DOE/EA 1802

FINAL
ENVIRONMENTAL ASSESSMENT

CHICAGO VIEW WIND PROJECT

CHICAGO HEIGHTS
COOK COUNTY, ILLINOIS

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

JANUARY 2011

DOE/EA1802

FINAL
ENVIRONMENTAL ASSESSMENT

CHICAGO VIEW WIND PROJECT

CHICAGO HEIGHTS
COOK COUNTY, ILLINOIS

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

JANUARY 2011

COVER SHEET

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

TITLE: *Final Environmental Assessment, Chicago View Wind Project, Chicago Heights, Cook County, Illinois* (DOE/EA 1802)

CONTACT: For additional copies or more information on this final Environmental Assessment (EA), please contact:

Pete Yerace
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
Phone: 513-218-4069
Email: pete.yerace@emcbc.doe.gov

ABSTRACT: DOE has provided a grant to the State of Illinois and proposes to authorize the expenditure of Federal funding to assist with financing the Chicago View Wind Project (the proposed project). DOE has authorized Chicago View Wind, LLC (CVW) to use a percentage of its Federal funding for preliminary activities, including the development of this EA. Such activities are associated with the proposed project and do not significantly impact the environment nor represent an irreversible or irretrievable commitment by DOE in advance of the conclusion of the EA for the proposed project. CVW proposes to construct, operate, and eventually decommission a single 1.5 megawatt (MW) wind turbine at the Chicago Heights construction debris landfill located north of Sauk Trail and west of Cottage Grove Avenue in Chicago Heights, Cook County, Illinois. The turbine rotor diameter would be 253 feet, which would connect at its hub (midpoint) to a 202-foot-tall tower. The total height of the wind turbine would be 328 feet, from the bottom of the tower to the blade tip at its highest point. A 5,540-foot underground transmission line would connect the turbine to the 12.47-kilovolt distribution line owned by Commonwealth Edison at the nearby Bloom Trail High School. This 1-mile underground transmission line would follow the landfill property boundary, within a road right-of-way, until it was directionally drilled under the road and into the school property. The proposed turbine is estimated to produce 3,143 MW-hours of electricity per year. The Bloom Township High School District 206 would purchase all of the electricity generated by the proposed project, pursuant to a purchase agreement between CVW and the School District.

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

PUBLIC INVOLVEMENT: The public was provided an opportunity to comment on the draft EA via email or written correspondence. Details regarding the comment process are included in Section 1.5 of this document.

AVAILABILITY: This Final 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	*American Recovery and Reinvestment Act of 2009*
BMP	best management practice
ComEd	Commonwealth Edison
CFR	*Code of Federal Regulations*
CVW	Chicago View Wind, LLC
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
DNL	Day Night Average Sound Level
DOE	U.S. Department of Energy
EA	Environmental Assessment
EcoCAT	Ecological Compliance Assessment Tool
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
GHG	greenhouse gas
HAARGIS	Historic Architectural and Archaeology Resources Geographical Information Systems
IBA	Important Bird Area
IDNR	Illinois Department of Natural Resources
IHPA	Illinois Historic Preservation Agency
IPCB	Illinois Pollution Control Board
MBTA	*Migratory Bird Treaty Act*
MW	megawatt
NEPA	*National Environmental Policy Act*
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
SEP	State Energy Program
SWPPP	storm water pollution prevention plan
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
WNS	White-Nose Syndrome

CONTENTS

Section Page

1. INTRODUCTION 1
1.1 National Environmental Policy Act and Related Procedures 1
1.2 Background 1
1.3 Purpose and Need 4
1.3.1 DOE's Purpose and Need 4
1.3.2 Illinois' Purpose and Need 4
1.4 Illinois' SEP Project Selection Process 4
1.5 Public and Agency Involvement 5
1.5.1 Scoping 5
1.5.2 Draft Environmental Assessment 6
2. PROPOSED ACTIONS AND ALTERNATIVES 7
2.1 DOE's Proposed Action 7
2.2 Illinois' Proposed Project 7
2.2.1 Project Location 8
2.2.2 Construction 8
2.2.3 Aviation Lighting 9
2.2.4 Operation and Maintenance 9
2.2.5 Decommissioning 9
2.3 Alternatives 9
2.3.1 DOE Alternatives 9
2.3.2 No-Action Alternative 10
2.3.3 Alternatives Considered by the Project Proponents 10
2.4 Permits, Approvals, and Notifications 10
2.5 Project Proponent-Committed Practices 11
2.5.1 Bird, Bat, and Raptor Avoidance and Minimization Measures 11
2.5.2 Human Health and Safety 12
2.5.3 Soil 12
2.5.4 Cultural and Historic Resources 12
2.5.5 Noise 12
2.5.6 Visual Resources 13
2.5.7 Waste Management 13
2.5.8 Water Resources 13
3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS 14
3.1 No-Action Alternative 14
3.2 Illinois' Proposed Project 14
3.2.1 Considerations Not Carried Forward for Further Analysis 14
3.2.1.1 Waste Management 14
3.2.1.2 Wild and Scenic Rivers 15
3.2.1.3 Intentional Destructive Acts 15
3.2.2 Considerations Carried Forward for Further Analysis 15
3.2.2.1 Land Use 15
3.2.2.2 Visual Quality 18
3.2.2.3 Noise 22

3.2.2.4 Cultural Resources 27
3.2.2.5 Geology and Soils 29
3.2.2.6 Water Resources....30
3.2.2.7 Biological Resources 31
3.2.2.8 Human Health and Safety 37
3.2.2.9 Transportation 38
3.2.2.10 Socioeconomics and Environmental Justice 39
3.2.2.11 Air Quality and Climate Change 39
3.2.2.12 Utilities and Energy Impacts....40
4. CUMULATIVE IMPACTS....42
4.1 Existing and Reasonably Foreseeable Projects....42
4.2 Summary of Cumulative Impacts 42
4.2.1 Noise 42
4.2.2 Visual 42
4.2.3 Climate Change and Greenhouse Gas 43
4.2.4 Biological Resources 43
5. IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES 44
6. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY 45
7. UNAVOIDABLE ADVERSE IMPACTS 46
8. REFERENCES 47
9. AGENCIES AND PERSONS CONSULTED 51

LIST OF TABLES

Table Page

2-1 Federal, State, and Local Permits and Approvals 11
3-1 Visual Simulation Locations and Observations 19
3-2 Shadow Flicker Analysis Results at the Nearby Residential Receptors....20
3-3 Typical Sound Pressure Levels Measured in the Environment and Industry 23
3-4 Allowable Noise Levels Emitted from Class C Land to Receiving Class A Land 24
3-5 Noise Modeling Results at the Nearby Residential Receptors 26
3-6 Estimated Octave Band Sound Pressure Levels 27

LIST OF FIGURES

Figure Page

1-1 Project Location Map 2
1-2 U.S. Geological Survey Topographic Map....3
3-1 City of Chicago Heights Zoning Map 16
3-2 Existing Land Use on Aerial Photograph 17
3-3 Shadow Flicker Affected Area....21

3-4 Sound Pressure Levels Contour Map 26

APPENDICES

Appendix A: Figures

Figure 1: Project Location Map
Figure 2: U.S. Geological Survey Topographic Map
Figure 3: City of Chicago Heights Zoning Map
Figure 4: Existing Land Use on Aerial Photograph
Figure 5: Visual Simulation Locations
Figure 6: Shadow Flicker Affected Area
Figure 7: Sound Pressure Levels Contour Map
Figure 8: National Register of Historic Places Search
Figure 9: Soil Survey Map
Figure 10: National Wetland Inventory Map
Figure 11: Flood Insurance Rate Map
Figure 12: Proposed Wind Turbine Location and Previously Considered Configuration
Figure 13: Regional Natural Resources Map
Figure 14: Spring Raptor Migration Routes
Figure 15: Fall Raptor Migration Routes

Appendix B: Site Photolog/Visual Simulation

Attachment B-1: Site Photolog
Attachment B-2: Visual Simulation

Appendix C: Agency Coordination and Approvals

Attachment C-1: FAA Determination of No Hazard to Air Navigation: 2010-WTE-1076-OE
Attachment C-2: INDR–OREP Response and EcoCAT Review Results
Attachment C-3: Correspondence with Chicago District Army Corp of Engineers
Attachment C-4: Correspondence with IDNR Office of Water Resources
Attachment C-5: Letter to USFWS
Attachment C-6: IHPA Consultation
Attachment C-7: NTIA Consultation

Appendix D: Analysis and Supporting Documentation

Attachment D-1: Wind Speed and Energy Estimates
Attachment D-2: Vensys 77 Information and Technical Data Sheet
Attachment D-3: Shadow Flicker Analysis
Attachment D-4: Distribution List for Draft EA
Attachment D-5: NOA Posting in Local Newspapers
Attachment D-6: Vensys 77 Octave Spectra

Appendix E: Public Comments and Responses

Attachment E-1: Comment Response Matrix
Attachment E-2: USFWS Draft EA Comment Letter

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 about Federal actions that could have environmental effects. 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 decisionmakers 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 Chicago View Wind, LLC (CVW) would not proceed with the project. No other action alternatives are analyzed.

1.2 Background

CVW proposes to construct, operate, and eventually decommission a single 1.5-megawatt (MW) wind turbine at the Chicago Heights construction debris landfill located north of Sauk Trail and west of Cottage Grove Avenue in Chicago Heights, Cook County, Illinois (Figures 1-1 and 1-2; see Appendix A for all figures related to this EA). The proposed wind turbine is forecast to supply 3,143 MW-hours of renewable energy to the nearby Bloom Trail High School. The projected cost of the project is estimated to be $4 million. The Illinois Department of Commerce and Economic Opportunity 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 SEP is to promote the conservation of energy and reduce dependence on imported

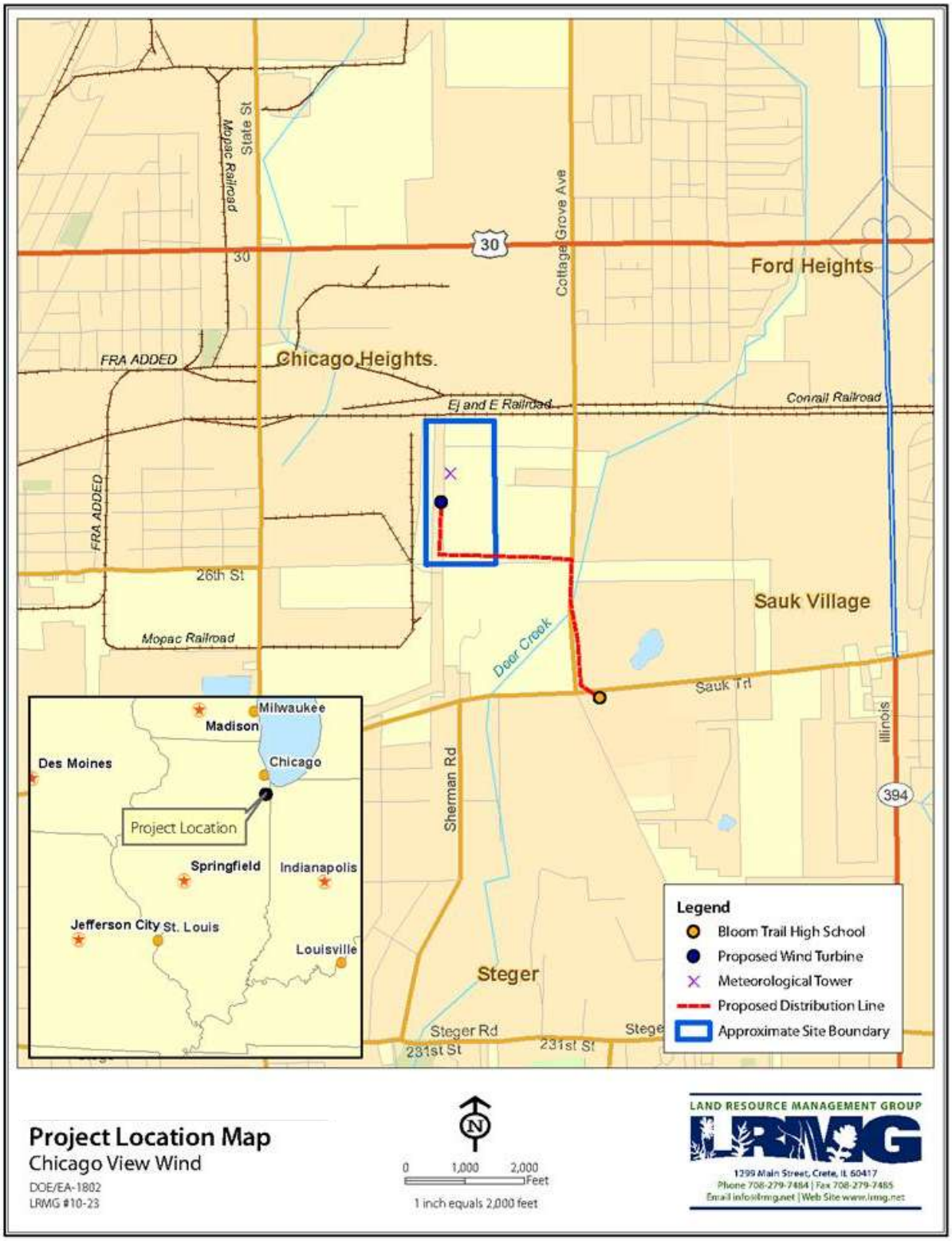

Figure 1-1. Project Location Map

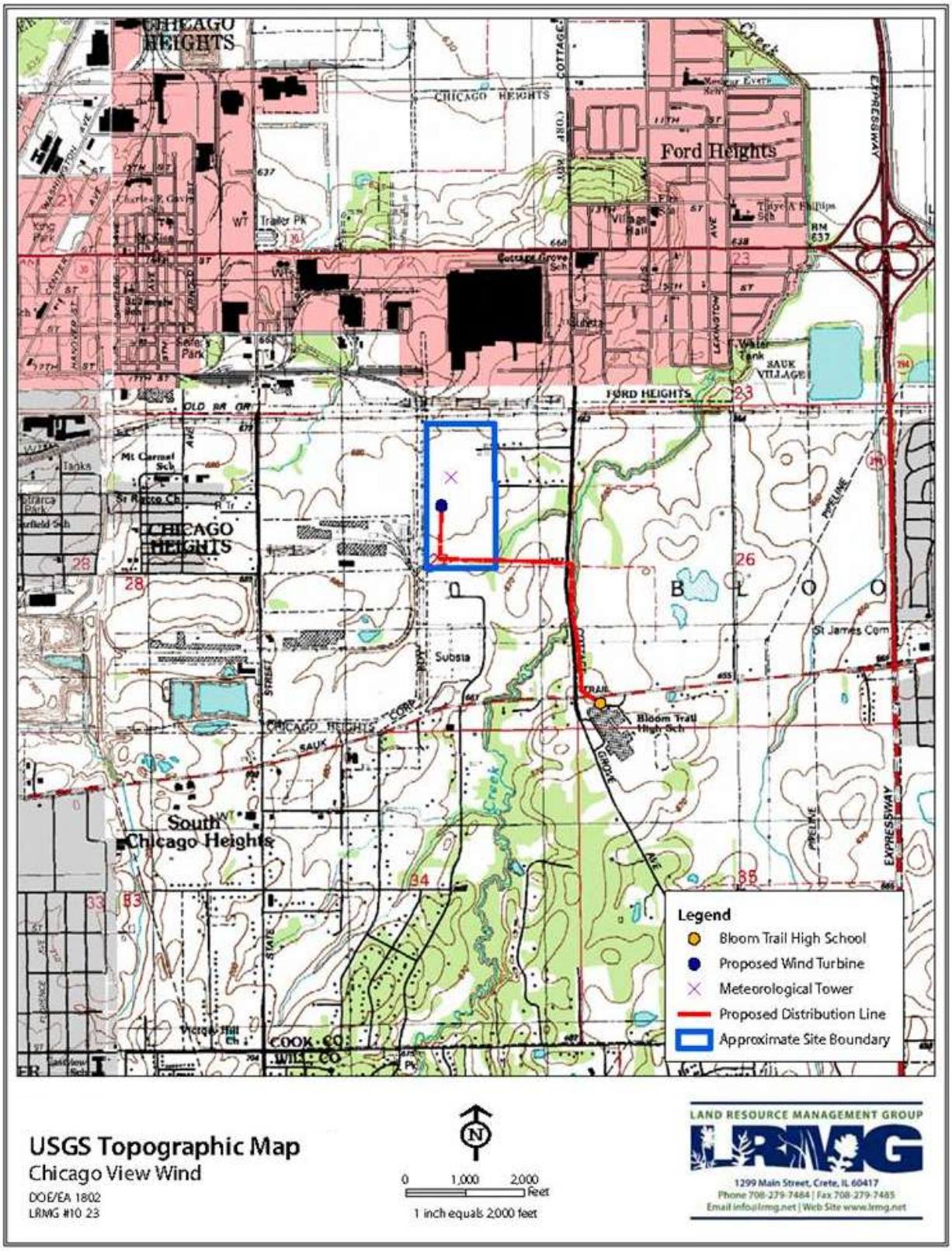

Figure 1-2. U.S. Geological Survey Topographic Map

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 generally 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 CVW Project (proposed 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 Illinois' SEP grant to CVW 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.

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.

1.4 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 SEP program includes four sub-programs:

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

Illinois' Office of Energy issued a Request for Proposal 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. A criterion of the SEP grant program is that funds must be fully obligated by September 30, 2010, and SEP-funded projects must be fully operational by March 2012. CVW was one of many renewable energy grant applicants to which the Illinois Office of Energy awarded SEP funds in 2009. For this project, DOE is the Federal action agency, while the Illinois Department of Commerce and Economic Opportunity (DCEO) is the recipient of Federal funding and CVW is the sub-recipient of this funding. The project will be implemented on CVW property.

1.5 Public and Agency Involvement

1.5.1 SCOPING

In accordance with the applicable regulations and policies, 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 comment. The notices were sent via postcard on July 16, 2010, directing stakeholders to DOE's Golden Field Office Public Reading Room, where DOE published the scoping letter for review. The scoping letter described the DOE's Proposed Action (authorize Federal funding) and requested assistance in identifying potential issues that could be evaluated in the EA. The public comment period closed on August 2, 2010. DOE did not receive any comments from individuals, organizations, tribes, or agencies. Appendix B of this EA contains a copy of the scoping letter, stakeholder distribution list, and Notice of Availability (NOA; discussed in Section 1.5.2).

DOE published the scoping letter online at the DOE Golden Reading Room website (http://www.eere.energy.gov/golden/reading_room.aspx). A legal notice for the project was placed in the *Southtown Star* on August 15, 16, and 17, 2010, requesting comments on the scope of the project.

The following agencies and organizations were contacted (see Section 9 and Appendix C):

- U.S. Fish and Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)
- U.S. Army Corps of Engineers (USACE), Chicago District Regulatory Branch
- Illinois Department of Natural Resources (IDNR) Office of Realty and Environmental Planning
- DNR Office of Water Resources
- Illinois Historic Preservation Agency (IHPA)

- City of Chicago Heights, Department of Economic Development
- Cook County Bureau of Administration
- Illinois Power Agency
- National Audubon Society
- Illinois Department of Transportation
- Illinois Commerce Commission
- Illinois Environmental Protection Agency

In 2009, CVW participated in meetings with the mayor and council members of the City of Chicago Heights and Cook County officials to discuss the proposed project. The project was well received and no objections were made by local officials.

1.5.2 DRAFT ENVIRONMENTAL ASSESSMENT

The draft EA was open for public comment for 17 days (from October 1 to October 18). DOE prepared an NOA and public comment procedures for the EA and published both in the *Southtown Star* and the *Northwest Indiana Times* (see Appendix D-5). The procedures outlined the public's opportunity to comment on the potential impacts to social, environmental, and economic factors from the proposed project The NOA was sent to potential stakeholders and interested parties (that is, Federal, State, tribal, and local agencies, as well as the general public). The NOA for the draft EA clearly identified the public's opportunity to comment on the project's potential impacts per the NEPA process.

The draft EA was posted on the DOE NEPA website (http://nepa.energy.gov) on September 28th and the DOE Golden Field Office Reading Room website (http://www.eere.energy.gov/golden/Reading_Room.aspx) on October 1st. Stakeholders and interested parties were afforded the opportunity to comment via email or written correspondence to the postal address provided therein.

At the conclusion of the comment period (October 18, 2010), DOE received comments on the EA from the USFWS. DOE's response to those comments is included in Appendix E of this EA. In response to USFWS comments, text was revised and new text included, providing more details on impacts to migratory birds and bats.

2. PROPOSED ACTIONS AND ALTERNATIVES

2.1 DOE's Proposed Action

DOE has provided a SEP grant to the State of Illinois and proposes to authorize the expenditure of Federal funding to assist with financing of the design, permitting, and construction of CVW's proposed project, a proposed 1.5 MW wind turbine in Chicago Heights, Illinois. In so doing, the project would facilitate Illinois' achievement of the objectives of the SEP. DOE has authorized CVW to use a percentage of its federal funding for preliminary activities, including the development of this EA. Such activities are associated with the proposed project and do not significantly impact the environment nor represent an irreversible or irretrievable commitment by DOE in advance of the conclusion of the EA for the proposed project.

2.2 Illinois' Proposed Project

The DCEO selected CVW for a $500,000 grant based on project readiness, cost-effectiveness, economic impact for ~~Illinois,~~Illinois and the project's ability to (1) provide emission-free energy, and (2) create jobs during the construction of the project. This project is DOE's Federal action for purposes of NEPA review, while DCEO is the recipient of the Federal funding and CVW is the sub-recipient of this funding. The project would be implemented on CVW's property in Chicago Heights, Illinois.

The project would involve the construction, operation, and eventual decommissioning of a single 1.5 MW wind turbine, which would connect at its hub (midpoint) to a 61.5-meter (202-foot)-tall tower. The total maximum height of the wind turbine would be 328 feet, from the bottom of the tower to the blade tip at its highest point. No new access or other roads are necessary for construction and operation of the wind turbine at the proposed location. A 5,540-foot, underground transmission line would connect the turbine to the 12.47-kilovolt distribution line owned by utility Commonwealth Edison (ComEd) at the nearby Bloom Trail High School. The distribution line would run eastward along the southern access road, head southward along Cottage Grove Avenue, and connect to the school at the southeastern corner of the Sauk Trail intersection. The distribution line would be constructed by open trenching except when crossing existing wetlands and streams, where the line would be directionally drilled to minimize potential impacts to water resources. Directional drilling is a steerable, "trenchless" method of installing underground pipes, conduits, and cables and is less intrusive than excavation drilling~~.~~. The proposed turbine is forecast to produce 3,143 MW-hours per year. The Bloom Township High School District would purchase all of the electricity the proposed project would generate, which would account for a majority of the overall electrical demand of the Bloom Township High School. One-half acre of land would be irreversibly committed during the functional life of the project.

The proposed project would bring a number of benefits to various parties in the local region. The Bloom Township High School District would reduce its carbon footprint by purchasing clean renewable energy the proposed wind turbine would generate. The project would also create temporary and permanent jobs during the construction and operation of the CVW facility. The local area and municipality might experience indirect economic benefits. The project would offer the public and the students in the School District the opportunity to learn firsthand about

renewable wind energy. CVW currently is considering constructing a small education center at the facility as part of a second phase of the project. The construction would not use DOE funds and is not analyzed in this EA.

2.2.1 PROJECT LOCATION

The proposed project would be located on a construction debris landfill (approximately 60 acres) in the city of Chicago Heights, Cook County, Illinois (see Figure 1-1 above). The landfill is west of Cottage Grove Avenue, north of Sauk Trail, and just south of the Ford Motor Company Stamping Plant along U.S. Highway 30. It is about 25 miles south of the Chicago city center. The landfill can be accessed from Cottage Grove Avenue via the south entrance road or 217th Street (north entrance). The approximate center point of the proposed wind turbine would be 49 degrees north latitude and 87 degrees west longitude.

2.2.2 CONSTRUCTION

Site construction would include installation of a single wind turbine, underground distribution line, and necessary improvements to access roads, crane pads, and foundation systems. The construction would be carried out in accordance with approved soil erosion and sedimentation control plan and the associated National Pollutant Discharge Elimination System (NPDES) permit, and in compliance with all other applicable requirements and regulations. Wind turbine installation, including site preparation, erection, final commission, generator installation, underground distribution line installation, overall systems tie-in, and start-up is planned to be completed within about 4 months of groundbreaking.

The turbine tower foundation would be designed in a “spread foot” style. The spread-footing design would require additional excavation of materials under the foundation and additional compaction, as well as additional engineered fill to increase the soil bearing strength to support the turbine and avoid uneven settling.

CVW would install an underground distribution line to send electricity to the 12.47-kilovolt distribution line (owned by ComEd) at the nearby Bloom Trail High School at the southeastern corner of Cottage Grove Avenue and Sauk Trail (see Figure 1-1). The distribution line would run eastward along the southern access road, head southward along Cottage Grove Avenue, and connect to the school at the southeastern corner of the Sauk Trail intersection. The distribution line would be constructed by open trenching, except when crossing existing wetlands and streams, where the line would be directionally drilled to minimize potential impacts to water resources.

Construction would involve the following tasks: (1) constructing the turbine pad; (2) constructing a foundation for the tower; (3) trenching for underground utilities; (4) placing underground electrical cables in the trench; (5) connecting the turbine to the transformer; (6) transporting tower sections to the site and assembling the towers with a crane; (7) installing the nacelle, rotor, and other turbine equipment; (8) conducting final testing; and (9) implementing site restoration.

Total land disturbance during construction would be approximately 3 acres within the 60-acre landfill site, including the turbine foundation and the temporary construction laydown area. Of

these 3 acres, approximately 0.5 acre would be permanently committed as part of the proposed project.

During construction, the contractor would provide necessary facilities consistent with similarly sized construction projects, including construction trailer, temporary chemical toilets, and solid waste collection containers. All solid and liquid wastes would be removed from the site in accordance with applicable regulations and permit conditions.

2.2.3 AVIATION LIGHTING

CVW would use a flashing, red-light-emitting diode at the minimum number, minimum intensity, and minimum number of flashes per minute allowable by the FAA. The project has received final approval from the FAA for this configuration (see Appendix C-1).

2.2.4 OPERATION AND MAINTENANCE

CVW would operate and maintain the proposed project according to standard industry procedures and applicable requirements. Routine maintenance of the turbine would be necessary to maximize performance and identify potential problems or maintenance issues. The turbine would be remotely monitored daily to ensure operations are proceeding efficiently. All workers would be properly trained for turbine maintenance and safety. 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, without using 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.

2.2.5 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 the project’s useful life beyond 20 years. Activities associated with the decommissioning of the project are expected to be similar to those in the initial construction. When CVW terminates the project, 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 3 feet below grade. CVW would sell, reuse, or recycle salvageable items (including fluids), as appropriate; unsalvageable material would be disposed of at authorized sites. The soil surface would be restored as closely as possible to its original condition. Reclamation procedures would be based on site-specific requirements commonly employed at the time the area is to be reclaimed and could include regrading, adding topsoil, and replanting all disturbed areas.

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.

DOE's alternatives to its Proposed Action relating to Illinois' use of its SEP funds are limited to (1) any alternatives that Illinois is still considering in regard to this project, and (2) prohibiting Illinois and CVW from using Federal funding for the proposed project. The second alternative is equivalent to the No-Action Alternative described in Section 2.3.2. Illinois has informed DOE that it is not considering any "project-specific" alternatives for the proposed project; therefore, DOE's alternatives are limited to the No-Action Alternative. Additionally, there are no unresolved conflicts concerning alternative uses of available resources associated with the project site that would suggest the need for other alternatives.

2.3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, DOE would not allow the State of Illinois to use its SEP funds for this project. For this EA, DOE assumed that the project would not proceed without SEP funding. This assumption might be incorrect, but it enables a comparison between the potential impacts of the project as proposed and the impacts of not proceeding with the project. Without approval from DOE for this funding through the State, the Department assumed that the Bloom Township High School District would continue purchasing electricity generated mostly from nonrenewable sources. 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 to further the goals of ARRA.

2.3.3 ALTERNATIVES CONSIDERED BY THE PROJECT PROPONENTS

CVW considered several locations within the Chicago Heights area for the wind turbine project. The project proponent selected the former demolition debris landfill site due to various siting considerations (topography, site elevation, prevailing wind direction); location (proximity to electrical interconnection, proximity to meteorological tower location, accessibility); and physical siting constraints (landfill footprint, property boundaries).

A group of five turbines initially was considered for the project (see Figure 12 in Appendix A). This turbine configuration was rejected due to concerns by the FAA about potential interference with the nearby radar and flight-control operations. The final single turbine configuration was selected because a single turbine at the proposed location would minimize the potential impact to air traffic control and flight operation of the Lansing Municipal Airport (see pages 8 and 9 in Appendix C), which is approximately 5 miles to the northeast of the project site. A single turbine also minimizes the potential for shadow flicker at the nearby single-family residences on 219th Street.

2.4 Permits, Approvals, and Notifications

Prior to construction, CVW would obtain all required Federal, State, and local permits and approvals. The required permits and approvals are listed in Table 2-1. Documentation of all agency approvals that have been received is included in Appendix C of this EA.

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

Agency	Permit Approval / Type
Federal	
Federal Aviation Administration	FAA Aeronautical Determination (received 3/2/2010)
National Telecommunications and Information Administration	Radio Frequency Transmission Approval
U.S. Fish and Wildlife Service	Compliance with the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*
Army Corps of Engineers	Compliance with the *Clean Water Act*, Section 404 (Wetlands) – obtaining Letter of No Objection (distribution line)
State	
Illinois Environmental Protection Agency	National Pollutant Discharge Elimination System; filing the Notice of Intent for Construction Activities
Illinois Historic Preservation Office	Compliance with the *National Historic Preservation Act*
Illinois Department of Natural Resources – Office of Realty and Environmental Planning	State Threatened or Endangered Species consultation and natural resource review
Illinois Department of Natural Resources – Office of Water Resources	Regional Permit No. 3 for authorization construction of minor projects in Northeastern Illinois Regulatory Floodways (distribution line)
Local	
City of Chicago Heights	Special Use Permit and Building Permit

2.5 Project Proponent-Committed Practices

CVW 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, design, and installation, CVW gave consideration to the guidelines contained within the USFWS *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 impacts to the avian and bat species:

- The 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 rather than a lattice tower, which have become roosting sites for birds at other wind projects.

- Ground guy wires would not be used to support the wind turbines. 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.

In addition, the applicant would conduct voluntary post construction migratory bird monitoring for one year during spring and fall migration periods with an optional second season depending on the first year results. This monitoring would be consistent with USFWS migratory bird monitoring protocols to be developed in early 2011.

2.5.2 HUMAN HEALTH AND SAFETY

The construction contractor and facility operator would prepare a health and safety plan in accordance with Occupation Safety and Health Administration requirements before starting work. Construction of the proposed project would comply with all applicable Federal, State, and local requirements. The entire property currently is surrounded by a fence. Signs warning of a high-voltage area would be installed.

2.5.3 SOIL

CVW would require its construction contractor to use best management practices (BMPs) during installation and operation to protect topsoil and minimize soil erosion, including the following: containing excavated material, using silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas directly following construction activities.

2.5.4 CULTURAL AND HISTORIC RESOURCES

Through IHPA's review of its internal archaeological database, the Agency concluded that impacts to archaeological resources during construction of the proposed project were not likely to occur (see Appendix D). However, 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 *National Historic Preservation Act*.

2.5.5 NOISE

All construction activities would occur during normal working hours to avoid noise and other disturbances to the extent practicable to surrounding residences, and would conform to all local noise ordinances and other applicable Federal, State, and local requirements. Acoustic modeling shows that the wind turbine under consideration would produce a noise level less than or equal to 45.3 A-weighted decibels (dBA) at the nearest residential receptor. The nighttime maximum noise levels for the Vensys 77 wind turbine (the model CVW has selected) would not exceed the noise level required under Illinois State law at the nearest receptor. CVW would limit the turbine speed at night to meet applicable noise regulations.

2.5.6 VISUAL RESOURCES

The number of hours of theoretical shadow flicker can be calculated by considering potential receptors (homes or businesses) with respect to wind turbine and sun position. For the proposed project, six of twelve residences (receptors) to the northeast of the site would experience a maximum theoretical duration of between 30 and 60 hours of shadow flicker per year. The remaining six would experience between 9 and 22 hours of shadow flicker per year. The nearest industrial receptor would experience a maximum 120 theoretical hours of shadow flicker per year. If shadow impacts became an annoyance to the nearby receptors, CVW would assist those receptors in purchasing blinds for windows or by planting trees to screen for shadow impacts.

2.5.7 WASTE MANAGEMENT

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

2.5.8 WATER RESOURCES

To minimize any potential loss or degradation to water resources as a result of the proposed project, the following measures would be taken:

- CVW would avoid wetlands when determining the final alignment of underground distribution line. If crossings of wetlands and/or streams could not be avoided, all crossings under existing wetlands and/or streams would be installed by directional drilling methods to minimize impacts.

- CVW would prepare and implement a storm water pollution prevention plan (SWPPP) in accordance with Illinois Environmental Protection Agency guidance and the Illinois Urban Manual. The SWPPP would address the NPDES requirements, and a Notice of Intent would be filed with the Illinois Environmental Protection Agency before construction began.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

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

3.1 No-Action Alternative

Under the No-Action Alternative, DOE would not authorize the use of Federal funds for the design, construction, and operation of the proposed project; therefore, there would not be any impacts to the resource areas analyzed in this EA. However, the Bloom Township School District would continue to purchase all its electricity from the local utility company, ComEd. For the 12-month period ending March 31, 2010, ComEd provided 39 percent of the overall supply of electricity from fossil fuel sources (coal and natural gas), 58 percent from nuclear power, and the remaining 3 percent from renewable sources (ComEd 2010). If the proposed project was not implemented, the overall emissions of carbon dioxide and other greenhouse gases (GHGs) from electricity generation to serve the School District would be higher and CVW would not meet its objective to reduce its carbon footprint.

Under the No-Action Alternative, there would be no impacts to the area's visual resources from the proposed project. Nearby residents would not be affected by the noise that would have been generated by the construction activities and operation of the wind turbine. Potential impacts to bird and bat species would not occur. Temporary and permanent jobs associated with the construction and operation of the wind turbine facility would not be created. The local area and municipality would not experience any indirect economic benefits that the proposed project might have brought.

3.2 Illinois' Proposed Project

The proposed project would potentially affect the environmental resources near the project site and in the region. Each resource area is described and discussed in the following sections.

3.2.1 CONSIDERATIONS NOT CARRIED FORWARD FOR FURTHER 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.

3.2.1.1 Waste Management

CVW anticipates the following solid wastes would be generated during construction: equipment packaging materials and construction-related material debris. Solid wastes generated during operation of the turbines would be minimal. CVW anticipates the following solid wastes would be generated during decommissioning: dismantled equipment and construction-related material

debris. CWV does not anticipate generating hazardous, regulated nonhazardous, and universal wastes 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 gearbox oil, hydraulic fluid, and gear grease) is not considered a waste because it can be reused and/or recycled. Used oil would not be generated during operation of the proposed project since the selected turbine does not have a gearbox and the magnet generator with large bearings (which require lubrication) is permanently sealed with grease. Any other waste fluids or used parts would be handled, collected, transferred, and reused/recycled in accordance with applicable Federal, State, and local regulations.

3.2.1.2 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). The proposed project site is not located within a waterway, corridor, or drainage area of a stream or river protected under Illinois State Law (State of Illinois Public Act 84-1257) or a waterway included in the National Wild and Scenic River System. The closest and only scenic river in Illinois is the Middle Fork River (a tributary to the Vermilion River). The Middle Fork River is near Oakwood, Illinois (approximately 100 miles from the proposed project site). The proposed project would not impact any Federal- or State-designated wild and scenic rivers.

3.2.1.3 Intentional Destructive Acts

DOE considers intentional destructive acts (i.e., acts of sabotage or terrorism) in all of its EAs and environmental impact statements. The proposed 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, heath, or safety.

3.2.2 CONSIDERATIONS CARRIED FORWARD FOR FURTHER ANALYSIS

3.2.2.1 Land Use

The land use surrounding the project site is predominately industrial with patches of agricultural and residential areas (see Figures 3-1 and 3-2). The current zoning in that area, including the site itself, is heavy industrial. The site is just within the eastern corporate limit of the city of Chicago Heights. East of the site is unincorporated Cook County.

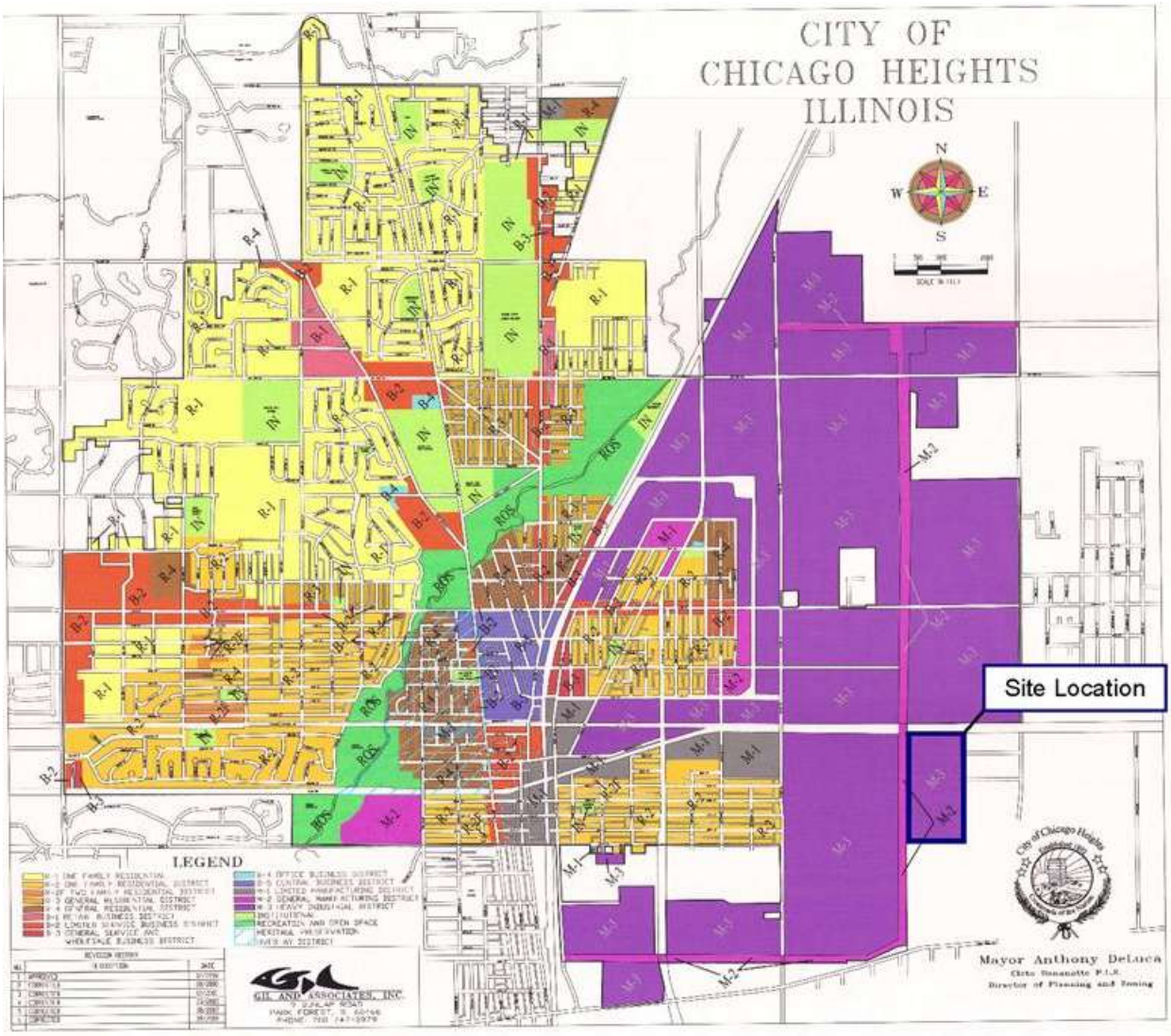

Figure 3-1. City of Chicago Heights Zoning Map

Figure 3-2. Existing Land Use on Aerial Photograph

The project site was previously a demolition debris landfill, which was properly closed in 2004. Immediately north of the site, separated by the Elgin, Joliet and Eastern Railroad, is the Ford Motor Company Stamping Plant. The area between the eastern site boundary and Cottage Grove Avenue consists of light industrial and commercial properties. Also, there is an area of residential housing on the north side of 219th Street and also on 217th Street. Note that this isolated area of residential housing is surrounded by either existing or proposed industrial/commercial-use properties. Immediately to the southeast of the site are vacant properties and farm fields. South of the site on Sherman Road is a ComEd electrical substation. West of the site are several intermodal facilities along the east side of State Street. There are other residential areas farther from the site to the south (south of Sauk Trail) and northeast (east of Cottage Grove Avenue). (See Figure 4 in Appendix A for aerial photograph and surrounding land use.)

The City of Chicago Heights currently has no zoning category for wind turbine projects and is in the process of amending its ordinance for this project. A special use permit would be acquired from the City prior to the construction of the project.

The closest forest preserves are Sauk Trail Woods and Plum Creek Forest Preserve, approximately 3 miles southwest and 3.5 miles southeast of the project, respectively. The project is approximately 13 miles south-southwest of Wolf Lake near the shore of Lake Michigan (see Figure 13 in Appendix A).

Direct and Indirect Impacts

Implementation of the proposed project would permanently commit 0.5 acre of previously disturbed land. CVW estimates that temporary land disturbance during construction would be approximately 3 acres. The overall use of the general area would remain predominantly industrial according to the zoning map of the city of Chicago Heights. The proposed project would be consistent with this existing land use and would not result in any direct or indirect impacts to future land use of the area.

3.2.2.2 Visual Quality

The existing view of the project area is primarily industrial with typical scenery of railroads, high-voltage electrical transmission lines and towers, factories, and warehouses. Some vacant lands and farm fields also surround the project site. (See Figure 4 in Appendix A for aerial photograph and Section 3.2.1 for detailed description of surrounding land use.)

Major vertical elements in the vicinity of the project site include the landfill, itself, transmission line towers, and water towers. The landfill is approximately 70 feet tall and all slopes are vegetated. High-voltage power lines run along the western boundary of the landfill and the associated towers are approximately 180 feet tall. There are also several water towers near the project site.

While it is not possible to quantify the visual impact of a wind energy project due to the subjective nature of aesthetics, visual impacts are sometimes a concern with such projects. Concerns about the visual impacts of wind energy projects generally revolve around aesthetic and shadow flicker impacts associated with the rotating turbine blades.

3.2.2.2.1 Visual Simulations

To address the potential concerns about the aesthetic impacts of the proposed project, DOE generated visual simulations of the proposed turbine from various viewpoints in Chicago Heights and surrounding communities. These viewpoints ranged from 0.3 mile to 1.5 miles from the proposed turbine location and surrounded the project site from all principal directions (see Table 3-1 and Figure 5 in Appendix A). The locations of these viewpoints were selected based on potential impacts to receptors primarily from residential areas and major thoroughfares surrounding the site. These viewpoints are on publicly accessible areas, which potentially have greater impacts than those on private properties.

Table 3-1. Visual Simulation Locations and Observations

Photo	Location	Distance to wind turbine (feet)	Direction to wind turbine	Wind turbine viewshed obstruction	Vertical objects in viewshed
1	219th Street (west of Cottage Grove Avenue)	1,725	West	Trees	Trees, and power poles
2	Ellis Avenue and 16th Street	4,562	Southwest	Building	Power poles, light poles, building, and trees
3	U.S. Route 30	4,224	South	Transmission line towers and overhead power lines	Transmission line towers, light poles, power poles
4	State Street and East 23rd	2,985	East	Trees	Transmission line towers, light poles, building, and trees
5	Sauk Trail and Lahon Road	3,575	North	Overhead power lines	Transmission line towers, power poles, light poles, and trees
6	Sauk Trail and Cottage Grove Avenue (Bloom Trail High School)	4,225	Northwest	Trees and billboard	Billboards, transmission line towers, and power poles
7	Sauk Trail and Illinois State Route	8,075	Northwest	Trees and billboard stand	Light poles, billboard stand, water tower, and transmission line towers

Source: Appendix B-2 of this EA.

The visual simulations (see Appendix B-2) show that the view of the proposed wind turbine would be frequently obstructed by various vertical elements in the area such as trees, electrical transmission line poles and towers, and buildings. The visibility of the turbine varies by location depending the numbers and types of vertical elements in the line of sight. Unlike the open, treeless prairies or deserts of the West, or flat, agricultural areas of the Midwest where tall towers can be seen for miles away, the vegetation of Illinois includes many trees, occurring both naturally and as landscape plantings. These trees would effectively screen many potential views of the turbine. Where trees are lacking, in many cases buildings could serve as visual obstacles to views of the wind turbine.

3.2.2.2.2 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 receptors. The spatial relationship between a wind turbine and a receptor, the location of trees, buildings, and other obstacles, and weather characteristics such as wind speed/direction and sunshine probability are key factors related to shadow-flicker impacts. Shadow flicker becomes much less noticeable at distances beyond about 1,000 feet, except at sunrise and sunset when shadows are long.

Wes Engineering Inc. prepared a shadow flicker study using HG WindFarmer software [a proprietary software for wind farms design (GL Garrad Hassan 2010)] to determine if any nearby occupied dwellings would be adversely affected by shadow flicker of the turbine. The results are presented in Table 3-2 and as Figure 3-3. A detailed report is included in Appendix D-3. The actual shadow flicker hours experienced were reduced by cloudy days, days when the turbine was not turning, and days when the wind turbine blades were oriented parallel to the path of the sun and receptor. These factors reduce the actual hours to approximately 50 percent or less of the theoretical maximum hours. The analysis did not consider topography, including the height of the landfill. Wes Engineering estimated that topographical considerations would increase the potential shadow flicker (conservatively assuming 365 sunny days) by an additional 5 to 10 hours per year at the 12 residences. The additional hours due to topography are not included in Table 3-2.

Of the 12 residential dwellings to the northeast of the site, a total of 6 would experience shadow flicker for more than theoretical 30 hours per year. Results also show that two of these six residential receptors would experience between 50 and 60 maximum theoretical hours of shadow flicker per year. As seen in Photo 1 in Attachment B-2, mature trees are abundant and surround these residential dwellings and other dwellings on 219th Street. The theoretical hours of shadow flicker would be further reduced by the trees during leaf-on periods. The nearest industrial receptor west of the wind turbine (600 feet away) would experience a maximum 20 theoretical hours of shadow flicker per year.

Table 3-2. Shadow Flicker Analysis Results at the Nearby Residential Receptors

Dwelling ID	1	2	3	4	5	6	7	8	9	10	11	12
Distance from Wind turbine (feet)	1,000	1,130	1,500	1,610	1,770	1,880	2,000	2,380	1,250	1,350	1,420	1,550
Maximum Shadow Hours per Year	54	40	22	18	16	12	12	9	59	33	47	48

Source: Appendix D-3 of this EA.

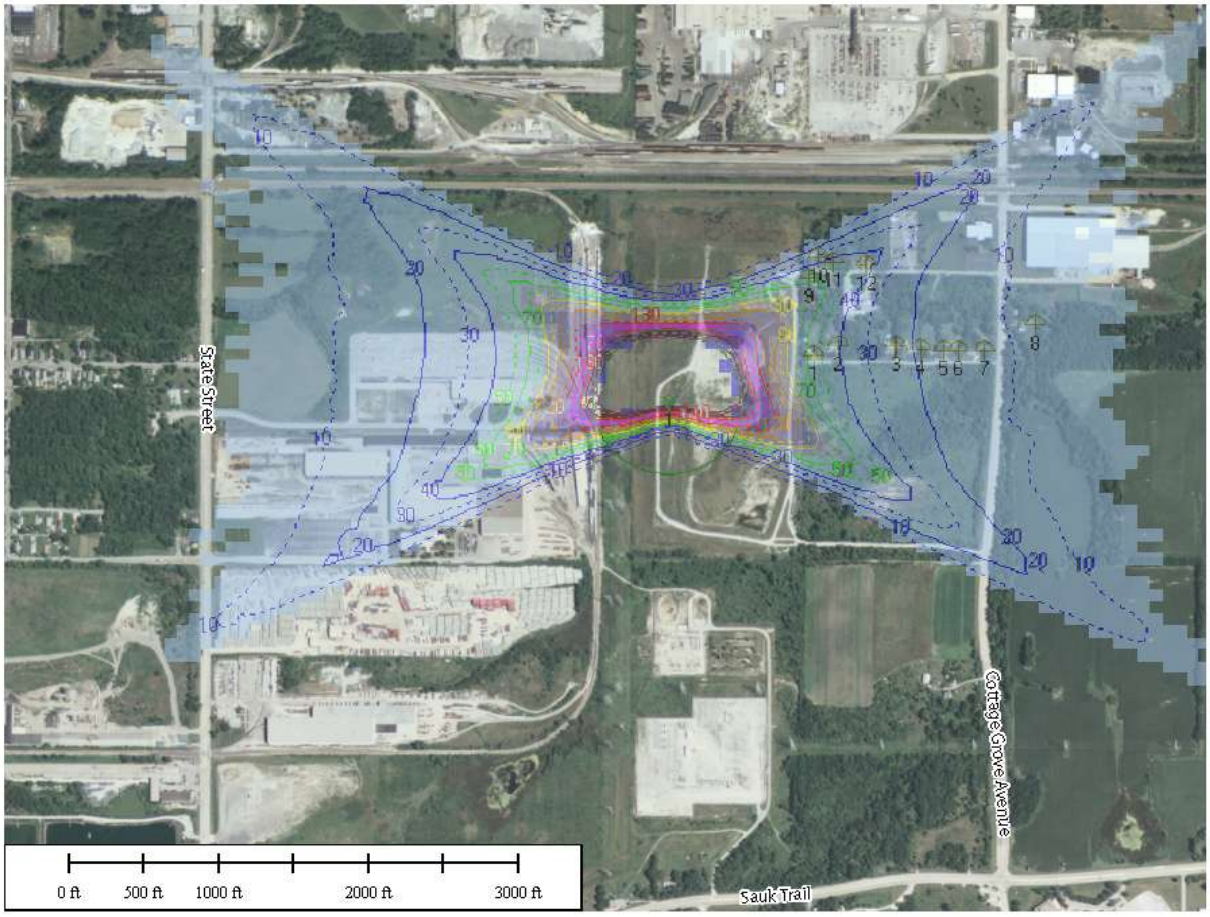

Figure 3-3. Shadow Flicker Affected Area

Direct and Indirect Impacts

The proposed wind turbine project would affect the viewshed in the project area. The wind turbine would be a dominant vertical feature in the landscape due to its height. However, the visual impact of the wind turbine is substantially reduced because of other currently 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 clearest views of the turbine would be found from vantage points at State Street and Sauk Trail (see Photos 4 and 5 in Attachment B-2). This view also encompasses transmission line towers. Despite the fact that the wind turbine would be taller than the nearby transmission line towers, from the vantage points at Sauk Trail and U.S. Route 30 (see Photos 3 and 5 in Attachment B-2), the turbine would appear to be the same height as the towers because of its close proximity to the towers.

Because of the relatively flat terrain in the project area, the turbine would be visible from more than 1 mile away. However, trees and buildings would effectively screen many potential views of the turbine. Weather conditions would also affect visibility of the turbine farther from the project site.

In general, there are no anticipated visual impacts that would adversely affect nearby residents, users of the project area and surrounding areas, or passersby as a result of the proposed project. If shadow impacts become an annoyance to the nearby receptors, CVW would assist those receptors in purchasing blinds for windows or by planting trees to screen for shadow impacts. The spatial relationship between a wind turbine and a receptor, the location of trees, buildings, and other obstacles, and weather characteristics such as wind speed/direction, and sunshine probability are key factors related to shadow flicker impacts. Shadow flicker becomes much less noticeable at distances beyond about 1,000 feet, except at sunrise and sunset when shadows are long.

There is some concern 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 2010). For example, the proposed Vensys 77 model wind turbine has a rotor speed range of between 9 and 17.3 rotations per minute (see Appendix D-2).

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 de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear [i.e., using the A-weighting filter adjusts certain frequency ranges (those that humans detect poorly)] (Colby et al. 2009). On the average, each A-weighted sound level increase of 10 decibels corresponds to an approximate doubling of subjective loudness.

Noise is any unwanted, undesirable sound. It has the potential to interfere with communication, damage hearing, and, in most cases, is viewed as an annoyance. Noise can occur in different volumes and pitches depending on the type of source and the distance from a receptor. It is important to consider the amount of noise that would be created during both the construction and operation phases of a project to avoid disturbing people working or living in the surrounding areas.

Table 3-3 shows common outdoor and indoor sound sources and typical associated sound levels. It is always important to list the distance to the source as well as the level.

Table 3-3. Typical Sound Pressure Levels Measured in the Environment and Industry

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) Shout (0.5 feet)	100	
N.Y. subway station Heavy truck (50 feet)	90	Very annoying Hearing damage (8-hour, continuous exposure)
Pneumatic drill (50 feet)	80	Annoying
Freight train (50 feet) Freeway traffic (50 feet)	70 to 80	
	70	Intrusive (Telephone use difficult)
Air conditioning unit (20 feet)	60	
Light auto traffic (50 feet)	50	Quiet
Living room Bedroom	40	
Library Soft whisper (5 feet)	30	Very quiet
Broadcasting/Recording studio	20	
	10	Just audible

Adapted from Table E, "Assessing and Mitigating Noise Impacts", NY DEC, February 2001.
Source: Colby et al. 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 periods of time such as 8 hours or 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 because it combines all sound sources during 24 hours.

A 24-hour exposure level of 70 dBA 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 dBA outdoors and 45 dBA indoors are defined as preventing activity interference and annoyance to human receptors. In noise-sensitive areas such as where people sleep, EPA modified these latter criteria by making them Day Night Average Sound Level (DNL) values. The DNL values represent energy averages over a 24-hour period, but a 10-decibel penalty is added to sounds that occur during the 9 hours between 10:00 p.m. and 7:00 a.m. Accordingly, in residential areas, for

example, EPA's guidelines for sound levels to avoid activity interference and annoyance are DNL levels of 55 dBA outdoors and 45 dBA indoors. 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 DNL less than or equal to 65 dBA and a future design goal DNL of 55 dBA for exterior sound levels (EPA 1977). While only the local noise regulations are legally enforceable; the EPA's guidelines are a useful resource for analyzing a project's noise impacts. 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). The applicable IPCB regulations are shown in Table 3-4 and apply to noise generators and receptors in relation to their respective property lines. IPCB noise regulations are legally enforceable. Because the Illinois regulations are presented in terms of octave bands, including low frequency bands, the appropriate units are decibels, not A-weighted decibels as used in many standards and guidelines.

Table 3-4. Allowable Noise Levels Emitted from Class C Land to Receiving Class A Land

Octave Band Center Frequency (Hz)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
Daytime Allowable Noise Level (dB)	75	74	69	64	58	52	47	43	40
Nighttime Allowable Noise Level (dB)	69	67	62	54	47	41	36	32	32

Source: Adapted from IAC, Title 35, Subtitle H, Section 901.102.
db = decibel; Hz = hertz; IAC = Illinois Administrative Code.

Direct and Indirect Impacts

Noise produced during project construction would be a result of heavy equipment at the site. Sound levels from typical construction equipment (for example, bulldozers, rollers, or other heavy equipment with diesel engines and limited movement) are generally in the 80 to 90 dBA range at a distance of 50 feet (EPA 1974). Sound attenuation factors such as air absorption and ground effects from terrain and vegetation would be expected to decrease the distance at which construction noise would be 55 dBA or greater. Per Table 3-3, noise levels experienced at the nearby residences during construction would be similar to those of a normal office and from conversations. In addition, the sounds would be relatively short-term and would occur only during the daytime when they would be less apt to interfere with sound-sensitive activities such as sleeping.

Noise produced during decommissioning of the wind turbine would be expected to be very similar to, if not less than, that generated during construction. That is, with appropriate control of nighttime activities, noise impacts would be minimal and temporary. Accordingly, the remainder of this section describes potential noise impacts from wind turbine operations.

Operating wind turbines can generate two types of sound: mechanical sound from components such as gearboxes, generators, yaw drives, and cooling fans, and aerodynamic sound from the flow of air over and past the rotor blades (Colby et al. 2009). Modern wind turbines have been designed to significantly reduce the noise of mechanical components. The aerodynamic noise, generated by the interaction of air flow across rotating turbine blades, typically is the dominant source and generally heard as a "whooshing sound" as the blades of the turbine rotate. The aerodynamic noise has a frequency range approximately between 500 to 1,000 hertz, and tends to be less noticeable by humans when compared with sound from road traffic, trains, aircraft, and industrial activities.

CVW intends to install a single Vensys 77 wind turbine atop a demolition landfill. The proposed wind turbine would be located in a heavily industrial area, currently zoned M-3, near the southeast limit of the city of Chicago Heights (see Figures 3 and 4 in Appendix A). The proposed site is neighbored by the Ford Motor Company Stamping Plant to the north and several intermodal facilities to the west. Railroad tracks separate the project site from these neighboring facilities. The site has direct access to Cottage Grove Avenue to the east; this and the other three roads circumventing the site (U.S. Route 30, Sauk Trail, and State Street) are urban four-lane thoroughfares. Illinois State Highway 394 is 1.5 miles east of the site. The existing environmental noise for this heavy industrial area is characterized by local tractor-trailer traffic, rail traffic, and daily operations from neighboring industrial and intermodal facilities.

A potential noise receptor(s) of concern is an isolated area of single-family residences on the north side of 219th Street and also on 217th Street. These houses are bordered to the north by industrial use properties, with the nearest residential building located at the dead-end of 219th Street, approximately 1000 feet from the proposed location of the wind turbine.

CVW performed noise modeling using GH WindFarmer software to assess the potential noise impacts from operation of the proposed wind turbine. The Vensys 77 technical specifications state the sound level of the wind turbine is 104 decibels when operating at 95-percent-rated power (see Appendix D-2). Assuming this value at the source, the maximum sound pressure levels due to the operation of the wind turbine can be calculated for the surrounding area. Figure 3-4 shows the contour map of the calculated sound pressure levels. Note that the estimated sound pressure levels are conservative and can be viewed as the upper limit because attenuation due to various environmental factors (e.g., wind direction, temperature, humidity, vegetation, background noise levels) has not been accounted for in the model. The residential community to the northeast of the site consists of 12 residential dwellings. The estimated sound pressure levels for all 12 residences are below the 55 decibels the EPA levels initially established for protection against outdoor activity interference in residential areas (EPA 1974). Table 3-5 shows the predicted wind turbine noise levels using the GH WindFarmer software. In order to directly compare predicted noise levels for the turbine with the Illinois state regulations provided in Table 3-4, DOE performed additional modeling based on the same mathematical equation of the GH WindFarmer software, taking into account atmospheric considerations for the upper octave

bands (2,000, 4,000, and 8,000 Hz). A sample calculation is included as part of Appendix D-6 of this EA. The results of this analysis are shown in Table 3-6.

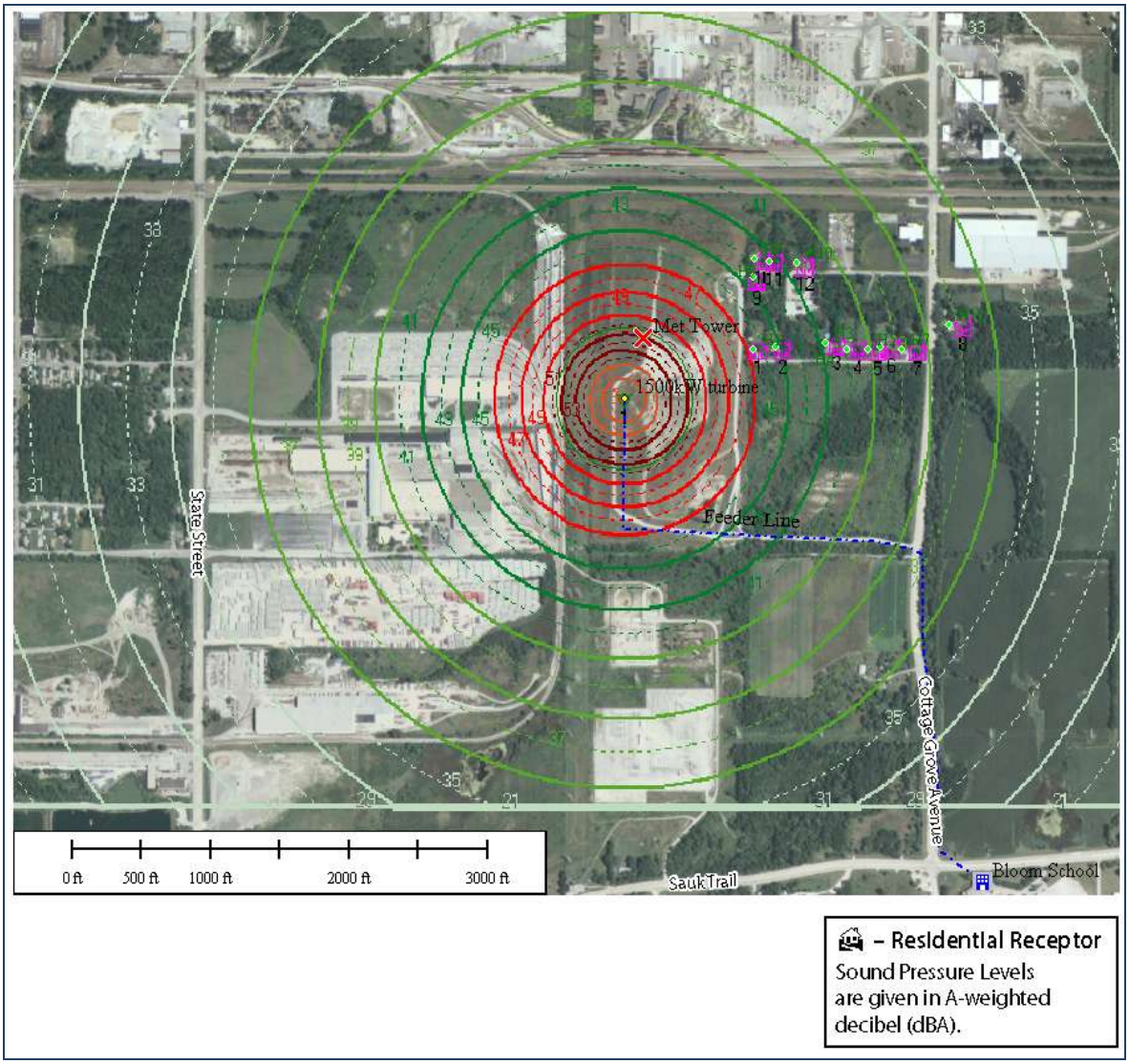

Figure 3-4. Sound Pressure Levels Contour Map

Table 3-5. Noise Modeling Results at the Nearby Residential Receptors

Dwelling ID	1	2	3	4	5	6	7	8	9	10	11	12
Distance to Wind Turbine (feet)	1,000	1,130	1,500	1,610	1,770	1,880	2,000	2,380	1,250	1,350	1,420	1,550
Predicted Maximum Noise Level (dBA)	45.3	43.9	41.3	40.5	39.7	39.2	38.4	36.8	43.4	42.5	42.1	41.1

Source: Appendix D-2 of this EA.
dBA = A-weighted decibel.

Table 3-6. Estimated Octave Band Sound Pressure Levels at the Nearest Receptor

Octave Band Center Frequency (Hz)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
Nighttime Allowable Noise Levels (dB)	69	67	62	54	47	41	36	32	32
Noise Level at the Nacelle (dB)[a]	85	87.46	94.35	97.68	96.55	96.23	94.01	89.72	78.15
Modeled Noise Levels (dB) at Dwelling 1[a]	27.34	29.76	36.54	39.65	38.21	37.30	33.06	21.06	20.49

a. Manufacturer data for octave band sound pressure is included as Appendix D-6.
dB = decibel; Hz = hertz.

Figure 3-4 and Table 3-5 show that, at the closest residence (1,000 feet northeast of the wind turbine – Dwelling ID #1), the estimated maximum noise level (outdoors) due to the wind turbine operation would be 45.3 dBA. Table 3-6 shows that Dwelling ID#1, approximately 1000 feet from the turbine, would not experience noise above the Illinois nighttime standards, even under maximum operating load. Based on wind data obtained for the meteorological tower at the site, maximum operating load is expected to occur less than 40 hours a year, a portion of which would be during daytime hours. Since Dwelling ID#1 is the closest receptor, noise levels at all residential receptors are predicted to comply with the Illinois standards.

3.2.2.4 Cultural Resources

Cultural resources are archaeological sites, historical structures and objects, and traditional cultural properties. Historic properties are cultural resources that are listed on or eligible for listing in the National Register of Historic Places (NRHP) because they are significant and retain integrity (per 36 CFR 60.4). Section 106 of the *National Historic Preservation Act* (16 U.S.C. 470 *et seq*.) requires that Federal agencies take into account the effects of their actions on historic properties. Section 101(b)(4) of NEPA requires that Federal agencies coordinate and plan their actions to identify any unique historic or cultural characteristics of the geographic area (40 CFR 1508.27) of the proposed project and act accordingly. Regulations under 36 CFR Part 800 "Protection of Historic Properties" describes the process for compliance with Section 106, including defining the area of potential effect (APE), taking steps to identify resources, evaluate effects, and initiate consultations with interested parties including the State Historic Preservation Officers.

3.2.2.4.1 Consulting Party Participation

On August 28, 2009, DOE executed a Memorandum authorizing its ARRA grant applicants under the Energy Efficiency and Conservation Block Grant , Weatherization Assistance, and SEP programs to initiate Section 106 consultations pursuant to 36 CFR 800.2(c)(4). As of that date, applicants and their authorized representatives could consult with the State and Tribal Historic Preservation Officers to initiate the review process established under 36 CFR Part 800. On March 24, 2010, Wes Engineering, on behalf of the CVW, submitted a cultural/historic resources consultation letter to IHPA for the proposed project in accordance with established submittal guidelines (http://www.illinoishistory.gov/PS/rcdocument.htm). On March 29, 2010, IHPA provided a written response to CVW, indicating its cultural resources review was complete

and concluding that, "…no historic properties are affected. We, therefore, have no objection to the undertaking proceeding as planned" (Appendix C).

IHPA evaluated the proposed project in accordance with the standards for determining adverse effects in 36 CFR Part 800, using an aboveground APE of a 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 mile is small and diminishes rapidly as one travels farther 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. The Agency 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 or potentially eligible for listing in the NRHP.

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 is no Tribal Historic Preservation Officer for the State of Illinois, according to the National Association of Tribal Historic Preservation Officers website (http://www.nathpo.org). However, DOE provided the NOA to nine tribal representatives that are regularly notified of Federal and State actions in Cook County, Illinois.

3.2.2.4.2 Aboveground and Archaeological APEs

The archaeological APE for the proposed project is defined as the 60-acre proposed construction site and the existing right-of-way of Cottage Grove Avenue for the transmission line. DOE concurs with IHPA's determination of an aboveground APE for the project as a 1-mile radius around the proposed wind turbine location.

The APE determined for archaeological resources focuses on the zone of direct ground disturbance associated with the construction of the wind turbine. Although the installation of the wind turbine would be limited to less than half an acre, which includes the foundation of the wind turbine and clearing around the foundation, the construction site is considered to potentially include the entire 60-acre area and the existing right-of-way for the transmission line. The archaeological APE, therefore, is considered to be the 60-acre construction site and the existing right-of-way for the transmission line. However, since all 60 acres were previously disturbed as part of the landfill, and the location of the transmission line is part of the existing right-of-way of Cottage Grove Avenue, no further archaeological analysis was performed.

The likelihood of a clear, unobstructed vista of the wind turbine beyond 1 mile is small and diminishes rapidly as one travels farther away from the site. The varied topography, which

includes a power line corridor, structures consistent with a dense, urban industrial area including tall towers, and tree canopy found throughout the vicinity, create frequent visual obstacles that block expansive views in the area. A 1-mile APE is justified for determining the effects, including visual effects, of the proposed wind turbine, as it represents a reasonable effort to assess visual effects of the project based on available technology and the existing physical character of the area.

3.2.2.4.3 Identification of Historic Aboveground Properties in APE

DOE performed a search of the NRHP to identify historic places near the project site. Neither the IHPA's Inventory of Historic Places nor the NRHP lists any State or Federal historic resources within the APE.

DOE also performed a search of the State of Illinois' Historic Architectural and Archaeological Resources Geographical Information Systems (HAARGIS). No known NRHP-eligible sites were identified in the 1-mile APE of the proposed wind turbine or the proposed electrical distribution line (IHPA 2010).

In addition, there are no known sites within the APE listed on the National Park Service's National Registry of Natural Landmarks (NPS 2010). Two natural landmarks are located in Cook County: Busse Forest Nature Preserve and Markham Prairie. These landmarks are approximately 40 and 9 miles, respectively, from the proposed turbine location.

Direct and Indirect Impacts

Since the project would be constructed on a capped landfill, potential belowground archaeological resources are not expected to be impacted. IHPA determined that no historic properties are present in the aboveground 1-mile-radius APE (see Appendix C-6). Since the likelihood of a clear, unobstructed vista of the wind turbine beyond 1 mile is small and diminishes rapidly as one travels farther away from the site, any visual impacts to historic properties outside of the APE would be negligible. Noise emitting from the wind turbine at a distance beyond the 1-mile radius APE would be below the ambient noise level. Any noise impacts to historic properties outside of the APE also would be negligible. DOE, therefore, finds that the construction and installation of the proposed CVW turbine would not adversely affect the cultural resources in the area. If archaeological resources were encountered during construction, construction activities would cease immediately, and IHPA would be contacted for further instruction regarding additional studies and/or potential avoidance, minimization, or mitigation measures required in accordance with the *National Historic Preservation Act*.

3.2.2.5 Geology and Soils

Soils existing within the project site and along the proposed distribution line include Milford silty clay loam, Ashkum silty clay, Bryce silt clay, Frankfort silt loam, Markham silt loam, Orthents, and Sawmill silty clay loam (see Figure 9 in Appendix A for the soil survey map). Milford, Ashkum, Bryce, and Sawmill are indicated as hydric soils in the soil survey (NRCS 2009).

The project location is a former demolition landfill and, as such, has been completely disturbed. The landfill was properly capped with clay and top soil, and stands at an elevation of 70 feet. The landfill was well compacted and is suitable for installation of the foundation for the wind turbine.

No modern active fault zones are known to be in northern Illinois. According to the U.S. Geological Survey's National Seismic Hazard Map (http://earthquake.usgs.gov/hazards/products/conterminous/2008/maps/us/PGA.usa.jpg), the proposed project location is between 6 and 8 percent of peak acceleration, which is considered to be a low potential for an earthquake hazard.

Direct and Indirect Impacts

Site preparation and project construction would result in soil disturbance. However, the project contractor would commit to using sediment and erosion pollution control BMPs in conformance with the SWPPP that would be prepared specific to this project. These BMPs would include containing excavated material, using silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas. Onsite construction personnel would inspect the erosion and sediment control structures and measures weekly and after significant precipitation events.

The proposed project would not impact prime farmland since the project would be located on previously disturbed land and is currently a grass field.

3.2.2.6 Water Resources

DOE obtained the hydrogeological setting of the project site from the *Ground Water Atlas of the United States: Segment 10* (Lloyd and Lyke 1995) and also from water well records obtained from the Illinois State Geological Survey. A gravel layer exists above the bedrock, which is at a depth between 25 to 60 feet below ground surface. The gravel is overlain by clay material near the surface and bears ground water, which helps recharge the underlying bedrock aquifer. The topmost layers of the bedrock consist of dolomite and limestone, which compose the Silurian-Devonian aquifer.

Searches of the Illinois Water Well Database (http://www.isgs.illinois.edu/maps-data-pub/wwdb/wwdb.shtml) suggest that all wells in the vicinity of the project site were installed to draw freshwater from the bedrock Silurian-Devonian aquifer and not from the shallow surficial gravel aquifer. These wells are all private wells. No public drinking water supply wells are located near the project site. All municipalities in the area use Lake Michigan as a water supply.

Two existing storm water detention ponds are located within the project area. The combined single outlet of these ponds is near the southeastern corner of the demolition landfill. Deer Creek and its tributary are generally located to the east and southeast of the landfill. The proposed distribution line would cross an unnamed tributary to Deer Creek at the south access road and would also cross Deer Creek at Cottage Grove Avenue. Regulatory floodplain exists along Deer Creek (see Figure 11 in Appendix A for the Flood Insurance Rate Map).

Pursuant to 10 CFR Part 1022, DOE reviewed the USFWS National Wetlands Inventory (NWI) maps and Federal Emergency Management Agency floodplain maps. DOE identified no floodplains, wetlands, or surface water sources such as streams or drainage channels located

within the 60-acre APE that could be affected by the construction and operation of the wind turbine. Wetlands areas are present; however, they occur along the proposed alignment of the distribution line (see Figure 10 in Appendix A). The NWI identifies freshwater forested/shrub wetlands on the north side of the southern access road and on the east side of Cottage Grove Avenue. An area of freshwater emergent wetlands is also identified by NWI at approximately 500 feet north of the intersection of Cottage Grove Avenue and Sauk Trail. These wetlands areas are associated with Deer Creek and its unnamed tributary.

The USACE regulates all discharges of fill and/or dredged material into jurisdictional wetlands and "waters of the United States" under Section 404 of the *Clean Water Act*. This authority has been delegated to the USACE by the EPA, the lead *Clean Water Act* enforcement agency. Consultation with the USACE Chicago District Regulatory Branch (see Appendix C-3) established that any discharge of fill within waters of the United States is unlikely since CVW would use horizontal directional drilling methods to install the distribution line at the crossings of Deer Creek and its tributary.

CVW also consulted the IDNR Office of Water Resources regarding the proposed project since it has jurisdiction over any construction activities within a regulatory floodway (see Appendix C-4). In Illinois, any utility crossings of a designated floodway can be automatically authorized by the Regional Permit No. 3, provided all the terms and conditions are met. Based on CVW's consultation with the Office of Water Resources, the project is automatically qualified for the Regional Permit No. 3 since the distribution line would be installed by a horizontal directional drilling method.

Direct and Indirect Impacts

The proposed project would not adversely affect any groundwater or surface water resources. CVW would use a horizontal directional drilling method to install the distribution line at the crossings of Deer Creek and its tributary to avoid impacts to floodplains and wetlands associated the streams. Since horizontal directional drilling basically bores a hole into the ground rather than excavating a trench, there would be minimal impacts to the surrounding area. No runoff or discharges from the proposed project construction area would directly enter Deer Creek or its tributary. A SWPPP would be prepared such that erosion and sediment control BMPs would be implemented during the construction of the project. Onsite construction personnel would inspect the erosion and sediment control structures and measures weekly and after significant precipitation events.

3.2.2.7 Biological Resources

3.2.2.7.1 Migratory Birds

The *Migratory Bird Treaty Act* (16 U.S.C. 703-7012; MBTA) implements four treaties 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 USFWS. While MBTA has no provision for allowing unauthorized take, the USFWS recognizes that some migratory birds might be taken during activities such as wind turbine operation even if all reasonable measures to avoid take have been

implemented. The USFWS works with individuals and industries to eliminate impacts to migratory birds.

Migratory birds, including raptors, neotropical migratory songbirds, waterfowl, and shorebirds, have been observed using the western shoreline of Lake Michigan (approximately 15 miles from the proposed site) for their spring and fall migration routes according to information available on USFWS websites (see Figures 14 and 15). Raptor species include Merlin (*Falco columbarius*), Northern Harrier (*Circus cyaneus*), Peregrine falcon (*Falco peregrinus*), Short-eared Owl (*Asio flammeus*), osprey (*Pandion haliaetus*), Sharp-shinned Hawk (*Accipiter striatus*), Red-shouldered Hawk (*Buteo lineatus*), Broad-winged Hawk (*Buteo platypterus*), Red-tailed Hawk, (*Buteo jamaicensis*) and American Kestrel (*Falco sparverius*). None of these raptor species is currently listed as Federally threatened or endangered. However, the Short-eared Owl and the Peregrine falcon are State-listed as endangered and the Red-shouldered Hawk and bald eagle are listed as threatened.

3.2.2.7.2 Bald and Golden Eagles

Bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*) are included under the MBTA, but are afforded additional legal protection under the *Bald and Golden Eagle Protection Act* (16 U.S.C. 668-668d). According to IDNR's Ecological Compliance Assessment Tool (EcoCAT), the nearest bald eagle nest is over 12 miles away from the site. Bald eagle habitat generally consists of large, tall trees (e.g., deciduous and evergreen trees), near rivers, streams, lakes, or reservoirs (INHS 2009). The potential for golden eagles to occur on the project site is limited because their habitat consists of mountainous regions, rocky cliffs, and tall trees (INHS 2009). Further, golden eagles are not known to nest in Illinois. However, they are known to overwinter in Illinois, though not in Cook County (Illinois Natural History Survey 2005a). Due to the lack of highly suitable habitat, it is unlikely that bald and golden eagles would be present in the project area. Direct and Indirect Impacts

Migratory Birds and Bald and Golden Eagles

CVW has and would continue to give consideration to the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (USFWS 2003). CVW has committed to incorporating all applicable recommendations 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. CVW has also reviewed and incorporated several of the BMPs from the USFWS *Wind Turbine Guidelines Advisory Committee's Site Development and Construction Best Management Practices* (USFWS 2010). The following is a brief description of facts demonstrating that CVW 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 area around the turbine is mainly industrial and does not provide significant bird habitat or fragment any such habitat. Although the proposed project would require temporary access and staging of approximately 3 acres, this area is predominantly landscaped and maintained grass and construction BMPs would be implemented as part of the proposed project. All but the 0.5-acre footprint of the wind turbine would be revegetated and continue to be maintained as landscaped

grass. CVW would use the minimum aviation lighting required by FAA in order to minimize potential bird and bat impacts.

CVW and DOE consulted with both the USFWS and IDNR prior to completion of this EA. Based on the feedback received from the IDNR (Appendix D) and the research conducted on the proposed turbine design, height, and location, DOE has determined that the risk of collisions by migratory birds, including bald and golden eagles is low. Due to the lack of highly suitable habitat, it is unlikely that bald and golden eagles would be present in the project area. While the site is approximately 15 miles from Lake Michigan, the proposed turbine location does not occur in a migratory pathway and is not within any areas designated as an IBA (the nearest IBA is 10 miles to the west of the site). 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. While the potential exists for migratory birds to travel inland from the Lake Michigan migratory pathway, the expected impact to migratory birds is low because the mitigation measures described in Section 2.5.1 would be taken. In fact, the potential for project impacts to nonmigrating birds is greater for grassland bird species than for forest bird or waterfowl species, given the land cover composition within the project area. Avian habitat within the project area is of limited quality, given the predominance of disturbed habitat, cultivated crops, and proximity to human development. Therefore, the footprint of the proposed project would not be likely to cause serious disturbance to networks of high-quality avian habitat in the region, thus a habitat restoration plan is not warranted.

Only one mortality study has been performed in Illinois. Data from the 33-turbine Crescent Ridge Wind Power project in Bureau County showed on average one bird and three bats killed per turbine per year (Kerlinger et al. 2007). Recent studies for two wind facilities in Wisconsin—Blue Sky Green Field and Cedar Ridge, consisting of 88 and 41 turbines, respectively—estimated annual bird fatality per turbine for those two wind projects were 12 for Blue Sky Green Field and 11 for Cedar Ridge (for small and medium birds). The studies performed at the Wisconsin sites did not differentiate between migratory and nonmigratory birds.

Overall, impacts to migratory birds, including bald and golden eagles, are expected to be minimal. However, the applicant has agreed to conduct voluntary post construction migratory bird monitoring for one year during spring and fall migration periods, with an optional second season depending on the first year results. This monitoring would be consistent with USFWS migratory bird monitoring protocols.

3.2.2.7.3 Bat

Two recent bat surveys were performed in Cook County. A site at Black Partridge Creek in southern Cook County was netted for two nights during July 2005 (Hofmann and Amundsen 2005). Species caught at this site were the big brown bat (*Eptesicus fuscus*) and northern bat (*Myotis septentrionalis*). A second study conducted mist netting at 13 sites in Cook County. Species caught at this site in 2006 and 2007 were the big brown bat, Northern bat (*Myotis septentrionalis*), Eastern red bat (*Lasiurus borealis*), Hoary bat (*Lasiurus cinereus*), and Eastern pipistrelle (*Pipistrellus subflavus)* from 2006 to 2007 (Hofmann et al. 2008).

Based on the surveys above and a review of national and state range maps (BCI 2010; Illinois Natural History Survey 2005b), a total of seven bat species have geographic distributions that could include the project area:

- Little brown bat (*Myotis lucifugus*)
- Big brown bat (*Eptesicus fuscus*)
- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)
- Evening bat (*Nycticeius humeralis)*
- Eastern pipistrelle (*Pipistrellus subflavus)*
- Northern bat (*Myotis septentrionalis*)

All of these species use woodland habitat for feeding or roosting at some time during the year (BCI 2010). Many of these species also forage along stream corridors or over water, neither of which are present at the project site. Approximately 800 feet to the east of the site is an undeveloped parcel of land that contains patchy clusters of trees. There is an agricultural field approximately 1,400 feet to the southeast of the site. However, due to the industrial nature of the properties surrounding the project location and adjacent parcel, DOE does not consider the trees and agricultural fields suitable roosting or foraging habitat for bat species.

White-Nose Syndrome (WNS), a disease affecting hibernating bats, has been impacting regional bat populations. Named for the white fungus that appears on the muzzle and other body parts of hibernating bats, WNS has caused the death of more than 1 million bats in eastern North America since it was first identified in 2007. Bats with WNS exhibit uncharacteristic behavior during cold winter months, including flying outside in the day and clustering near the entrance of hibernacula. More than half of the 45 bat species living in the United States rely on hibernation for winter survival. Little brown, big brown, small-footed, and Indiana bats are among the species found in Illinois that have been impacted by WNS. However, WNS has not yet been documented as present in Illinois (USFWS 2010a).

Direct and Indirect Impacts

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 2010; BHE 2010; Gruver 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). These high proportions of little brown bats are unlike those found at Crescent Ridge, Illinois (Kerlinger et al. 2007) and Buffalo Ridge, Minnesota (Osborn et al. 1999) 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.

3.2.2.7.4 Threatened, Endangered, and Special Concern Species

DOE used the USFWS Midwest Region Section 7(a)(2) Technical Assistance website to obtain a list of Federally threatened, endangered, and proposed species that occur in Cook County, Illinois. The species listed in Cook County are as follows: Eastern prairie fringed orchid, Leafy-prairie clover, Mead's milkweed, Prairie bush clover, Hine's emerald dragonfly, Eastern Massasauga, and the Piping Plover.

The project area was formerly a demolition landfill that had been properly closed with installation of a soil cap and seeded with vegetation. The distribution line, which would use existing right-of-ways, would run eastward along the southern access road, head southward along Cottage Grove Avenue, and connect to the school at the southeastern corner of the Sauk Trail intersection. The line would be constructed by open trenching except when crossing existing wetlands and streams, where the line would be directionally drilled to minimize potential impacts to water resources. The vegetative community within the project site and along the route of the transmission line is highly degraded and dominated by grasses and upland Eurasian invasive species. The proposed project area does not include any undisturbed habitats that might be suitable for the Eastern prairie fringed orchid, Leafy-prairie clover, Mead's milkweed, or Prairie bush clover.

One notable natural area near the project site is the Wolf Lake/Lake Calumet wetland complexes, located approximately 13 miles north of the project site (see Figure 13 in Appendix A for location of the natural areas.) According to IDNR (see Appendix C-2), these wetlands complexes provide habitat to 13 species of Illinois-listed endangered breeding migratory birds, including the yellow-headed blackbird (*Xanthocephalus xanthocephalus*), Black-crowned Night Heron (*Nycticorax nycticorax*), Black Tern (*Chlidonias niger*), Yellow-crowned Night Heron (*Nyctanassa violacea*), Snowy Egret (*Egretta thula*), Wilson’s Phalarope (*Phalaropus tricolor*), Upland Sandpiper (*Bartramia longicauda*), Common Moorhen (*Gallinula chloropus*), King Rail (*Rallus elegans*), Least Bittern (*Ixobrychus exilis*), Peregrine Falcon (*Falco peregrinus*), Little Blue Heron (*Egretta caerulea*), and Piping Plover (*Charadrius melodus*). The Piping Plover is also Federally listed as endangered.

Another notable natural area, approximately 10 miles from the site, is Bartel Grassland, a 585-acre prairie restoration project, which is sustained through a partnership among the Forest Preserve District of Cook County, Audubon-Chicago Region, the USACE, Thorn Creek Audubon Society, and the Bartel Grassland Volunteers. In 2003, Bartel Grassland was designated a Land and Water Reserve and accepted for protection by the Illinois Nature Preserves Commission. Additionally, Bartel has been recognized as an Audubon Important Bird Area (IBA). The open land at Bartel provides breeding habitat for several bird species, including the Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Grasshopper Sparrow (*Ammodramus savannarum*), Dickcissel (*Spiza americana*), and Henslow’s Sparrow (*Ammodramus henslowii*). Some of these birds return each spring to Bartel from as far away as South America to nest and raise their young.

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 searched its Illinois Natural Heritage Database (INHD) for known occurrences of State-threatened or endangered species within Cook County. Consultation with IDNR has shown that the INHD contains no records of State-listed species occurring in the project area or surrounding vicinity. The INHD also does not contain any 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. IDNR has, therefore, concluded that adverse effects to State-listed species resulting from the proposed project are unlikely (see Attachment C-2).

DOE and CVW requested information from USFWS concerning rare, threatened, and endangered species in the project area (see Appendix C-5). The USFWS provided comments on the draft EA, which DOE has incorporated into this final EA. While the project area lies within the range of the Piping Plover (*Charadrius melodus*), a Federally listed endangered species, the project area does not contain suitable habitat for this species. The Piping Plover inhabits sandy beaches, lakeshores, and dunes. This preferred habitat (i.e., shorelines of the Great Lakes) does not occur within or immediately adjacent to the project area, which is approximately 15 miles from the Lake Michigan shoreline.

Direct and Indirect Impacts

The proposed project area does not include any undisturbed habitats that would be potentially suitable for the Eastern prairie fringed orchid, Leafy-prairie clover, Mead's milkweed, and Prairie bush clover. A search of the IDNR EcoCAT database did not indicate any records of this species in the vicinity of the proposed project. No habitat for the Hine's emerald dragonfly, Eastern Massasauga, and the Piping Plover is present within the 60-acre project area.

The nearest critical habitat for the Hine’s emerald dragonfly is approximately 20 miles to the north-northwest of the Des Plaines River. Based on the lack of known occurrence of this species or suitable habitat at or near the proposed project site, this project would not affect this species.

The Eastern Massasauga is typically found near sedge meadows, peatlands, wet prairies, open woodlands, and shrublands, none of which exist within the project area. Since the project would only take place on previously disturbed land, construction would not affect this species.

Plover nesting or feeding habitat, primarily coastal sand and gravel beaches, is not found at the project site. The nearest shoreline is approximately 15 miles away on the coast of Lake Michigan. Based on the lack of known occurrence of this species or suitable habitats at or near the proposed project site, the likelihood that this project would affect individuals of this species or suitable habitats is discountable.

Furthermore, IDNR evaluated the information from EcoCAT and concluded that any adverse effects of the project to the natural resources in the vicinity of the project site are unlikely (see Appendix C-2). In its 2007 report, IDNR stated that habitat displacement and fragmentation are of potentially greater significance to a wide array of wildlife other than avian species. Since this project site is a landfill where the area had previously been disturbed, the project would not likely cause further habitat displacement and fragmentation.

DOE sent a letter to USFWS on September 3, 2010, requesting consultation about the occurrence of threatened and endangered species in the project area. Based on subsequent conversations with the USFWS, DOE sent a revised letter on September 23, 2010, with its conclusion that the proposed project would have "no effect" on any of the Federally listed species (see Appendix C). Section 7 of the Endangered Species Act only requires consultation for Federal activities that "may affect" listed resources. Because DOE has determined that the proposed project would have "no effect" on the Piping Plover, Leafy-prairie clover, Eastern prairie fringed orchid, Mead's milkweed, Prairie bush clover, or Hine's emerald dragonfly, Section 7 does not apply and USFWS concurrence is not required. Therefore, DOE does not expect to receive a response to its September 23rd letter. However, the USFWS did provide comments on the draft EA and those comments have been incorporated into this final EA.

3.2.2.8 Human Health and Safety

Project facilities have the potential for members of the pubic to attempt to climb towers, open electrical panels, or encounter other hazards. A fence currently exists around the landfill property and would prohibit members of the general public from accessing the wind project area. Safety signage would be posted around all towers (where necessary), transformers and other high-voltage facilities, and along roads in conformance with applicable Federal and State regulations.

The project area is not located in the vicinity of a local or regional airport or a military air base. The proposed wind turbine would have aircraft warning lights installed in accordance with FAA requirements. The FAA has issued a Determination of No Hazard to Air Navigation for the proposed wind project (see Appendix C-1).

All contractors, subcontractors and their personnel are required to comply with all State and Federal worker safety requirements, specifically all of the applicable requirements of the Occupational Safety Health Administration. Traffic accidents and interference are not likely due to the sparse population in the general area.

Two major accident scenarios associated with turbines are the collapse of a turbine and breakage of one or more turbine blades. The potential for the proposed turbines to fall over or collapse causing damage, injury, or death are remote. Foundations are designed to prevent turbines from falling over, but 5 of the 13,000 GE turbines operating globally have collapsed since 2002 (Bogdan 2009). For example, in March and October 2009, 1.5 MW GE turbines collapsed in Altona and Fenner, New York, respectively. Similarly, blades have broken off wind turbines, but such events are rare. In either case, the impacts would depend on the direction of the falling turbine or dislodged blade and who or what was in the path. While no local ordinance exists to define the size of the fall zone, BMPs define the fall zone as the circular area (centered at the proposed wind turbine location) with a radius equal to the height of the wind turbine (i.e., 328 feet). The fall zone would be entirely contained within the CVW property with little potential for damage. Since the nearest residential receptor and nonresidential receptor are over 1,000 and 600 feet, respectively, from the base of the turbine, no impact is expected.

Another potential source of accidents is ice shedding (also known as ice throw). Ice shedding 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 turbine would 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. This was a factor when choosing a site for the turbine. The proposed location provides an adequate clear zone underneath the turbine. However, ice shedding does occur and remains a potential safety concern.

The potential for fire or explosion from the wind energy facility is minimal. The electrical effects of the proposed distribution line can be characterized as current-induced magnetic fields and voltage-induced electrical fields. There are no Federal standards governing electric or magnetic fields. Local aircraft or radar or television signals within the area can be impacted by electric or magnetic fields produced by electrical equipment and distribution lines.

Because no fuel is used in wind energy projects, 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 the wind turbine; for the Vensys 77 turbine, there is only grease inside the bearings and no oil or hydraulic fluids are required. Any lubricants used in the turbine would be managed in accordance with Federal and State regulations.

Direct and Indirect Impacts

For this analysis the fall-zone radius was determined by using the total height of the turbine (328 feet). In cases of wind turbine collapse, the turbine tends to buckle and fall somewhere within the fall zone. The project location was selected so that in the unlikely event of turbine tower collapse, lightning strike, or ice throw, no structures, public, or roads would be impacted.

Some lubricants are used in wind turbines, including gearbox oil, hydraulic fluid, and gear grease, that require periodic replacement. These lubricants would be collected, handled, and disposed of in accordance with all applicable local, State, and Federal regulations.

No adverse public safety or security impacts are anticipated to occur from the project. Safety signage would be posted around the tower (where necessary), and transformers and other high-voltage facilities would be in conformance with applicable Federal and State regulations. CVW would education its employees about security procedures to follow when in the vicinity of the turbine.

3.2.2.9 Transportation

The project site is accessible at Cottage Grove Avenue (see Figure 1 in Appendix A). Access to the Interstate transportation system is via Sauk Trail and Illinois State Highway 394, just southeast of the proposed site. No new access or other roads are necessary for construction and operation of the wind turbine at the proposed location.

Construction equipment would travel to the project site via Cottage Grove Avenue. There is an existing access road (leading to the top of the demolition landfill) that connects Cottage Grove Avenue to the proposed construction site.

Direct and Indirect Impacts

During the construction phase of the project, DOE expects a temporary increase in vehicular traffic on the local roads surrounding the project site. This modest traffic increase would occur for a period of approximately 4 months. No long-term or permanent impacts to the local transportation systems would occur as a result of this project.

Large pieces of equipment, such as the turbine tower, rotor blade, and the housing for all of the power-generating components, referred to as the nacelle, would be designated oversized loads and would temporarily slow traffic on Illinois State Highway 394 freeway, Sauk Trail, and Cottage Grove Avenue. However, the impacts would be temporary.

3.2.2.10 Socioeconomics and Environmental Justice

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 composition of the city of Chicago Heights in 2000 was 45.02 percent white with the remainder being minorities, compared with 56.27 percent for Cook County. The median household income in 1999 dollars for a household in the city of Chicago Heights in 2000 was $36,958, compared with $45,922 for Cook County as a whole. About 13.7 percent of families and 17.5 percent of individuals were below the poverty level in 2000. This contrasts to comparable figures of 10.6 percent and 13.5 percent, respectively, for Cook County as a whole (Bureau of the Census 2010).

Direct and Indirect Impacts

The proposed wind project would be located within an industrial/manufacturing area and over 1,000 feet from the nearest residential building to the east. DOE has not identified potential high and adverse impacts to human health or environmental effects in this EA. Therefore, there would be no disproportionately high and adverse human health or environmental effects on minority or low-income populations.

3.2.2.11 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. 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 ($PM_{2.5}$). Cook County is in attainment for all of the criteria pollutants listed above except ozone and $PM_{2.5}$. According to the publicly available, community pollution information website (Scorecard 2010), the 8-hour average ozone concentration was exceeded nine times and the annual arithmetic mean $PM_{2.5}$ concentration was exceeded eight times in 2003.

Direct and Indirect Impacts

The proposed project would be emissions-free and 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 watering dry roads), this project would not adversely impact air quality. The project would not require any air permits.

As explained further in Section 4.2, carbon dioxide is a GHG that contributes to climate change, which in turn harms many physical and biological systems. The proposed project would reduce the Bloom Township High School District's carbon footprint by reducing reliance on fossil fuels.

For the 12-month period ending March 31, 2010, ComEd provided 39 percent of the overall supply of electricity from fossil fuel sources (coal and natural gas), 58 percent from nuclear power, and the remaining 3 percent from renewable sources (ComEd 2010). The project's carbon reduction is calculated as follows:

> 39% coal × 2.0562 pounds of carbon dioxide per kilowatt-hour × 3,143,000 kilowatt-hours = 2,520,428.74 pounds of carbon dioxide per year, or 1260.2 short ton of carbon dioxide per year, or 1143.2 metric tons per year

Thus, under the proposed project, the wind turbine would reduce the School District's carbon footprint and tend to marginally slow climate change. Under the No-Action Alternative, the School District would not reduce its carbon footprint and the status quo would prevail.

3.2.2.12 Utilities and Energy Impacts

The proposed project would have a nameplate capacity of 1.5 MW and generate approximately 3,143 MW-hours of renewable energy to the nearby Bloom Trail High School. Currently, the Bloom Trail High School District purchases all its electricity from local utility company ComEd. Installation and operation of the proposed wind project would allow Bloom Trail High School to obtain a majority of its electrical power from a clean, renewable energy resource.

The term electromagnetic field (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields caused by the flow of electricity or current traveling 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). EMF 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 National Telecommunications and Information Administration (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 NTIA's Inter-department 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 from the project. The implementation of this project would reduce the carbon footprint of the Bloom Township High School District and present an invaluable opportunity to educate students in the School District about renewable energy.

Wind turbines are not considered a significant source of EMF exposure since emissions levels around wind farms are low (CMOH 2010). Based on the most current research on EMF, and the distance between any turbine and occupied residences, the turbine would not impact public health and safety due to EMF.

On July 2, 2010, DOE notified the NTIA of the proposed wind turbine project. On August 27, 2010, the NTIA responded that no Federal agencies identified any concerns regarding blockage of the radio frequency transmissions as a result of the proposed project.

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 over the same period and in the same general location as the proposed wind energy project. To determine cumulative impacts from past, existing, and reasonably foreseeable projects, DOE conducted online research and consulted with the City of Chicago Heights to determine current and future development projects in proximity to the project location. No pending or planned projects were identified within the area for possible impacts related to land use or noise. Additionally, no past projects were identified that could have a cumulative impact when combined with the potential impacts of the proposed project.

As the initial step in addressing cumulative impacts to avian species, DOE performed a search to identify all wind turbine projects within a 40-mile radius around the site. There currently is only one other wind project within Cook County, the Big Windy project rated 0.1 MW (Illinois Wind Working Group 2010). The Big Windy project is approximately 30 miles to the north of the CVW project. This project is also the closest wind facility to the proposed site. No other projects are within 40 miles.

In addition, DCEO has selected 10 wind projects to receive funding from DOE under Illinois' SEP grant. These projects are spread throughout the state and none are in Cook County. These projects, when looked at together, would not present cumulative impacts to visual or biological resources. Because of the small scale of each individual project and the sufficient distance between projects, cumulative impacts are not anticipated.

4.2 Summary of Cumulative Impacts

4.2.1 NOISE

Noise from the proposed project would be localized (see Section 3.2.3) and add to the noise levels in the immediate project vicinity. Other noises in the project area are intermittent, such as the noise from passing vehicles on area roads. While the turbines would 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 industrial nature of the area.

4.2.2 VISUAL

The wind turbine would be the dominant vertical feature in the landscape, at a height of 328 feet. Because the proposed site is within an already developed area and other vertical, industrial

features exist, the visual impact is anticipated to be less than if the turbine were located on a flat, rural landscape. Therefore, there would not be a cumulatively ~~significant~~ visual impact from the proposed project.

4.2.3 CLIMATE CHANGE AND GREENHOUSE GAS

While the scientific understanding of climate change continues to evolve, the Intergovernmental Panel on Climate Change *Fourth Assessment Report* states 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* further 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 the Bloom Township High School currently uses, resulting in a net decrease in emissions of carbon dioxide for each year of operation. The proposed project would neither reduce the concentration of GHGs in the atmosphere nor reduce the annual rate of GHG emissions. Rather, it would minimally decrease the rate at which GHG emissions are increasing every year and contribute to efforts ongoing globally to reduce GHG and slow climate change.

4.2.4 BIOLOGICAL RESOURCES

Most of the reasonably foreseeable single wind turbine projects in the state (discussed above) have received a letter from IDNR Office of Realty and Environmental Planning stating that avian and bat species were not at risk as a result of the respective projects. Four of these projects received letters from the USFWS stating that there are no threatened or endangered species or bald eagle concerns. In these letters, USFWS requested that the projects implements the avoidance measures stated in the Interim Guidelines (USFWS 2003). All of these letters were issued by the same office and same individuals at these offices over the same time period. Additionally, these turbines are spread out through the state of Illinois, and the anticipated potential to result in a cumulative impact to avian or bat species is low.

While not yet documented in Illinois (USFWS 2010a), WNS, a disease affecting hibernating bats, has been impacting regional bat populations. WNS has caused the death of more than 1 million bats in eastern North America since it was first identified in 2007. Little brown, big brown, small-footed, and Indiana bats are among the species found in Illinois that have been impacted by WNS. Since the proposed project consists of a single wind turbine, it is anticipated that it will contribute negligibly to bat fatalities in Cook County and the state of Illinois.

Given the proposed project's urban and industrial setting, DOE did not identify any other potential cumulative impacts on the environment that are reasonably foreseeable.

5. IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES

A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource or limit those factors that are renewable only over long periods of time. Examples of nonrenewable resources are minerals, including petroleum. An irretrievable commitment of resources refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations. Examples of irretrievable resources are the loss of a recreational use of an area. While an action might result in the loss of a resource that is irretrievable, the action might be reversible. Irreversible and irretrievable commitments of resources are primarily related to construction activities.

These resource impacts are considered impacts to nonrenewable resources. For the proposed project, most resource commitments are neither irreversible nor irretrievable and are considered short-term and temporary.

Specifically, resources consumed during construction of the project, including labor, fossil fuels, and construction materials, would be committed for the life of the project. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline and diesel-powered construction equipment during construction. Approximately 0.5 acre of land would be irreversibly committed during the functional life of the project.

The expenditure of ARRA funding from DOE would also be irreversible

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 that used 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 was decided at some time in the future that the project had reached its useful life, the turbine, tower, and foundation could be decommissioned and removed, and the site reclaimed and revegetated with indigenous plant species to resemble a habitat similar to the pre-disturbance conditions. The installation 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 less than 0.5 acre of vegetation resulting from the construction of the tower foundation,
- An increase in noise levels during construction and operation,
- Introduction of a dominant vertical feature into the existing landscape,
- Shadow flicker impacts for a limited number of residences; and
- A risk of tower collapse

These impacts would be temporary, in the case of the construction noise, and long-term in regard to the loss of vegetation, visual and shadow flicker impacts, and the risk of tower collapse. Overall, impacts from the proposed project on the environment and human health are minimal, as described in the relevant sections in Chapter 3.

8. REFERENCES

AWEA (American Wind Energy Association) 2010. *Wind Turbines and Health*. Available online at: http://www.awea.org/pubs/factsheets/Wind_Turbines_and_Health.pdf (accessed August 2010).

Arnett, E.B.; Brown, W.K.; Erickson, W.P.; Fiedler, J.K.; Hamilton, B.L.; Henry, T.H.; Jain, A.; Johnson, G.D.; Kerns, J.; Koford, R.R.; Nicholson, C.P.; O'Connell, T.J.; Piorkowski, M.D.; and Tankersley, R.D. Jr. 2008. "Patterns of Bat Fatalities at Wind Energy Facilities in North America." *Journal of Wildlife Management* 72 (1):61-78; 2008.

BCI (Bat Conservation International, Inc.), 2010. Species Profiles. Available online at: http://www.batcon.org/index.php/all-about-bats/species-profiles.html (accessed September 2010).

BHE Environmental 2010. *Post-construction bird and bat mortality study Cedar Ridge wind farm Fond du Lac County, Wisconsin*. Interim Report prepared for Wisconsin Power and Light and submitted to Wisconsin Public Service Commission.

Bureau of the Census 2010. American FactFinder. http://factfinder.census.gov/home/saff/main.html?_lang=en (accessed August 9, 2010).

Colby, W.D.; Dobie, R.; Leventhall, G.; Lipscomb, D.M.; McCunney, R.J.; Seilo, M.T.; and Søndergaard, B. 2009. *Wind Turbine Sound and Health Effects: An Expert Panel Review*. Prepared for: American Wind Energy Association and Canadian Wind Energy Association. http://www.awea.org/newsroom/releases/AWEA_CanWEA_SoundWhitePaper_12-11-09.pdf (accessed August 17, 2010).

ComEd (Commonwealth Edison) 2010. Environmental Disclosure Information: Twelve Months Ending March 31, 2010. https://www.comed.com/Documents/CustomerService_Brochuresandforms/EnvironmentalDisclosureJuly2010.pdf (accessed August 18, 2010).

Drake, D.J.; Garvin, S.; Grodsky, and Watt, M. 2010. *Post-construction bird and bat monitoring at the Forward Energy Center Second Interim Report*. Interim Report prepared for Forward Energy LLC and submitted to the Wisconsin Public Service Commission.

EPA (U.S. Environmental Protection Agency) 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, EPA Publication No. 550/9-74-004, April 2, 1974. Washington, DC: U.S. Government Printing Offices.

EPA (U.S. Environmental Protection Agency) 1977. *Toward a National Strategy for Noise Control*. U.S Environmental Protection Agency, Office of Noise Abatement and Control.

Erickson, W.P.; Johnson, G.D.; Strickland, M.D.; Young, D.P. 2001. *Avian collisions with wind turbines: a summary of existing studies and comparisons to other sources of avian*

collision mortality in the United States. Report to the National Wind Coordinating Committee (Cheyenne, Wyoming: NWCC). Available at http://www.west-inc.com/reports/avian_collisions.pdf (accessed September 20, 2010).

FAA (Federal Aviation Administration) 2007. "Obstruction Marking and Lighting," Advisory Circular, AC 70/7460-1K, Change 2. U.S. Department of Transportation.

GAO (U.S. Government Accountability Office) 2005. *Wind Power Impacts on Wildlife and Government Responsibilities for Regulating Development and Protecting Wildlife*. Available at www.gao.gov/new.items/d05906.pdf (accessed September 20, 2010)

GL Garrad Hassan 2010. "GH WindFarmer." http://www.gl-garradhassan.com/en/software/GHWindFarmer.php (accessed September 2, 1010).

Gruver, J.; Sonnenburg, M.; Bay, K.; and Erickson, W. 2009. *Post-construction bat and bird fatality study at the Blue Sky Green Field Wind Energy Center, Fond du Lac County, Wisconsin*. Final Report submitted to the Wisconsin Public Service Commission by WEST, Inc.

Hofmann, J.E. and Amundsen, S.B. 2005. "Indiana bat survey, Interstate 355 south extension (FAP 340), Interstate 55 to Interstate 80, Cook and Will counties, IL." Memorandum submitted to Illinois State Toll Highway Authority, Downers Grove.

Hofmann, J.E.; Merritt, J.F.; Mengelkoch, J.M.; and Carpenter, S.K. 2008. *A two-year mist netting survey for bats in Cook, DuPage, Kane, Kankakee, Lake, McHenry, and Will counties in northeastern Illinois*. Final Report submitted to Bureau of Design and Environment, Illinois Department of Transportation, Springfield. Illinois Natural History Survey Technical Report.

IDNR (Illinois Department of Natural Resources) 2007. *The Possible Effects of Wind Energy on Illinois Birds and Bats. Springfield, IL*. http://dnr.state.il.us/publications/pdf/00000544.pdf (accessed September 20, 2010).

IHPA (Illinois Historic Preservation Agency) 2010. Historic Architectural/Archaeological Resources Geographic Information System (HAARGIS). http://gis.hpa.state.il.us/hargis/ (accessed August 18, 2010).

Illinois Natural History Survey (INHS) 2005a. "Illinois Gap Analysis Project: Birds." Available online at: http://www.inhs.uiuc.edu/cwe/gap/whr_birds.htm (accessed August 2010).

Illinois Natural History Survey (INHS) 2005b. "Illinois Gap Analysis Project: Mammals." Available online at: http://www.inhs.uiuc.edu/cwe/gap/whr_mammals.htm (accessed August 2010).

INHS (Illinois Natural History Survey) 2009. Illinois Natural Resources Information Network. Available online at: http://www.inhs.illinois.edu/animals_plants/birds/ifwis/birds/ (accessed November, 2010).

Illinois Wind Working Group 2010. *Map of Illinois Wind Projects*. http://renewableenergy.illinoisstate.edu/wind/databases/IL%20Windfarms%2024x32%20121209%20online%20030310.pdf (accessed August 18, 2010).

IPCC (Intergovernmental Panel on Climate Change) 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp. http://www.ipcc.ch/ipccreports/ar4-wg1.htm (accessed August 18, 2010).

Kingsley A. and Whittam B. 2005. *Wind turbines and birds. A background review for environmental assessment*. Document prepared by Bird Studies Canada, for Environment Canada / Canadian Wildlife Service.

Kerlinger, P.; Curry, R.; Hasch, A.; and Guarnaccia, J. 2007. *Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006*. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Lloyd, O.B. and Lyke, W.L. 1995. *Ground Water Atlas of the United States: Segment 10 – Illinois, Indiana, Kentucky, Ohio, Tennessee*. Hydrologic Investigations Atlas 730–K. U.S. Geological Survey. Reston, Virginia.

NPS (National Park Service) 2010. "National Natural Landmarks." http://www.nature.nps.gov/nnl/ (accessed August 18, 2010).

NRCS (Natural Resources Conservation Services) 2009. Web Soil Survey, Release 2.2.6. U.S. Department of Agriculture. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm (accessed August 9, 2010).

CMOH (Ontario Chief Medical Officer of Health) 2010. *The Potential Health Impact of Wind Turbines*. http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf (accessed September 19, 2010).

Pearce, D. 2010. "Bald Eagle Killed by Wind Turbine," *Ontario - Hancock Wildlife Foundation*. http://www.hancockwildlife.org/article.php/20100919095412140 (accessed September 23, 2010).

Scorecard 2010. "Criteria Air Pollutant Report: Cook County, IL." http://scorecard.org/env-releases/cap/county.tcl?fips_county_code=17031#air_rankings (accessed August 9, 2010).

Tetra Tech EC, Inc. 2007. "Exhibit 14 - Wind Turbine Ice Blade Throw." *Ice Shedding/Blade Throw Analysis*. http://www.horizonwindfarms.com/northeast-region/documents/under-dev/arkwright/Exhibit14_IceSheddingandBladeThrowAnalysis.pdf (accessed August 9, 2010).

USFWS (U.S. Fish and Wildlife Service) 2003. "Service Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines." Letter to Regional Directors dated May 13, 2003. Washington, D.C. http://www.fws.gov/habitatconservation/Service%20Interim%20Guidelines.pdf (accessed August 18, 2010).

USFWS (U.S. Fish and Wildlife Service) 2010. Wind Turbine Guidelines Advisory Committee. 2010. Recommendations on developing effective measures to mitigate impacts to the wildlife and their habitats related to land-based wind energy facilities. March 4, 2010.

USFWS (U.S. Fish and Wildlife Service) 2010a. *A National Plan for Managing White-Nose Syndrome in Bats Fact Sheet*. http://www.fws.gov/WhiteNoseSyndrome/pdf/White-noseNatlPlanFSOct2010.pdf

9. AGENCIES AND PERSONS CONSULTED

Organization	Name	Title	Address	City and State	Zip	Phone	Email
Federal Aviation Administration	Thomas Cuddy		Office of Environment and Energy 800 Independence Avenue, SW, Room 900	Washington, DC	20591	202-493-4018	thomas.cuddy@faa.gov
Federal Aviation Administration	Sam Lakhani	Airspace (OE/AAA) Program Management	Central Service Area Engineering Services, Operations Support-Chicago 2300 E Devon Avenue	Des Plaines, IL	60018	847-294-8451	Sam.Lakhani@faa.gov
Illinois Department of Commerce and Economic Opportunity	Alyson Grady	Deputy Director	Illinois Energy Office 500 East Monroe	Springfield, IL	62701-1643		
Illinois Department of Natural Resources	William Boyd	Water Resources Engineer	Office of Water Resources - Division of Resource Management 2050 West Stearns Road	Bartlett, IL	60103	847-608-3100 ext 2025	William.Boyd@Illinois.gov
Illinois Department of Natural Resources	Michael Branham		Office of Realty and Environmental Planning - Division of Ecosystems and Environment One Natural Resources Way	Springfield, IL	62702-1271		
Illinois Historic Preservation Agency	Anne Haaker	Deputy State Historic Preservation Officer	#1 Old State Capitol Plaza	Springfield, IL	62701-1507		
U.S. Army Corps of Engineers	Kate Bliss	Project Manager	111 N. Canal Street Suite 600	Chicago, IL	60606		
U.S. Fish and Wildlife Service	Janice Engle	Chicago Illinois Field Office	1250 South Grove, Suite 103	Barrington, IL	60010		
U.S. Fish and Wildlife Service	Sean Cirton	Chicago Illinois Field Office	1250 South Grove, Suite 103	Barrington, IL	60010		