind Energy Project include the foundation of the turbine and transmission line trenching. These areas have been previously disturbed by college's development. Conservation measures include cleaning of equipment/vehicles to reduce the transplantation of an invasive species, use of clean fill and mulch, and by replanting with only native plant species. The project proponents would include these conservation measures within the construction requirements to ensure they are implemented. No significant impacts to plant species from the implementation of the proposed project are likely.

3.2.2.7 Human Health and Safety

Workers can be injured or killed during construction, operation and decommissioning of wind turbines through industrial accidents such as falls, fires and dropping or collapsing equipment. Such accidents are uncommon in the wind industry and are avoidable through implementation of proper safety practices and equipment maintenance.

The fall zone is defined as the approximate area around the base of the turbine that would likely receive the tower and/or turbine, if it were to fall. In the event of wind turbine collapse, wind turbine towers tend to buckle or bend prior to collapse. Therefore, for this analysis the fall-zone radius was determined as 1.1 times the total turbine height or approximately 133 meters (440 feet).

Collapse of a turbine or breakage (and throwing) of one or more turbine blades are possible, but very unlikely occurrences. Estimates of blade throw vary; MacQueen et al. (1983) estimate the probability of being struck outside of a one blade diameter (82 meters, or 269 feet, in this case) of the tower base is about 10^{-7} per year for a fixed building, and substantially less for people who are mobile. Another potential source of accidents is ice shedding and ice throw. Ice shedding, or ice throw, refers to the phenomenon that can occur when ice accumulates on rotor blades and subsequently breaks free or melts and falls to the ground. Although a potential safety concern, it is important to note that while more than 90,000 wind turbines have been installed worldwide, there has been no reported injury caused by ice thrown from a turbine (Tetra Tech EC, Inc. 2007). The proposed project is to be supplied with ice sensors on the turbine blades. When ice forms the sensors would engage and the turbine would not be permitted to rotate until the ice has melted. This technology is intended to prevent ice throws. Ice that has accumulated on the blades would fall to the foot of the turbine as it melts. To prevent accident or injury from ice that falls as it melts, the turbine requires the area directly underneath to be a clear zone.

The potential for the proposed turbines to fall over or collapse causing damage, injury, or death would be remote. Foundations are designed to prevent turbines from falling over, but 5 of the 13,000 or 0.0004 percent of GE turbines operating globally have collapsed since 2002 (Bogdan 2009). Although tower collapses are rare, reported instances have been due to circumstances including blade strikes, rotor over speed (due to brake failure in high winds), cyclonic winds and poor or improper maintenance (Global Energy Concepts 2005). No residences (or areas zoned

for residential use) are located within the fall zone of the turbine. No existing HCC facilities or parking areas are located within the fall zone. A proposed new parking lot to be located on HCC property is currently under preliminary design. There is potential for this parking lot to be sited within the northwest portion of the HCC campus, within the fall-zone radius; however, a specific location for the parking lot is yet to be determined. Any proposed project occurring within the fall zone would do so under full knowledge of the risks posed to human health and safety.

A study conducted for the National Renewable Energy Laboratory was successful in identifying damage mechanisms due to direct and indirect effects of lightning strikes on wind turbines. Lightning strikes can cause extensive damage to the turbine blades, controllers, and power electronics. However, this damage can be reduced by protection from tall nearby communication towers, integral blade protection in the form of conductors, bonding to minimize arcing, good turbine grounding, controller cable and controller shielding, and transient voltage surge suppression. The amount of lightning damage is a factor of the lightning activity in the area, the height and prominence of the turbine, the terrain, and the lightning protection system in place. According to the National Oceanic and Atmospheric Organization Illinois has mid-range lightning activity (between 40 and 50 annual thunderstorm days).

The project is not located within the immediate vicinity of a local or regional airport or a military air base, though Central Illinois Regional Airport at Bloomington-Normal is located approximately 8.8 km (5.5 miles) southeast of the proposed project location. All structures more than 61 meters (200 feet) tall must have aircraft warning lights in accordance with requirements specified by the FAA.

Direct and Indirect Impacts

All contractors, subcontractors, and their personnel would be required to comply with all Federal and State worker safety requirements. The construction contractor and facility operator would prepare a health and safety plan pursuant to OSHA requirements before commencing work, and by following this plan, greatly reduce the potential for worker injuries and fatalities.

Project facilities have the potential for members of the public to attempt to climb towers, open electrical panels or encounter other hazards. Safety signage would be posted around the tower (where necessary); transformers and other high-voltage facilities would be in conformance with applicable Federal and State regulations.

No adverse public security impacts are anticipated due to the project. Members of the general public would be prevented from accessing the wind project area by fencing and security. Safety signage may be posted around the tower (where necessary); transformers and other high-voltage facilities would be in conformance with applicable Federal and State regulations. HCC employees would be educated as to the security procedures to be observed when they are in the vicinity of the turbine. The project location was selected so that, in the unlikely collapse of the turbine tower, lightning strikes or ice throw, no existing structures, public access or roads would be impacted.

Due to the extreme rarity of tower collapse or blade throw and the risks to the public safety due to such occurrences can be mitigated by management of access within these zones. The same access management strategies can mitigate the risks to public safety due to ice throw or shedding

conditions, which are in effect only on a limited temporal basis. Additionally, the nearest public area (HCC parking lot K) is approximately 134 meters (440 feet) away from the proposed wind turbine location, which is anticipated to be outside the ice throw or fall-zone areas. In cases of turbine collapse, the turbine would tend to buckle and, therefore, fall somewhere within this analyzed area.

No fuel would be used during the operational phase of the proposed project, therefore, there would be no process waste streams generated during operation of the wind turbine that could cause health and safety concerns. Some lubricants are used in wind turbines, including gearbox oil, hydraulic fluid, and gear grease that require periodic replacement. These lubricants would be managed in accordance with Federal and State regulations.

According to the FAA in a letter dated November 16, 2009, the aeronautical study performed for the proposed project would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, it was determined that the structure would not be a hazard to air navigation provided the structure would be marked or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2. A copy of FAA's letter is included (Appendix C-3).

This determination was made prior to HCC's decision to adjust the proposed location of the wind turbine. The updated location is the location analyzed within this EA (approximately 100 meters (328 feet)) west-southwest of the previous location in which the FAA's determination of no hazard to air navigation was applicable). This change voids the determination included in Appendix C. Under the direction of DOE, HCC is currently seeking a new determination from FAA for the new location. However, due to the minimal change in distance, and after reviewing the information attached in the original determination, DOE anticipates that the proposed project would continue not be a hazard to air navigation.

3.2.2.8 Transportation

The project site, as well as the entire HCC campus, is primarily served by W. Raab Road on the south side of the campus. Access to the local interstate transportation system is available at I-55 to the east and I-74 to the west of the proposed turbine location. The most direct access route to HCC is via Exit 165 (N. Main Street) on I-55 to W. Raab Road, approximately 1.6 km (1 mile) east of the campus.

Construction equipment would travel to the project site via I-55, US-51 BUS (Exit 165), south on Main Street and west on W. Raab Road, or would travel to the project site via I-74, Mitsubishi Parkway (Exit 125), southeast on Yuton Road. Access from W. Raab Road to the construction site is via Millennium Avenue, a campus entrance road located southeast of the proposed wind turbine location. Large pieces of equipment such as the turbine tower, rotor blade, and nacelle would be designated oversized loads.

A plan has not been finalized regarding transportation of project materials and equipment; however, it is likely the project would use existing infrastructure.

Direct and Indirect Impacts

A permanent gravel access road would be constructed from the northern edge of the campus at a length of 183 meters (600 feet) as an extension of Parking Lot K to the proposed wind turbine location (Appendix A- Figure 5). No other new roads are necessary for the construction, operation and eventual decommissioning of the wind turbine at the proposed location.

During the active construction phase of the project, which is anticipated to last approximately five months, a temporary increase in the number and frequency of vehicles on the local roads identified above surrounding the project site is anticipated. No long-term or permanent impacts to the local transportation systems would occur as a result of this project.

The movement of large pieces of equipment would temporarily slow traffic on the Interstate freeways. Local traffic impacts would be primarily along Main Street (south of Exit 165) and W. Raab Road. Additionally, minor road improvements or adjustments might be needed to deliver the extended-length components to the project site. Any necessary road closures would be temporary and would only apply to the roads immediately surrounding the project site. Any damage to the local road network as a result of delivering project equipment would be fully mitigated and repaired by the project developer.

3.2.2.9 Socioeconomics and Environmental Justice

The Town of Normal's population in 2000 was approximately 45,386 (Bureau of the Census 2000). Major local employers in the town include Illinois State University, State Farm Insurance, Country Financial, Unit 5 Schools, and Mitsubishi Motors North America.

Executive Order 12898 (February 11, 1994) directs Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The racial makeup of the Town of Normal in 2000 was 86.6 percent White, 8.5 percent African American, 3.1 percent Hispanic and remaining as other races. The median income for a household in the Town of Normal in 2000 was \$47,283, compared to \$52,175 for the United States. About 7.2 percent of families and 21.2 percent of individuals were below the poverty line in 2000 (Bureau of the Census 2010).

DOE reviewed *Economic Impact, Wind Energy Development in Illinois* by the Center for Renewable Energy at Illinois State University (ISU 2010). This economic analysis monitored the economic impacts of 21 projects in Illinois which account for 1,847.76 megawatts of wind generating capacity in the state of Illinois. According to this analysis, these 21 projects:

- Created approximately 9,968 full-time equivalent jobs during construction, with a total payroll of over \$509 million;
- Support approximately 494 permanent jobs in rural Illinois areas, with a total annual payroll of over \$25 million;
- Support local economies by generating \$18 million in annual property taxes;

- Generate \$8.3 million annually in extra income for Illinois landowners who lease their land to the wind farm developer; and
- Will generate a total economic benefit of \$3.2 billion over the life of the projects.

Direct and Indirect Impacts

The job creation impact of the project was calculated using the results of an extensive report titled *Economic Impact, Wind Energy Development in Illinois* dated June 2010 and developed by the Center for Renewable Energy at Illinois State University (2010). The report cites that on average 5.39 construction jobs and 0.26 permanent jobs are created per each installed megawatt. Smaller projects have double that effect because of a similar amount of work required for a project and fewer megawatts over which to spread any effect. HCC's proposed project is expected to generate up to 8 jobs during the selection, evaluation, and construction phase of the project. Construction of the proposed project would create 8 temporary jobs, and the project is expected to retain one permanent faculty position during the operation and maintenance phase of the project. The temporary construction jobs would last approximately 12 months and would not contribute to a population increase in the area. The area's public and community services such as schools, health care, social services and fire protection would not be affected by the proposed project. No residences, businesses or industries would be negatively affected or relocated as a result of the proposed Wind Energy Project. The additional permanent job would provide a limited benefit to the local economy.

No potential high and adverse impacts to human health or environmental effects have been identified in this EA. There would, therefore, be no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

3.2.2.10 Air Quality and Climate Change

The affected air environment can be characterized in terms of concentrations of the criteria pollutants carbon monoxide, sulfur dioxide, particulate matter, nitrogen dioxide, ozone, and lead. The EPA has established National Ambient Air Quality Standards for these pollutants. There are two standards for particulate matter, one for particulates with an aerodynamic diameter less than or equal to a nominal 10 micrometers and one for particulates with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. According to the US EPA's online air quality maps and monitoring data (<http://www.epa.gov/oar/data/>), McLean County is in attainment for all pollutants listed above.

The EPA has found that the "aggregate group of the well-mixed greenhouse gases (GHG)" constitutes an air pollutant that contributes to climate change. Carbon dioxide is a GHG, and the HCC wind turbine would have an indirect impact on carbon dioxide emissions from fossil fuel sources.

Electricity for HCC is currently supplied by Corn Belt Energy. Corn Belt Energy's power supplier, Wabash Valley Power Association generates electricity and also purchases electricity from other utilities. According to the Corn Belt Energy website, the Wabash Valley Power Association obtains its electricity through coal-fired power plants (65 percent), pet coke (11 percent), renewable sources (4 percent), nuclear (7 percent), non-fuel specific (10 percent), and

natural gas (2 percent) (Corn Belt Energy 2010). Therefore, fossil fuels are currently the primary electricity source for the HCC.

Direct and Indirect Impacts

The proposed Wind Energy Project at HCC would be an emissions-free energy generation project that would not degrade air quality. Aside from temporary dust generated during construction and decommissioning, which would be minimized to the extent practicable (for example, by keeping gravel on roads and watering dry unpaved roads), this project would not result in any adverse impacts to air quality. The project would not require any air permits.

Carbon dioxide is a GHG that contributes to climate change, which in turn causes harm to many physical and biological systems. The proposed project would reduce HCC's carbon footprint by reducing reliance on fossil fuels. It is assumed if the Wind Energy Project was not built; the electricity used by HCC would continue to be supplied primarily by fossil-fuel sources. The annual energy capture associated with the installation of a 1.5-megawatt wind turbine at the HCC campus is anticipated to be approximately 4.3 million kilowatt-hours per year (AESI 2009). According to the Corn Belt Energy website (<http://www.cornbeltenergy.com/about-us/news-center/company-profile.html>), its provider, the Wabash Valley Power Association, obtains 78 percent of its electricity through fossil fuels including coal, natural gas, and petroleum coke (Corn Belt Energy 2010). Therefore, the project carbon reduction is calculated as follows:

78 percent fossil fuel use × 2.0562 pounds of carbon dioxide per kilowatt-hour × 4,267,000 kilowatt-hours per year = 6,843,568 pounds of carbon dioxide per year or 3,421 short tons of carbon dioxide per year or 3,104 metric tons of carbon dioxide per year or 3,055 long tons of carbon dioxide per year. The proposed project would reduce HCC's carbon footprint by reducing its reliance on fossil fuels.

3.2.2.11 Utilities and Energy

The proposed Wind Energy Project would have a nameplate capacity of 1.5 megawatts and is anticipated to offset approximately 500 kilowatts of electrical load; with the current electrical load for HCC averaging 815 kilowatts (AESI 2009). This represents approximately 61 percent of HCC's demand over an average day. The proposed renewable energy project would produce significant amounts of clean electricity for the 20-year design life of the project. If the project did not move forward, it is assumed the electricity used by HCC at this location would continue to be supplied primarily by fossil fuel sources, which are finite.

The term electromagnetic fields refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electric charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, collector lines, substation transformers, house wiring, and electric appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). Electromagnetic fields can occur indoors and outdoors. While the general consensus is that electric fields pose no risk to humans, the question of

whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate.

The NTIA is responsible for managing the Federal spectrum and is involved in resolving technical telecommunications issues for the Federal government and private sector. This information aids in siting wind turbines, so they do not cause interference in radio, microwave, radar, and other frequencies, disrupting critical lines of communication. While a voluntary process, upon submittal by a wind project proponent, the NTIA provides project specific information to the members of the Administration's Interdepartment Radio Advisory Committee for review and comment on whether the proposed project could potentially interfere with Federal radio communication links.

Direct and Indirect Impacts

No adverse energy impacts would result for the project. The proposed renewable energy project would produce clean electricity for the 20-year design life of the project and would assist in reducing the HCC's carbon footprint.

On July 8, 2010, the NTIA was notified of the proposed Wind Energy Project (Appendix C-4). The project was reviewed by members of the Interdepartment Radio Advisory Committee, and on August 27, 2010, the NTIA responded to DOE indicating that no Federal agencies identified any concerns regarding the blockage of their radio frequency transmissions (Appendix C-4).

4. CUMULATIVE IMPACTS

Cumulative impacts are those potential environmental impacts that result “from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

4.1 Existing and Reasonably Foreseeable Projects

DOE reviewed information on past, present, and reasonably foreseeable future projects and actions that could result in impacts to a particular resource over the same period and in the same general location as the proposed Wind Energy Project. DOE consulted with local planning departments and local chapters of the Chamber of Commerce via phone and email, and conducted searches via the internet, to identify current and future projects in the vicinity of the proposed HCC wind turbine location. No pending or planned projects were identified within the area to be affected by the turbine’s land use, visual impacts, or noise impacts. Additionally no past projects have been identified that could have a cumulative impact when combined with the impacts of the proposed project.

In regard to cumulative impacts to biological resources, i.e., migratory birds and bats, and threatened and endangered species, DOE reviewed the April 2007 USFWS Indiana Bat (*Myotis sodalis*) Draft Recovery Plan (USFWS 2007). The Draft Recovery Plan notes that Indiana bat migration and swarming patterns "have not been extensively studied and are poorly understood" and summarizes existing data (USFWS 2007). Eight fall swarming period studies indicated a migratory range of 0.32 to 30.6 km (0.2 to 19 miles). Eight spring emergence studies indicated a migratory range of 16.1 to 96.6 km (10 to 60 miles) and two spring emergence studies indicated migratory distances of 477 and 575 km (296 and 357 miles) (USFWS 2007, pp. 41-44). Based on this data, DOE determined that 96.5 km (60 miles) is a reasonable distance for evaluating the potential for cumulative impacts to migrating individuals.

According to the USFWS’s map of Fall and Spring Migratory Bird Information (Appendix A-Figure 13 and 14), the closest known migratory bird corridor (fall migration) to the proposed project is the Illinois River, located 48 km (30 miles) to the northwest. The 96.5 km (60 mile) radius encompasses this area and, thus, also is a reasonable distance for evaluating the potential for cumulative impacts to migrating birds.

DOE identified the following wind energy projects that are within a 96.6 km (60 miles) radius of the site.

Existing projects (data as of January 1, 2010 from the Illinois Wind Working Group)

Twin Groves Wind Farm, McLean County, IL
Approximately 32 km (20 miles)
Operating 240 turbines at 400-megawatt capacity

Porta High School

Approximately 96.5 km (60 miles), Menard County, IL
600-kilowatt capacity

Rail Splitter Wind Farm, Tazewell County, Logan County
Approximately 50 km (31 miles)
Operating 67 turbines at 100-megawatt capacity

Cayuga Ridge, Livingston County, IL
Approximately 68 km (42 miles)
Operating 150 turbines at 300-megawatt capacity

Sugar Creek Wind Farm, Logan County, IL
Approximately 72 km (45 miles)
Operating 110 wind turbines at 220-megawatt capacity

Richland Community College, Macon County, IL
Approximately 74 km (46 miles)
Operating 1 turbine at 100-kilowatt capacity

Grand Ridge Wind Farm, LaSalle County, IL
Approximately 76 km (47 miles)
Operating 74 wind turbines at 111-megawatt capacity

Camp Grove Wind Farm, Marshall and Stark Counties, IL
Approximately 48 miles
Operating 100 wind turbines at 150-megawatt capacity

Top Crop Wind Farm, LaSalle, Grundy and Livingston Counties, IL
Approximately 77 km (48 miles)
Operating 68 wind turbines at about 100-megawatt capacity

Grand Ridge Wind Farm Expansion, LaSalle County, IL
Approximately 79 km (49 miles)
Operating 66 turbines at about 111-megawatt capacity

Providence Heights and Crescent Ridge Wind Farms, Bureau County, IL
Approximately 89 km (55 miles)
Operating 36 wind turbines at 72-megawatt capacity for Providence Ridge
Operating 33 wind turbines at 54.45-megawatt capacity at Crescent Ridge

Porta High School, Menard County, IL
Approximately 95 km (59 miles)
Operating 1 wind turbine at 600-megawatt capacity

Agriwind, Bureau County, IL
Approximately 97 km (60 miles)

Operating 4 turbines at 8.4-megawatt capacity

Permitted Projects for Construction

White Oak Wind Energy Center, McLean County, IL
Approximately 8 km (5 miles)
150-megawatt capacity

Twin Groves Wind Farm III, IV, and V, McLean County, IL
Approximately 21 km (13 miles)
200-megawatt capacity each

Top Crop Wind Farm, LaSalle, Grundy and Livingston Counties, IL
Approximately 69 km (43 miles)
207-megawatt capacity

Proposed Projects

Chenoa Wind Farms II, III, and IV (proposed), McLean County, IL
Approximately 35 km (22 miles)
200-megawatt capacity each

Alta II Wind Farm (proposed), DeWitt County, IL
Approximately 34 km (21 miles)
Operating 125 wind turbines at 225-megawatt Capacity

Alta I Wind Farm (proposed), McLean and DeWitt Counties, IL
Approximately 42 km (26 miles)
Operating 187 wind turbines at 330-megawatt Capacity

Pleasant Ridge Wind Farm (proposed), Livingston County, IL
Approximately 58 km (36 miles)
Operating 333 units at 500-megawatt capacity

Midwest Wind Energy Farm (proposed)
Approximately 64 km (40 miles)
Capacity unknown at this time

Paxton Wind Farm (proposed), Iroquois and Ford Counties, IL
Approximately 82 km (51 miles)
Capacity unknown at this time

K4 Wind Farm (proposed)
Approximately 89 km (55 miles)
460-megawatt capacity

Other development included:

- The ongoing construction of a Multimodal Transportation Center in Uptown Normal which began construction in the summer 2010 and is expected to be completed in approximately 24 months. The Transportation Center will be a 68,000-square-foot, four-story structure with an attached parking structure. The facility will replace the existing Amtrak station and also connect that passenger rail service with other transportation modes.
- The Illinois Army National Guard is proposing to construct and operate the 404th Maneuver Enhancement Brigade Headquarters on HCC's campus. The 50,000 square foot facility would sit on 20 acres in the middle of Heartland's property along W. Raab Road. It would be south of the Astroth Community Center and west of the campus pond. A small portion of the space to be utilized would include the proposed Ready-Response parking lot, which likely would be located to the west of Parking Lot K (Appendix A-Figure 5), located within the fall zone of the proposed wind turbine. The Illinois Army National Guard is aware of the proposed construction of the proposed Wind Energy Project.

Additionally, the *Sustainable Energy Plan*, proposed by the governor of Illinois in early 2005, consists of a Renewable Portfolio Standard, which requires use of renewable energy such as wind, biomass, solar, and other sources. It is expected that about 95 percent of the renewable energy generated in the state of Illinois, will come from wind by the year 2025. Approximately 3,300 wind turbines are expected to be constructed between the years 2010 and 2025. The average size of the wind turbine installed in 2008 was 1.67 megawatts and in 2007 it was 1.65 megawatts (ISU 2010). Although it is reasonable to conclude from the Governor's Plan that more wind turbines would be proposed than those listed above, their locations and timing are not reasonably foreseeable at this time.

4.2 Summary of Cumulative Impacts

4.2.1 CUMULATIVE GREENHOUSE GAS IMPACTS

While the scientific understanding of climate change continues to evolve, the Intergovernmental Panel on Climate Change *Fourth Assessment Report* stated that warming of the earth's climate is unequivocal, and that warming is very likely attributable to increases in atmospheric GHG caused by human activities (anthropogenic) (IPCC 2007). The Panel's *Fourth Assessment Report* indicates that changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental impacts are linked to changes in the climate system, and that some changes may be irreversible (IPCC 2007).

The release of anthropogenic GHGs and their potential contribution to global warming are inherently cumulative phenomena. It is assumed that this Wind Energy Project would displace fossil fuel electricity currently used by HCC, resulting in a net decrease in emissions of approximately 2,751 metric tons of carbon dioxide equivalents for each year of operation. The proposed project in combination with the above-listed wind energy projects and plans for additional turbines in Illinois by 2025 would neither measurably reduce the concentration of GHGs in the atmosphere nor reduce the annual rate of GHG emissions. Rather, they would marginally decrease the rate at which GHG emissions are increasing every year and contribute to efforts ongoing globally to reduce GHG and slow climate change.

4.2.2 NOISE

Noise from the construction, operation, and eventual decommissioning of the proposed project would be localized and add to the noise levels in the immediate project vicinity. Other noise sources in the project vicinity include: the noise from passing vehicles on I-55 and on local area roads, and noise generated by the campus' daily operations (i.e., vehicle movement, building operations, and staff/student activities). There would be temporary noise generated during the proposed construction of the Army National Guard's planned headquarters for the 404th Maneuver Enhancement Brigade. However this noise would primarily be associated with construction and operation of the proposed facility. The Illinois Army National Guard would have to address noise levels emitted during the day; however, use of the facility is expected to be similar in nature to the current use of existing buildings on the HCC campus. During the operational phase of the proposed National Guard facilities, increases in ambient noise levels during daytime hours would likely be insignificant. While the proposed turbine may add to background noise levels, these levels, even when added to noise sources from the activities listed in Section 4.1 and other local activities, would not be likely to cumulatively impact area residents or change the semi-rural nature of the area.

Based on the review of existing and reasonably foreseeable project, no projects other than the proposed Illinois National Guard project is in close enough proximity to HCC's proposed project to significantly impact the ambient noise levels in the area.

4.2.3 VISUAL RESOURCES

The proposed project would affect the viewshed in the project area. The turbine would be a dominant vertical component in the landscape due to its height. There are several wind projects in the region surrounding the proposed HCC turbine. The closest known project permitted for construction is White Oak Wind Energy Center, which is approximately 8 km (5 miles) from HCC. Three other wind farm projects permitted for construction are Twin Groves Wind Farms II, IV, and V which are approximately 21 km (13 miles) or more proceeding east from the Town of Normal. All other known wind farms and proposed projects are located approximately 32 km (20 miles) or more from the HCC site. The project sites are unlikely to be located within the same viewshed of the proposed project. Therefore, there would not be a significant cumulative visual impact from the proposed HCC wind turbine.

4.2.4 BIOLOGICAL RESOURCES

The USFWS lists all of Illinois as potential habitat for the Indiana bat, a threatened and endangered species (<http://www.fws.gov/midwest/endangered/lists/illinois-spp.html>). However, there have been no known occurrences of the Indiana bat in McLean County (<http://www.fws.gov/midwest/endangered/lists/illinois-spp.html>). The closest known location of an Indiana bat maternal colony and critical habitat is the Black Ball Mine, which is approximately 96 km (60 miles) to the north of the proposed project site.

Although some recent studies have shown that Indiana bat may migrate to hibernaculum up to 575 km (357 miles), the *Indiana Bat Draft Recovery Plan* (USFWS 2007) also indicates that the Indiana bat's typical migration is within a distance of 96 km (60 miles). Based on the existing 1004 turbines operating and the other reasonably foreseeable projects (estimated to be greater than 860 turbines) within 96 km (60 miles) of the proposed project, the potential for cumulative impacts to the Indiana bat cannot be ruled out. However, the proposed project includes the installation of a single turbine, which would provide only a small increment to any potential cumulative impact. Additionally, the USFWS Region 3 office recently began preparation of a regional habitat conservation plan. Although this plan likely will take several years to complete, it is intended to address cumulative impacts to the Indiana bat and develop avoidance, minimization and mitigation measures for existing and proposed wind turbines.

There are no known major raptor migration corridors according to the USFWS's map of Fall and Spring Migratory Bird Information (Appendix A- Figures 13 and 14), no Audubon IBAs (Cecil 2009) and no known other areas of high bird concentration or use in close proximity to the project area. Given the distance from the Illinois River, nearest known migratory route, to the proposed project location, the impacts to migrating birds is unlikely as the project area does not have sufficient stop-over habitat for traveling individuals. Therefore, it is unlikely that the proposed single-turbine project would contribute to any potential significant cumulative impacts posed by the larger turbine capacity in the area.

There are no other potential significant cumulative impacts on the environment that are reasonably foreseeable.

5. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible and irretrievable commitment of resources is defined as a permanent reduction or loss of a resource that, once lost, cannot be regained. The primary irretrievable and irreversible commitment of resources for the proposed project would be the labor, materials, and energy expended in clearing the site and constructing the wind turbine. Approximately 0.2 acre (8,712 square feet) of land would be irreversibly committed during the functional life of the project.

6. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term use of the environment is the use during the life of the project. Long-term productivity refers to the period of time after the project has been decommissioned, the equipment removed and the land reclaimed and stabilized. The short-term use of the project area for the proposed project would not affect the long term productivity of the area. If it is decided at some time in the future that the project has reached its useful life, the turbine, tower, foundation, and access road could be decommissioned and removed, and the site reclaimed and re-vegetated to resemble a similar habitat to the pre-disturbance conditions. The construction of a wind turbine at this site would not preclude using the land for purposes that were suitable prior to this project.

7. UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts associated with the proposed project include:

- Long-term loss of approximately 0.2 acre (8,712 square feet) of vegetation resulting from the construction of the tower foundation
- An increase in noise levels during construction and operation
- Introduction of a dominant vertical element into the existing viewshed
- Shadow flicker impacts to one HCC building located at the northeastern edge of campus
- A low risk of harm resulting from tower collapse, blade failure and ice throw.

In the case of the construction noise, this impact would be temporary. The loss of vegetation, visual and shadow flicker impacts, operation noise and risk of tower collapse would be long term impacts. Overall, impacts of the proposed project on the environment and human health are not considered significant as described in the relevant sections in Chapter 3.

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9. AGENCIES AND PERSONS CONSULTED

The following is a list of persons, agencies and organizations that have been contacted about this project to date.

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